REMEMBER YOUR HUMANITY

REMEMBER YOUR HUMANITY

International Student/Young Pugwash Yearbook 2005

ISYP Journal on Science and World Affairs, Vol. 1

Arthur Petersen & Juan Pablo Pardo-Guerra, Editors

Het Spinhuis Publishers
2005

The publication of this book was made possible by a generous grant from the Netherlands Ministry of Foreign Affairs

Distribution in the United States, Canada, Latin America and United Kingdom:
Transaction Publishers (US)

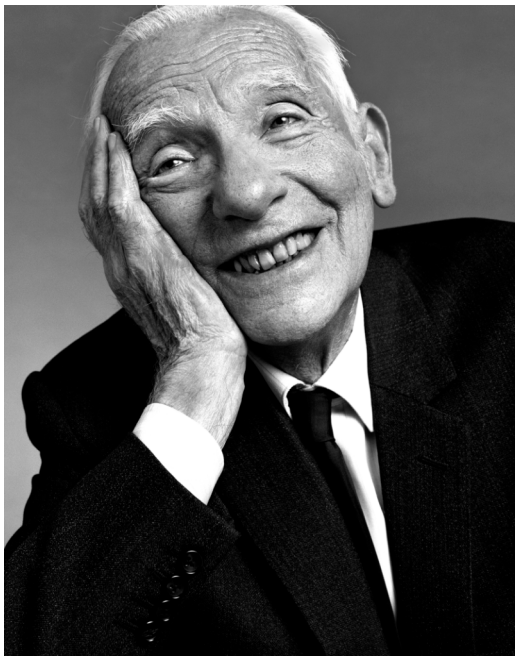
ISBN 90-5589-260-2

Cover photograph:	Joseph Rotblat and Ruth Adams at the first Pugwash Conference in 1957; © Pugwash Archives
Photograph on page v:	Peter Hönnemann, used by courtesy of TheCommunity.com
Coverdesign:	Juan Pablo Pardo-Guerra
Lay-out:	Juan Pablo Pardo-Guerra & Arthur Petersen
Typesetting:	Juan Pablo Pardo-Guerra & Arthur Petersen

Printed and bound in The Netherlands on acid-free paper

Het Spinhuis Publishers
Oudezijds Achterburgwal 185, 1012 DK Amsterdam, The Netherlands
www.spinhuis.nl

To Jo…



ISYP Journal on Science and World Affairs
A biannual publication of International Student/Young Pugwash

About the Managing Editors

Juan Pablo Pardo-Guerra, physicist, has an interest in economics and is a PhD student at the Science Studies Unit, University of Edinburgh and Chair of International Student/Young Pugwash.

Arthur Petersen, physicist, philosopher and atmospheric scientist, directs the methodology and modelling programme at the Netherlands Environmental Assessment Agency and is Treasurer of Pugwash Netherlands.

Contents

ISYP Journal on Science and World Affairs, Vol. 1, No. 1, 2005

Preface

Our global society faces continued threats from nuclear weapons as well as from social, economic and environmental problems that put human security at risk. *We have to learn to think in a new way*, as was written in the Russell-Einstein Manifesto (1955). Guided by this Manifesto, and inspired by the life and work of Sir Joseph Rotblat (1908-2005), International Student/Young Pugwash (ISYP) draws together international students and young professionals concerned with global problems and the socially responsible application of science and technology. Jo Rotblat was a founding member of the Pugwash Conferences on Science and World Affairs and prime supporter of the Student/Young Pugwash community. This book reflects the focus, ideals, and interests of a young generation of Pugwashites and touches upon a broad range of issues including nuclear disarmament and non-proliferation; space weaponisation; regional security; terrorism; biotechnology; environmental security; and the social responsibility of scientists. This collection will serve as a reference for introducing young scientists and professionals to the tradition of the Pugwash movement and to deeper reflection on science and world affairs.

This ISYP Yearbook 2005 *Remember your Humanity* is our tribute to Jo. Besides material on ISYP and Rotblat, the book contains the first volume of the *ISYP Journal on Science and World Affairs*, an e-journal that can be found at www.scienceandworldaffairs.org. The journal and this book are the product of a project run jointly by ISYP and Pugwash Netherlands.

Most of the articles contained in the main body of this book were presented by their authors during the conferences organised by ISYP in 2003 and 2004. Support from members of the Pugwash Conferences on Science and World Affairs, in particular Jeffrey Boutwell, Sally Milne, the members of the Editorial and Advisory Boards, the additional reviewers and the Board members of Pugwash Netherlands, was invaluable for the completion of this book. We gratefully acknowledge the Netherlands Ministry of Foreign Affairs for awarding us a generous grant to make this publication possible.

Arthur Petersen & Juan Pablo Pardo-Guerra

A brief history of International Student/Young Pugwash

Rian Leith

345 Vista Drive, Faerie Glen 0043, South Africa;
rianleith@lantic.net

Tracing back its origins to when national Student/Young Pugwash groups first began to form in the United States of America and Canada in the late 1970s, International Student/Young Pugwash (ISYP) has since evolved into a global network of young people involved in issues associated to the use of science and technology. Inspired by the Pugwash Conferences on Science and World Affairs, ISYP, with its own goals and agenda, is centered on the interplay that lies at the crossroad of science, technology, and world affairs. ISYP not only helps to introduce the younger generation to the principles and objectives of the Pugwash Conferences, but also provides a plural forum for students and young professionals to critically examine and explore the motivations for scientific advancements and the corollaries of technology on the everyday lives of people. Within this context, this article aims to provide a brief overview of the historical development of ISYP.

The escalating Cold War between the United States and the Soviet Union in the aftermath of the Second World War dashed initial hopes for the second half of the 20th century. As the shadow of the superpowers' rivalry unfurled, scientists made several efforts to focus world attention on the critical necessity for new approaches to international security in the nuclear age. According to one observer, 'scientists feared that national leaders and the public little understood the implications of the new and devastating hydrogen bombs' [1].

One of these efforts took place on 9 July 1955, when the British philosopher Bertrand Russell issued a statement to a gathering of international reporters in London. The statement, written by Russell and ultimately signed by 11 eminent scientists (including Albert Einstein, Max Born, Percy Bridgman, Leopold Infeld, Frederic Joliot-Curie, Herman Muller, Linus Pauling, Cecil Powell, Joseph Rotblat, and Hideki Yukawa), was a grave warning about the dire consequences of war in the nuclear age and called upon scientists of all political persuasions to assemble to discuss the threat posed to civilisation by the advent of thermonuclear weapons. Later termed the Russell-Einstein Manifesto, the statement directly resulted in a meeting of scientists hosted in 1957 by the American philanthropist Cyrus Eaton in his birthplace, the town of Pugwash, Nova Scotia, Canada.

The meeting in turn gave birth to the Pugwash Conferences on Science and World Affairs, taking as its mission 'to bring scientific insight and reason to bear on threats to human

International Student/Young Pugwash Yearbook 2005 xi-xvi

security arising from science and technology in general, and above all from the catastrophic threat posed to humanity by nuclear and other weapons of mass destruction' [2]. Consequently, in bringing together, from around the world, influential scholars and public figures concerned with reducing the danger of armed conflict and seeking co-operative solutions for global problems, the Pugwash Conferences provides a forum where participants,

> meeting in private as individuals, rather than as representatives of governments or institutions, exchange views and explore alternative approaches to arms control and tension reduction with a combination of candour, continuity, and flexibility that are seldom attained in official East-West and North-South discussions and negotiations. Yet, because of the stature of many of the Pugwash participants in their own countries (as, for example, science and arms-control advisers to governments, key figures in academies of science and universities, and former and future holders of high government office), insights from Pugwash discussions tend to penetrate quickly to the appropriate levels of official policy-making [3]

Since that first meeting, the Pugwash Conferences quickly evolved into a transnational organisation with more than 300 conferences, symposia and workshops that have been held to date. The unique and innovative character of Pugwash has enabled the organisation to have 'a profound effect on the ways individuals and non-governmental actors promote arms control and disarmament' [1] – an important role in recognition of which the 1995 Nobel Peace Prize was jointly awarded to Pugwash and Sir Joseph Rotblat, one of its key figures, 'for their efforts to diminish the part played by nuclear arms in international affairs and, in the longer run, to eliminate such arms'.

However, as has been pointed out, the Pugwash Conferences were not just a forum for senior scientists and decision makers [4]. Within the informal environment of Pugwash meetings, the children and spouses of Pugwashites inevitably attended these events as accompanying persons. Having derived an interest from the discussions that were taking place, many were stimulated to introduce the principles and objectives of the Pugwash Conferences to a younger generation. The first step towards formal student/young participation in the Pugwash Conferences occurred in 1970 when a small group of students were invited to attend the twentieth Pugwash Conference held in the United States [5]. Since then, students were regularly invited to attend the annual conferences.

Although student/young participation in Pugwash events was generally welcomed, persuading Pugwash to allow the formation of formal Student/Young Pugwash groups was a different matter altogether. The reservations of 'senior' Pugwashites in this context mainly revolved around the desirability and feasibility of formal Student/Young Pugwash groups, and, if such groups were indeed allowed to be formed, what the exact nature of the relationship between these groups and Pugwash would be. The then Secretary-General of the Pugwash Conferences, Dr. Martin Kaplan, played an invaluable role in the process that led to the eventual decision to allow the formation of Student/Young Pugwash groups. Consequently, a group was established in 1979 when Jeff Leifer and some of his fellow students at the University of California in San Diego founded International Student Pugwash (renamed Student Pugwash USA, or SPUSA, in the early 1980s). In the same year, a Student Pugwash group was also launched in Canada. Since then, Student/Young Pugwash groups have been formed in over 30

countries around the world, in many cases with the direct involvement of Pugwash members. As time would prove, the successful development of Student/Young Pugwash activities required a symbiotic association with the 'senior' Pugwash community, developing an intergenerational exchange of ideas and projects.

Organising conferences for students and young professionals has been one of the most important activities of Student/Young Pugwash [6]. The first Student/Young Pugwash conference was organised in the Netherlands in 1988, followed by similar conferences in St. Petersburg, Russia (September 1990) and Pugwash, Nova Scotia, Canada (August 1992). In 1997 a Student/Young Pugwash conference was held in Lillehammer, Norway, prior to the annual Pugwash conference and thus initiated a tradition that has continued until today. To date, Student/Young Pugwash conferences have been held prior to the annual Pugwash Conferences in Metepec/Jurica, Mexico (1998), Rustenburg, South Africa (1999), Cambridge, UK (2000), Agra, India (2002), La Jolla, US (2002) Halifax, Nova Scotia, Canada (2003), Seoul, South Korea (2004), and Hiroshima, Japan (2005). In nearly all of these cases, the Student/ Young Pugwash Conferences were organised by the local national Student/Young Pugwash groups with the help and support of the Pugwash Conferences on Science and World Affairs and the national Pugwash group in that country.

In addition, two student Pugwash groups have held meetings which were associated to non-Pugwash events. In 2000 the Swedish Student/Young Pugwash group organised a student conference preceding the International Network of Engineers and Scientists for Global Responsibility (INES) Conference '*Challenges for Science and Engineering in the 21st Century*', while in 2001 the Danish Student/Young Pugwash Group convened a student conference prior to the Gender and Science Aand Technology (GASAT) conference '*World Wise Wisdom – socially responsible and gender inclusive Science and Technology*'. Student Pugwash USA, the Swiss, British and Togolese Student/Young Pugwash groups have also organised self-standing national and international conferences. Student Pugwash USA international conferences, held roughly every two years throughout the 1980s and 1990s, played an important role in fostering international communication prior to the establishment of regular ISYP conferences.

During the Student/Young Pugwash Conference in Rustenburg, South Africa (1999), representatives from various national Student/Young Pugwash groups formally endorsed a proposal to establish an international Student/Young Pugwash organisation to improve, expand and coordinate the activities of national groups. An Advisory Committee was formed to investigate the feasibility of such an organisation, to be named International Student/Young Pugwash. The members of the committee were Paul Guinnessy (UK, chair), Hugo Estrella (Argentina) and Sandra Ionno Butcher (Student Pugwash USA), while Jeffrey Boutwell from the Pugwash Conferences participated in an advisory capacity. Having received financial assistance from the Norwegian Government (through the efforts from the Norwegian Student/Young Pugwash group) and Pugwash, the Committee invited applications for the position of an interim international coordinator for a six-month period from February to July 2000. Following Estrella's resignation from the Committee and subsequent appointment to the position of international coordinator, Tannia Falconer (Mexico) joined the Committee.

At the Student/Young Pugwash Conference in Cambridge in July 2000, it was decided that a formally elected Interim Committee should replace the ad hoc Advisory Committee. During the election subsequently held in September 2000, the following persons were elected: Tom Børsen Hansen (Europe, Denmark, chair), Gina van Schalkwyk (Africa, South Africa),

Hugo Estrella (Latin America, Argentina), Jin Xie (Asia, China), Susan Veres (North America and Australia, US), Carsten Rohr (UK), and Lise Østby (Norway). In addition, Sir Joseph Rotblat, President Emeritus of Pugwash, served on the Committee as non-voting advisory member and liaison with the Pugwash Council. The Committee structured its activities in the process towards the establishment of ISYP around three focal areas, namely

- legal aspects (research and establishment of the legal structure of ISYP; drafting election procedures for the election of a Board; holding elections for the Board; and preparing ISYP nomination procedures for Pugwash Annual Conferences);
- fundraising (conducting fundraising; the writing of proposals in consultation with the national Pugwash and/or Student Pugwash groups where appropriate; and writing a budget for ISYP); and
- setting up an ISYP office (designing office structures; establishing first 6-month work plan; researching the best option for office space, and deciding upon its establishment; researching and writing a job remit for the ISYP Executive Director; maintaining contact, distributing information, and gaining input from national groups).

One of the most important results of the work of the Interim Committee was the formulation of the statutes of ISYP as the framework for the functioning of the organisation and its democratic approval by the national Student/Young Pugwash groups. A legal expert from the Netherlands, Guido den Dekker, assisted the Committee in this task. The proposed statutes formalised ISYP as an umbrella organisation of national Student/Young Pugwash groups, consisting of three organs: the General Assembly, the Board, and the Secretariat. All national groups are members of the General Assembly, which is the highest authority of ISYP. The General Assembly elects a Board of seven voting members plus one non-voting representative from the Pugwash Council. Between the meetings in the General Assembly the Board is responsible for ISYP and its activities. The Board can – when sufficient funding is raised – set up a Secretariat, although this has not materialised to date. Following the democratic approval of ISYP by the national Student/Young Pugwash groups, it then formally came into being in September 2001 with the ISYP Board replacing the Interim Committee. The new Board consisted of Tom Børsen Hansen (Europe, Denmark), Gina van Schalkwyk (Africa, South Africa), Alberto Salazar (Latin America, Mexico), Joe Wemin (Asia, Papua New Guinea), Clayton Nall (North America and Australia, US), Hugo Estrella (Argentina, chair), and Magdalena Kropiwnicka (Italy). During the two-year term of the Board, van Schalkwyk, Salazar and Wemin were replaced by Youssouf Salami (Togo), Juan Pablo Pardo-Guerra (Mexico) and Nagappan Parasuraman (India), respectively. Sir Joseph Rotblat remained as non-voting advisory member and liaison with Pugwash.

Sir Joseph Rotblat's contribution to the formation of ISYP should be highlighted for it was one of the stabilising elements that allowed the organisation to evolve without great discontinuities. Over the years, Sir Joseph became a crucial supporter of the Student/Young Pugwash community, endorsing many of its projects, and actively participation in several activities and projects. To a certain extent, such participation was founded in Sir Joseph's desire to make of Student/Young Pugwash a voice that could reach other young people and communicate the dangers posed by the nuclear peril and other challenges posed by advancing science and technology.

The newly established ISYP embarked on a range of activities under the leadership of the Board. A new website (www.student-pugwash.org) was designed where information can be shared and stored, announcements made, discussions conducted, relevant documents and links published and contact information for national groups provided. In addition, an electronic newsletter, edited by Gina van Schalkwyk, was sent out on a regular basis. The ISYP Board has also been greatly involved in the organisation of the Student/Young Pugwash Conferences (now known as the ISYP Conferences since the Conference held in Halifax, Nova Scotia, Canada in 2003).

Following the elections in October 2003, Pardo-Guerra took over from Estrella as ISYP chair, while Arthur Petersen (The Netherlands), Pablo Suarez (North America and Australia, US), and Moira Goodfellow (Canada) joined the Board, and Børsen-Hansen, Nall, and Wemin left. The new Board continued to expand the activities of ISYP, giving particular attention to the issues of fundraising and organising the Second ISYP Conference in Seoul, South Korea in October 2004. A series of bylaws was also passed to clarify certain aspects regarding the ISYP statutes. After the elections held in 2004, Rian Leith (Africa, South Africa) and Benjamin Rusek (North America and Australia, United States) joined the Board in the place of Salami and Suarez, respectively.

During the 2004/2005 period, ISYP has made great advances in strengthening and expanding the organisation. In *lieu* of the discontinued electronic newsletter, ISYP has created a general e-mail list and has started to publish an academic, peer reviewed biannual journal, entitled the *ISYP Journal on Science and World Affairs*. Edited by Juan Pablo Pardo-Guerra, Arthur Petersen and the other members of the Editorial Board, and supported by an Advisory Board formed by eminent 'senior' Pugwashites, the first two issues of the ISYP Journal were published on the Internet. However, following a generous donation by the Dutch Government, these issues have been reedited and compiled in the form of a yearbook. Further projects have also sought to expand the audience of ISYP and generate an exchange of knowledge between different, often complementing, generations. In particular, since 2003 ISYP organises a symposium prior to the Pugwash Conference in which a panel of important scholars can transmit their points of view to a younger generation. During the ISYP Conference in Seoul in 2004, these regular symposiums were renamed as 'ISYP Sir Joseph Rotblat Symposium on Science and World Affairs' as a modest way to honour Sir Joseph, who at this conference retired from his duty as liaison with the Pugwash Council. His position was taken up by Jeffrey Boutwell.

Furthermore, the activities of ISYP have increased in prominence with time: for instance, the Third ISYP Conference, held in Hiroshima, Japan in July 2005 received wide publicity in the Japanese media. As of October 2005, Irna van der Molen (Europe, The Netherlands), Jessy Cowan-Sharp (Canada) and Wakana Mukai (Japan) have replaced Kropiwnicka, Petersen and Goodfellow, respectively.

ISYP has come a long way since the first Student/Young Pugwash groups were formed more than 26 years ago. In its relatively short history, much has been achieved, but much also remains to be done. As stated in *Mission Possible*, a statement issued by the ISYP during the Third ISYP Conference in Japan, ISYP remains committed to the spirit and ideals of the Russell-Einstein Manifesto in meeting the challenges that lie ahead. Within the context of a rapidly

globalising world, the warning expressed by the Russell-Einstein Manifesto remains as relevant as ever:

> There lies before us, if we choose, continual progress in happiness, knowledge and wisdom. Shall we, instead, choose death, because we cannot forget our quarrels? We appeal as human beings to human beings: Remember your humanity and forget the rest. If you can do so, the way lies open to a new Paradise; if you cannot, there lies before you the risk of universal death.

Engaging a new generation for peace is imperative.

Acknowledgements

The author gratefully acknowledges the assistance of Sandra Ionno Butcher in providing information for, and invaluable support in, the writing of this article.

Notes

1. Sandra Ionno Butcher, The Origins of the Russell-Einstein Manifesto, Pugwash History Series, No 1 (May 2005), p. 5.
2. The Pugwash Conferences on Science and World Affairs, Mission Statement. (http://www.pugwash.org/about/mission.htm).
3. The Pugwash Conferences on Science and World Affairs, About Pugwash. (http://www.pugwash.org/about.htm).
4. Hugo Estrella, A brief history of ISYP, unpublished article (2004).
5. Sandra Ionno Butcher, e-mail correspondence with the author (10 June 2005). Although some students attended Pugwash events as accompanying persons prior to this Conference, as has been noted, this is the first time that student participants were formally listed.
6. The following discussion largely draws upon Tom Børsen-Hansen, International Student/Young Pugwash – the story so far, unpublished article (2002).

Mission possible: engaging a new generation

ISYP vision statement, Hiroshima, Japan, 27 July 2005

International Student/Young Pugwash

Flat A Museum Mansions, 63A Great Russell Street, London
WC1B 3BJ, UK; board@student-pugwash.org

With the invention of nuclear weapons, humanity for the first time obtained the capacity to extinguish itself. Today, our global society faces continued threats from nuclear weapons and nuclear proliferation, as well as social, economic and environmental problems that put human security at risk. New tools need to be developed within an interdisciplinary framework to actively search for and realise sustainable and equitable solutions. *We have to learn to think in a new way.*

The Russell-Einstein Manifesto articulates the dangers of war in the age of the hydrogen bomb and humanity's responsibility to prevent universal death. Guided by the Manifesto, International Student/Young Pugwash draws together international students and young professionals concerned with global problems and the socially responsible application of science and technology. Through exposure to a diversity of disciplines, cultures, and ideologies the members of ISYP form common understandings and collaborative links at an early stage in their careers and keep each other committed to ISYP's ideals.

ISYP has a mutually reinforcing relationship with the Pugwash Conferences on Science and World Affairs that enables the two organisations to focus in parallel on both the root causes and the symptoms of global insecurity. Through the intellectual proximity of these efforts, the Pugwash movement can foster truly creative approaches to world affairs.

The result of this relationship is an unprecedented opportunity for young people to concentrate on long-term, sustainable and equitable solutions. In order to pursue this goal, ISYP's focus is on educating students and young professionals; promoting dialogue and collaboration between young scientists, policy makers, and international institutions; and preparing members to reach crucial positions within the international policy community.

In this way, ISYP is committed to transfer the spirit of Pugwash to future generations. To engage a new generation, ISYP remains, and will continue to remain, infused by the indelible spirit echoed by the Russell-Einstein Manifesto: *Remember your humanity, and forget the rest.*

An open letter to my son on the death of Joseph Rotblat

Sandra Ionno Butcher

2162 Evans Court, #204, Falls Church, VA 22043, US;
sibutcher@earthlink.net

September 2, 2005

Dear Joey,

Today the world papers herald the life and legacy of the man for whom you were named: Professor Sir Joseph Rotblat. You know him as 'Prof'. Although at the age of three you do not yet know – and would not understand what this means – he died two nights ago in a London hospital, after 96 amazing years of life. Pictures of you and a painting you made for him were hanging in his room – quite possibly among the last of this Earth's beauty he was to see. Only a day or so before he died, his friend and assistant, Sally, gave him an update on your antics and activities and the impending arrival of your baby brother. While people around the world mourn his passing, I have been trying to decide how to show my deep appreciation of all that he gave to our world. I think the best way I can do that is to tell you in great detail why we chose to give you his name.

Prof considered it 'a great event in one's life to have a new human being named after one' and he was deeply moved to know that you would walk forward in this world, long after he had to leave it, bearing his name. But what, exactly, does that name stand for?

In my opinion, it stands for brilliance, compassion, patient optimism, humor, dogged determination, an insistence that we can all do better, energy, humility, youthfulness, and above all, humanity.

Let me tell you a few stories of my experiences with Prof.

Professor Rotblat was brilliant. I am not just referring to the cleverness of a young boy who, after having experienced hunger and disease and squalor during WWI, learned a trade and set up his own business at the age of 15 without formal schooling and during a time of religious persecution. I am not dwelling on the intellectual courage of a busy young electrician taking intimidating entrance exams for the Free University and going to school in the evenings after arduous days at work, who quickly secured a position teaching at the school (and who would later earn a doctor of physics, a PhD, a DSc and at least 8 honorary degrees). I am not

International Student/Young Pugwash Yearbook 2005 xix-xxiii

only thinking of the pure genius of a pioneer of the nuclear age, who saw the future in chain reactions and brought that lofty science down to reality. I am not only contemplating the forward thinking of a man who recognised the need for a new type of international effort to confront the nuclear danger, which he rightly predicted would become one of the greatest scourges facing humanity. I am not even at this point referring to the ingenuity of a scientist who, in the middle of a prestigious career, changed his line of work and helped harness for medical purposes the very atoms he had previously engineered for war. I am instead remembering the brilliance of his being. Prof had a presence unlike any I have ever encountered. I have seen him rally a room full of a thousand peace activists into a chanting fervor, and I have seen him in very intimate discussions with former heads of state. I have seen him talk to awe-struck high school students and to taxi drivers. In all his interactions, Prof propelled discussions and hopes forward. He had a force of personality that left people inspired and his smile filled a room with light.

Sandra Ionno Butcher, Joseph Rotblat, Joey Butcher and Martin Butcher

Prof had compassion. He was so touched, once, by an older man's decision to leave a small inheritance to Pugwash that he was going to change his travel plans and fly all the way to Canada to thank the man personally before he passed away. He told me he thought it was the only decent thing to do. One time, after speaking at a Student Pugwash USA event, he was deeply concerned when a student came up to him in tears after his talk to thank him for saying words that changed her life. He asked me to make sure that she was okay, and seemed unprepared to realise that he could have that impact on others (and he did have that impact, often). He always had a kind word, an interest in others. He made people feel appreciated.

He had a patient optimism. Here he was, a man who experienced two world wars, a man who lost the woman he loved most dearly to an inconceivable hatred that spread across countries and devastated his hopes for the future. Here was this person who had been vilified for standing up for his principles and refusing to use his considerable talents to further the development of nuclear weapons after he learned Hitler was not developing these weapons. 'How can you be so optimistic', I once asked him, 'after all that you have seen and experienced?' He looked thoughtfully at me and replied, 'What is the alternative?'

I like to remember a visit to a game park in South Africa. We were there for an outing during a Pugwash Conference. Prof had spent a chilly day riding on an open air vehicle, with all of the students rather than the 'senior Pugwashites'. We laughed as he donned more and more warm articles of clothing donated by the students, to supplement his inadequate light jacket – stray scarves, sweaters, gloves. (It was the only time I heard him give a physical threat, and it was directed at me…he threatened to kill me if I took a picture of him dressed in that manner! I did, he didn't.) But at one point at the game park, we all went down underground, through a long tunnel, to a concealed 'close' where we could watch a watering hole without the animals knowing of our presence. If we were lucky, we were told, we might see zebras come for a drink. I will forever have in my mind the silhouette of Prof, sitting quietly at the narrow open window, chin in his hands, long after the other conference participants came and went without seeing any of the promised thirsty striped animals. Prof, however, just sat there quietly,

appreciating all that he saw, waiting maybe for a zebra, but recognising it might take longer than most people were willing to wait. He enjoyed himself in the meantime, and was at peace. I don't know if he saw a zebra then, but I understood a bit more how it was he kept the faith after campaigning for more than 50 years for nuclear disarmament and a war-free-world.

He had a sense of humor, and was not unwilling to laugh at himself. Prof was always calculating the most efficient routes to take, and one day in his late 80s or early 90s he was rushing on an escalator in the London Underground. He apparently asked a group of teenagers to step out of his way so that he could move faster than the long escalator was able to take him. The teenagers, surprised, said 'You're in a big hurry for an old man!' And he replied, 'It is precisely because I am an old man that I am in a hurry, please get out of my way' Perhaps never was he more willing to laugh at himself than when discussing the state of his 'archives' (anyone who has seen his home knows why they now estimate it will take three years for someone to catalogue this amazing collection). Joey, you once played in his home office, where vertical stacks stretch from wall to wall with yellowing pages, numerous files, and books that chronicle some of the most dangerous days of human history and some of the most exciting times of scientific discovery.

He let you sit in his big leather chair and spin and spin. He had more faith than I did that you would not knock down any stacks. And amid those piles of paper, which were scattered throughout his house – his dining room table, for example, was inaccessible for years – Prof always kept a supply of new children's books, as gifts for any young people who might visit.

Your first meeting with Prof, when you were an infant, did not go nearly as well. Prof's sister-in-law, Hala, who lived across the street from him and who was a great companion for him over many years, had made us a splendid lunch during which you insisted on screaming non-stop (jetlag having conquered your usual good nature). Hala suggested we might try to let you nap on a bed (you refused). This led to a story about a time when Prof and Patricia Lindop traveled to Wales to see Bertrand Russell with one of Patricia's children. Russell's wife, who did not know they were there, walked unsuspectingly into the bedroom where the child was asleep. When questioned after coming out of the room if she saw anything unusual, she apparently replied that with Russell, anything was possible. On your next meeting with Hala, as a toddler, you instantly had an affinity for her – and not only because she gave you chocolates. You reacted with charm to these two older people whose warmth was apparent even then to your young sensibilities.

Prof had a reputation for being incredibly determined. In his later years, when I knew him, this took the form of a staunch insistence that Pugwash never lose its focus on the need to eliminate nuclear weapons. His insight on this topic could be razor sharp. When we would meet, he often would quiz your father on recent developments in Washington. These were challenging discussions that your dad always enjoyed, because Prof forced him to think in new ways about longstanding issues. In Pugwash working groups, I used to enjoy watching Prof sit there quietly with his eyes closed – some newcomers, I am sure, were probably blaming this seeming lapse of attention on old age and were unprepared for that moment when Prof would inevitably open his eyes, ask for the floor, and make some sort of interjection that would bring the whole discussion back on task or move it forward in a creative way.

He was willing to change his strategies, and found himself, he said, at the end of his life right back where he began his anti-nuclear career: focusing on the need for a vast public education campaign. After Prof left Los Alamos, he organised a traveling exhibition called the Atom

Train that toured throughout England and in different parts of the world. Early on, he took his concerns to the BBC and other media outlets. Likewise, in the final months of his life he had an op-ed in the *New York Times*, and helped to launch a Weapons of Mass Destruction Awareness Campaign in the UK, which is involving students, world leaders, and rock stars. In the years in between, he focused on engaging scientists, policy makers, and scholars in more private discussions, where new ideas could be discussed in a unique environment. Today's papers are outlining some of the accomplishments of those discussions – the numerous treaties that drew on ideas from Pugwash meetings, and the significant contributions Pugwash made to reducing conflict and furthering understanding of topics related to peace and disarmament.

Professor Rotblat believed – insisted – that we can and should do better as a society. My favorite quote from Prof comes from his Nobel address, and these are indeed words which I hope will guide you and your generation through this crazy world. Sitting in the elegant hall in Oslo in December 1995, the day after my 31st birthday, the importance of these words – and the holistic view toward life that they represent – left me awestruck. 'The quest for a war-free-world', he said, 'has a basic purpose: survival. But if in the process we learn how to achieve it by love, rather than fear, by kindness rather than by compulsion; if in the process we learn to combine the essential with the enjoyable, the expedient with the benevolent, the practical with the beautiful, this will be an extra incentive to embark on this great task'.

And, remember as you read those words, that this was a man who only learned English as a young adult, a man who spoke several languages, a man whose eloquence transcended cultural divisions.

So, how is it Joey, that I came to know this remarkable being? It was because he looked across the generations. He valued the thoughts of someone much, much younger than he was. He sought out people unlike himself. He did not intimidate others with his considerable resume. There was nothing false about his humility. Until the last few years of his life, when physical limitations made travel challenging, he always flew economy class and his work took him all over the planet. In pre-9/11 days, he was once held up at an airport because he was carrying a treasured pen knife. I am sure he did not mention to the security guards that he was a Nobel Peace Laureate and unlikely to cause trouble with the tiny blade. A special indulgence he did allow himself was to fly on the Concorde one time before it was finally grounded, fulfilling a dream. Here was a scientist in his 90s whose efforts to learn how to fly planes as a young man in Los Alamos brought suspicion from those who doubted his motives and assumed he must be a spy who wanted to fly with nuclear secrets into the former Soviet Union – this youthful and daring soul who wanted to taste this mastery of motion, flying beyond the speed of sound, at least once before he, and the Concorde, faced permanent rest.

Professor Rotblat gently guided others and shared his limelight whenever he could. During the Nobel Prize ceremonies, I was floored to hear him mention from the podium an initiative Student Pugwash USA took as a response to the Nobel Prize, an effort to get young people to sign a kind of Hippocratic Oath for young scientists. Prior to that moment, I never in a million worlds dreamed that something I had a hand in could become part of history in that way. And then, later, he asked me to write the history of this organisation he created. He wrote once of the urgency of the task, and said that he became melancholic when he saw my proposed timeline because although he wasn't a betting man, he would bet that he would not see the finished product.

And here we are. I have spent the day reading his obituaries and the history is still in progress. And despite many lovely hours spent with Professor Rotblat learning about his remarkable background and that of Pugwash, I mourn today for the vast wealth of knowledge and insight that he takes with him. He was a bridge to some of the leading moral and scientific giants of the last century (and indeed to those of the preceding century as well). Unfortunately, he never wrote an autobiography, he said he had too much work yet to do. I hope I find within myself the skills to help a wider group of people understand this wonderful man and his accomplishments through my work on the Pugwash history. Maybe someday you will give me your opinion about this.

In all our various conversations and communications, he never forgot, Joey, to ask about you and he always placed his hopes for your future in the context of the need for a better world. And these good wishes even preceded you. When he learned that your dad and I planned to get married, he wrote:

> The entire staff of the Senior Pugwash London Office (i.e. Tom and myself) send you warmest congratulations on your wise decision to enter into the state of matrimony.
> You have been working hard to avert a nuclear catastrophe. You have been calling on the student population to be responsible members of the community. You are now demonstrating – through your own example – your conviction that a stable world will be built in which new generations can be brought up in peace, harmony and love.
> My cordial wishes for the success of your laudable enterprise.

I think that joyful note, written with such good cheer to a much younger colleague, says a lot about the man.

My dear son, Joseph is a name you should wear with pride. Be a rebel, when it is for a good cause. Do not be constrained by limitations others set for you. Treat others with dignity and with loyalty. Stretch your mind and open your heart. Insist on an equitable world, and seek peace in every situation. Refuse to compromise your values. Laugh with others. Live simply and with meaning. Do not judge people by their titles or their age, but by their creativity and vivacity. Envision a long and productive life, and then exceed expectations. If you do all of these things, then you will honour the example set for you by Joseph Rotblat.

He changed my life, and extended for me the sense of what's possible. He became a friend. Who ever would have thought a kid from the New Jersey Shore could one day say she had a friend who was a 96-year-old Nobel Peace Laureate? But I did. And I miss him already. Together, Joey, we will continue to share his legacy with the world.

And Joey, if Prof were to have any parting words of wisdom for you, I believe he would say, 'Above all, remember your humanity'.

In sadness, but with hope for all that you represent,

Your mummy

The *ISYP Journal on Science and World Affairs*

A new project by International Student/Young Pugwash

Juan Pablo Pardo-Guerra & Arthur Petersen

Managing Editors of the *ISYP Journal on Science and World Affairs*.
JP PARDO-GUERRA: Science Studies Unit, University of Edinburgh, Buccleucg Place, Edinburgh EH8 9LN; pardoguerra@yahoo.com, UK.
AC PETERSEN: Netherlands Environmental Assessment Agency (Milieu- en Natuurplanbureau, MNP), P.O. Box 303, 3720 AH Bilthoven, The Netherlands; arthur.petersen@mnp.nl

The *ISYP Journal on Science and World Affairs* forms part of a growing list of projects led by the Executive Board of International Student/Young Pugwash (ISYP), most of which are designed to forge a stronger community and ultimately linking our organisation's activities with those of the broader peace-building community.

On more specific terms, the *ISYP Journal on Science and World Affairs* is a biannual, internationally peer-reviewed publication that hopes to serve as a forum for the discussion of the world problematique that embeds international affairs, from the perspective of the world's youth [1]. This characteristic makes the journal an ideal medium for the publication of articles written by students and young professionals, who have the potential of offering innovative standpoints, both for the analysis and for the solution of the problems that our societies are confronted with. In this sense, our main priority is to constitute the journal as a high-quality periodical that is capable of offering a balanced view of the youth's positions on important, far-reaching issues – positions which often do not get an airing in mainstream academic journals.

On the journal's editorial structure

The *ISYP Journal on Science and World Affairs* is in principle a project run by students and young professionals who are aided by important scholars from different areas. The general co-ordination of the project is in the hands of the Managing Editors. The responsibilities of the managing editors are:

- To manage the general operations of the journal.
- To coordinate communications between the reviewers, the members of the Editorial Board, the authors and the general public.

ISYP Journal on Science and World Affairs, Vol. 1, No. 1, 2005 1-3 (Editorial)

- To elaborate a yearly budget for the journal's operation.
- To make an initial selection of articles to be sent to reviewers.
- To select the reviewers.
- To lead the revision process, based on the comments made by reviewers.

The highest decision organ of the journal is the Editorial Board, constituted by the Executive Board of ISYP along with independent members of the ISYP community. The Editorial Board has the following responsibilities:

- To approve the yearly budget.
- To make the final selection of articles to be sent to reviewers.
- To approve the guidelines of publication.
- To resolve controversies.

In order to create an institutional linkage to senior members of the Pugwash movement, the editors are advised by the members of an Advisory Board in the selection of themes and the identification of potential contributors and reviewers. The reviewers, who are partly drawn from this Advisory Board, are responsible for assuring that the articles that are published are of a high quality and free from inconsistencies or inaccuracies. They perform this task by commenting on the articles and by providing guidance to the Managing Editors on the editorial work that remains to be done.

The basic edition of the journal is the online edition (ISSN 1574-1311). The location of the journal is the web domain www.scienceandworldaffairs.org. The journal is also associated with a professional publisher, Het Spinhuis Publishers (Amsterdam), for a printed edition of the journal in the form of ISYP yearbooks. The online edition will remain cost-free in the future in order to guarantee a broad distribution. The printed edition is completely identical to the online edition (thus, the page numbering is the same). The yearbooks contain additional ISYP-related materials. The Editorial Board intends to make the printed edition of the journal available to research and academic institutions in less developed countries at no or low cost.

On the journal's topics

The *ISYP Journal on Science and World Affairs* covers a broad range of topics related to global problems and the socially responsible application of science and technology. The journal's topics reflect the long tradition of the Pugwash Conferences on Science and World Affairs. In particular, the journal focuses on the following thematic subdivisions:

- **Security and co-operation**: Disarmament and proliferation, weapons of mass destruction, international co-operation, United Nations studies, conflict resolution.
- **Development and human security**: Economic inequality, Bretton-Woods institutions, globalisation, social movements, sustainable development, climate change and mitigation of its effects.
- **Science studies**: Epistemology, the ethics of scientific research, new knowledge-production models, the social implications of science and technology.

- **The future of Pugwash**: Structure and organisation of the Pugwash movement, the history of Pugwash, the role of Pugwash and peace-oriented NGOs in a multifaceted world.

This last topic is of special relevance for two reasons. First, it opens a space for the discussion of the future of the non-proliferation movement in an academic ambiance. But second – and perhaps more importantly – it opens the possibility for articles containing in-depth analyses of the pragmatic issues of activism in general, a topic that has yet to be embraced by peer-reviewed academic journals.

The journal is aimed at an audience composed of political and social scientists, international affairs scholars, activists and NGOs, and the general public with college education. However, in order to maintain a broad international audience, the editors will be careful with the journal becoming too topic-specialised. This does not deny the possibility of releasing special topic-specific issues.

On the contributors and their articles

To facilitate locating potential authors, the Editors of the ISYP Journal on Science and World Affairs will depend strongly on the articles submitted to the annual International Student/ Young Pugwash Conferences. While we expect the majority of authors to be students or young professionals, also original materials from more senior contributors will be published in the journal.

In reference to the annual ISYP Conferences, article submission for these events will become a decisive element in the allocation of funds – if available – among the selected participants. Therefore, high quality article submissions can potentially be rewarded with travel grants for attending ISYP events.

In every case, the authors will be asked to submit only original, unpublished materials. There are five possible types of submissions, each of them described below.

- **Articles**. Original pieces ranging from 3,000 to 10,000 words on any of the topics of the journal.
- **Reviews**. Original pieces reviewing a specific topic. From 5,000 to 8,000 words.
- **Briefs**. Short pieces (800-2,000 words) reporting important events/findings on the topics covered by the journal.
- **Comments**. Opinion pieces on any of the topics covered by the journal or on previously published articles and/or reviews.
- **Book reviews**. Pieces of 1,000 words or less reviewing recently published books covering any of the journal's topics.

All submissions should be sent to editors@scienceandworldaffairs.org.

Notes

1. 'Youth', in the definition of ISYP, includes students and young professionals. No formal age limit is applied, but in practice it is about 35.

Proposal for a regional missile limitation regime

An alternative to missile defence in Northeast Asia

Akira Kurosaki

Faculty of Law, Rikkyo University, 3-34-1 Nishi-Ikebukuro, Toshima-ku, Tokyo, Japan 171-8501; kurosaki@rikkyo.ne.jp

Besides technological and economic problems associated with the development and deployment of missile defence systems, the US missile defence policy has significant political and strategic implications. In this article, reactions of states in Northeast Asia to this missile defence policy are outlined. Subsequently, as an alternative to missile defence, a proposal for a regional missile limitation regime is presented, which aims at co-operatively reducing the threat of missiles through missile control and disarmament and enhancing regional security and stability.

In December 2002, US President George W. Bush announced the initial deployment of missile defence systems in 2004 to protect the homeland, troops overseas, and friend and allies of the United States against the threat of ballistic missiles. Certainly, ballistic missiles, which could be used as a means to deliver Weapons of Mass Destruction (WMD), i.e., nuclear, biological and chemical weapons, are threatening to the security of any country. The United States is not an exception. The development and deployment of missile defence systems by the United States, however, is very problematic. First, the technological feasibility of effective missile defence is still deeply in doubt. Second, the cost-effectiveness of missile defence as a countermeasure to the threat of ballistic missiles and/or WMD is questionable. More importantly, whether US missile defence systems would operate as expected or not, they could have seriously negative impacts on security and stability in various parts of the world. In this article, I examine reactions of states in Northeast Asia to the development and deployment of missile defence systems by the United States and their political and strategic implications, and then present, as an alternative to missile defence, a proposal for a regional missile limitation regime, which aims at co-operatively reducing the threat of missiles through missile control and disarmament and enhancing regional security and stability.

ISYP Journal on Science and World Affairs, Vol. 1, No. 1, 2005 5-17

The impacts of US missile defence on Northeast Asia

Since the late 1990s, the US government has regarded North Korea's ballistic missile capabilities as a major threat not only to US interests in Northeast Asia but also to the security of the United States itself, because North Korea has deployed short- and medium-range ballistic missiles that could be used to attack US allies as well as its troops in the region and is suspected to have been developing long-range ballistic missiles in the hope to acquire military capabilities to deter the United States. In the classified National Security Presidential Directive 23, only North Korea is specifically referred to as a state 'aggressively pursuing the development of weapons of mass destruction and long-range missiles as a means of coercing' the United States and its allies [1].

Now, it is widely known that North Korea has already deployed several different types of short-range ballistic missiles that could reach most if not all of South Korea. No Dong, which is the longest range ballistic missile that North Korea has deployed, could reach all of Japan [2]. This implies that US Forces stationed in both Japan and South Korea could be targets of those ballistic missiles from North Korea.

Although the North Korean government has conducted no ballistic missile flight test since the firing of a Taepo Dong-1 missile in August 1998, Washington believes it has not given up an ambition to develop long-range ballistic missiles that are capable to attack the US homeland. The National Intelligence Estimate (NIE) of the US government of December 2001, for example, speculates that 'the multi-stage Taepo Dong-2, which is capable of reaching parts of the United States with a nuclear weapon-sized payload, may be ready for flight-testing.' Then the analysis of the NIE continues as follows: 'The Taepo Dong-2 in a two-stage ballistic missile configuration could deliver a several-hundred-kg payload up to 10,000 km – sufficient to strike Alaska, Hawaii, and parts of the continental United States. If the North uses a third stage similar to the one used on the Taepo Dong-1 in 1998 in a ballistic missile configuration, then the Taepo Dong-2 could deliver a several-hundred-kg payload up to 15,000 km – sufficient to strike all of North America' [3].

Against this backdrop, the US rudimental missile defence capabilities set to be fielded in 2004 and 2005 include up to 20 ground-based interceptors, 20 sea-based interceptors (Standard Missile-3 or SM-3) with three Aegis ships outfitted for their use, an undisclosed number of Patriot Advanced Capability-3 (PAC-3) missiles, and upgraded radar systems to help identify and track targets. Both the ground-based interceptors are geared to defend against long-range ballistic missiles, while the sea-based interceptors and PAC-3 missiles are designed to defend against short- and medium-range ballistic missiles [4]. In Northeast Asia, the Ministry of Defence of South Korea and US Forces South Korea announced the deployment of PAC-3 by the latter in May 2003 [5].

The Japanese government, which has conducted technological research on missile defence with the US government but has taken a rather prudent attitude to its development and deployment, now seems increasingly interested in developing and acquiring its own systems. As the concern about a nuclear weapons programme in North Korea has mounted, the fear of its ballistic missile capability has been intensified recently in Japan. Under such circumstances, the Japanese government is considering the purchase of SM-3 and PAC-3 from the United States [6]. In the meantime, Tokyo is determined to continue the joint technological research

with the US government on a sea-based missile defence system (formally known as Navy Theater Wide Missile Defence, but now renamed as Aegis Ballistic Missile Defence), which started in 1999 in the aftermath of the launching of a Taepo Dong-1 missile [7]. It is reported that the Japanese government is planning to conduct flight tests of interceptors with the US government in 2005 and 2006 for the first time after the beginning of the bilateral technological co-operation [8].

Taiwan has been showing a keen interest in developing and acquiring missile defence systems as well. Undoubtedly, its interest in missile defence is rooted in its concern over Chinese short-range ballistic missile forces deployed across the Taiwan Strait. Reportedly, the Taiwanese defence officials have been in consultation with the American counterparts on that matter [9].

Russia and China, two of the most vehement opponents of US missile defence plans in past years, reacted coolly to the US announcement of the initial deployment of missile defence [10]. Apparently, Moscow, which is now seeking co-operation with the United States and NATO in the field of missile defence [11], accepted the US withdrawal from the Anti-Ballistic Missile Treaty (ABM Treaty, 1972), which had been an obstacle to the US missile defence plan, and the following decision by the US government to go ahead with the deployment of missile defence as unalterable realities in which it is compelled to seek its national interests and security.

In contrast, Beijing has not softened its hostile attitude to missile defence, probably for fear that US missile defence systems are designed to counter China's strategic deterrent against the United States, which is now made up mainly with around 20 single warhead intercontinental ballistic missiles (ICBMs). In this sense, it is noteworthy that, according to a recent press report, China succeeded in the flight-testing of a medium-range ballistic missile carrying multiple warheads [12]. Although this doesn't mean that China could deploy operational ballistic missiles with multiple warheads in the near future, such a testing could be interpreted as a Chinese effort to counter the development and deployment of missile defence systems by the United States. Beijing is also critical to US co-operation on missile defence with regional actors such as Japan and Taiwan.

North Korea has also opposed to the US missile defence programme as well as the joint Japan-US co-operation on missile defence. It is not difficult to assume that North Korea, which has already been exposed to overwhelming military pressures from Japan, South Korea and the United States, views missile defence as an offensive rather than defensive weapon system since it can be regarded as being intended to neutralise North Korea's missile forces by conducting military operations against it. Now that the doctrine of pre-emption has been not only espoused but also actually practiced by the Bush administration in Iraq, the US missile defence systems may appear more threatening than ever before to the North Korean government. Nevertheless, it has not taken any concrete countermeasures against the US decision to deploy missile defence systems. Actually, it remains committed to its voluntary flight test moratorium of long-range missiles, which has been in effect since 1999 and was extended indefinitely in September 2002 [13].

Thus, fortunately, the development and deployment of missile defence systems by the United States has not stimulated other states to build up their missile forces in Northeast Asia. This, however, does not mean that the danger of igniting a regional missile arms race has been completely eliminated. Besides, such a unilateral approach to mitigate the ballistic missile threat

could only nurture distrust among major regional actors, destructing co-operative efforts to reduce the missile threat in the region.

Furthermore, the development and deployment of missile defence systems by the United States has not been helpful to reduce the missile threat to its allies and to remove their interest in expanding their missile arsenals. Currently, Japan does not have military capabilities to attack ground targets in other countries, in line with the doctrine of 'Senshu Boei' (defensive defence posture). Japan's Defence Agency, however, is exploring to acquire such capabilities to prevent a missile attack against Japan, for example from North Korea. Proposed capabilities include air-to-surface missiles [14]. Besides, it is reported that the Japanese government is considering even the purchase of Tomahawk cruise missile from the United States [15].

South Korea, in turn, has been driven to beef up its missile capabilities to counter short-range ballistic missiles deployed by North Korea in recent years. Under the Memorandum of Understanding on missiles between the governments of South Korea and the United States in 1979, the former had been prohibited to develop ballistic missiles with a range over 180 km and a payload over 500 kg without the consent of the latter [16]. However, as a result of the negotiation between the two governments, a new agreement, which allows South Korea to develop, possess and deploy ballistic missiles with a range up to 300 km, was concluded and Seoul announced a new missile policy in accordance with the bilateral agreement in January 2001 [17]. In addition, the Defence Ministry of South Korea reportedly concluded a contract with Lockheed Martin on the purchase of army tactical missile system (ATACM) surface-to-surface missiles with a range of 300 km in January 2002. These were expected to be delivered to the South Korean Army in 2004 [18].

Therefore, the development and deployment of missile defence systems by the United States has contributed neither to reducing the ballistic missile threat nor to stopping or reversing a trend towards a new missile arms race in the Northeast Asian region, in which China, Taiwan, Japan, North Korea, South Korea, Russia, and the United States have already developed, possessed and/or deployed a variety of missiles (see Appendix).

Past and existing measures for missile control and disarmament

As the report of July 2002 on 'The Issue of Missiles in All Its Aspects' by a UN expert panel points out, 'no norm, treaty or agreement governing the development, testing, producing, acquisition, transfer, deployment or use specifically of missiles exists' [19]. However, some past and existing treaties and agreements, whether bilateral, multilateral or regional, do make specific provisions on particular types or aspect of missiles. Those past and existing treaties and agreements listed in the UN expert panel report could be categorised roughly into four types by their objectives. They are:

- *Measures to limit and/or reduce the number of certain kinds of missiles used to deliver WMDs* such as the Strategic Arms Limitation Treaty 1 and 2 (SALT 1, 1972 and SALT 2, 1979), the Inter-Mediate Nuclear Force Treaty (INF Treaty, 1987), the Strategic Arms Reduction Treaty 1 and 2 (START 1, 1991 and START 2, 1993), and the Strategic Offensive Reduction Treaty (SORT, 2002).
- *Measures to limit the deployment of missiles to deliver WMDs* such as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space (Outer Space

Treaty, 1967), the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Tlatelolco Treaty, 1967) and the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil (Seabed Treaty, 1971).

- *Measures to control the export of missiles and missile related* technologies such as the Missile Technology Control Regime (MTCR, 1987) and the International Code of Conduct against Ballistic Missile Proliferation (ICOC, 2002).
- *Measures to implement the prior notification of missile* launch such as the Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War between the United States of America and the United Soviet Socialist Republic (1971) and the Lahore Declaration between India and Pakistan (1991) [20].

In contrast to missile defence policies intended to counter the ballistic missile threat unilaterally, missile defence policies could also be regarded as co-operative measures to reduce the threat of missiles through missile control and disarmament. As we have seen, the development and deployment of missile defence systems by the United States involves the risk to nurture distrust among major actors in Northeast Asia, igniting a regional missile arms race. This could have serious adverse effects not only on co-operative efforts to reduce the missile threat in the region but also on the security of the United States. Therefore, what is needed today in the region seems to be an initiative to pursue such co-operative measures to reduce the threat of missiles in terms of regional security and to nip a new missile arms race in the bud before it becomes uncontrollable.

Such an initiative, however, should go beyond the past and existing agreements and treaties for missile control and disarmament, because they are not necessarily effective to cope with current missile issues in Northeast Asia. To illustrate this point, I examine the effectiveness of the MTCR and the regionalisation of the INF Treaty.

The MTCR was established by the United States and its six allies in April 1987 in order to prevent the proliferation of missiles and related missile technologies. Initially, the guidelines of the MTCR ban the transfer of missiles with a payload over 500 kg and a range over 300 km, but today it prohibits the transfer of all missiles that could deliver weapons of mass destruction regardless their payload and range. Some missile programmes have been stopped or delayed by this suppliers' export control measure [21].

However, the effectiveness of the regime has been limited in Northeast Asia as well as in the rest of the world. First, North Korea and China have not joined the regime and their missile export practices have been a matter of a great concern in terms of preventing missile proliferation. Second, the MTCR is not a legally binding agreement and there are no specific verification or enforcement mechanisms. Thus, the implementation of its guideline differs from one country to the other. Third, the MTCR does not address the issue of existing ballistic missile arsenals, ignoring the asymmetry between 'haves' and 'have-nots'. In addition, the fact that various shorter-range missiles are not regulated under the regime leaves room for a missile arms race in the region as we have seen above. Lastly, the MTCR cannot deal with political problems such as a regional conflict and arms race that create demand for missiles. This flaw is critical especially in Northeast Asia, in which the issues of two Koreas and Taiwan have been the major sources of political and military tension.

The INF Treaty was signed by the United States and the former Soviet Union in December 1987 and entered in effect in June 1988. Under the treaty, the two countries agreed to abolish all land-based ballistic and cruise missiles with a range between 500 and 5,500 km and this agreement was carried out within three years. This treaty is a remarkable achievement in missile disarmament, because it for the first time banned all the missiles in a certain category between the agreed parties [22].

The regionalisation of the INF treaty, however, would not be an effective missile disarmament measure in Northeast Asia. First, it could not regulate various short-range missiles possessed by Japan, North Korea and South Korea. In the Korean peninsula, even 300 km range ballistic missiles or other guided missiles delivering a conventional warhead could constitute a grave military threat to both North and South Koreas. A more serious problem, however, is that China, which has deployed a large number of land-based medium range ballistic missiles and regards them as its major deterrent against third country's intervention into a China-Taiwan conflict, would not agree to renounce them. It is not difficult to imagine that China may think it unfair and unacceptable to do so considering the fact that the United States is deploying an overwhelmingly large number of 1,700 km range Tomahawk ship launched cruise missiles (SLCMs) on naval warships that are assigned to the Seventh Fleet in the Asian-Pacific area.

Of course, the foregoing analysis is by no means intended to show the ineffectiveness of the past and existing agreements and treaties on missile issues. They have surely contributed to the reduction of the missile threat through missile control and disarmament. Nevertheless, it is also true that they are not necessarily attuned to address current missile concerns in Northeast Asia. Thus, a new design for co-operative missile control and disarmament in Northeast Asia seems to be needed today as an alternative to missile defence.

Towards a regional missile limitation regime in Northeast Asia

Here, I propose a plan to build a regional missile limitation regime in Northeast Asia. Currently, Japan, North Korea, South Korea, China, Taiwan, Russia, and the United States are developing, possessing and/or deploying a variety of missiles in Northeast Asia and all of them are expected to be the member of the regime, except Taiwan, which would be given a semi-member or an observer status. The objective of such a regional missile limitation regime should be to reduce the threat of missiles in Northeast Asia through co-operative missile control and disarmament. Designing such a regime, however, is not simple and easy, requiring careful considerations on a variety of concerns related to missiles specifically in the Northeast Asian settings. In the following part, I focus on four major issues, which seem especially important in doing so. They include (1) the diversity of missile capabilities among those states, (2) the limitations of missile defence, (3) dual-use technologies (missiles and space launch vehicles) and (4) the issues of two Koreas and Taiwan.

First, the diversity of missile capabilities that major actors are developing, possessing and/or deploying in Northeast Asia makes it difficult to find the intersections of their strategic interests and consequently complicates the work to design a regional regime for missile control and disarmament. For example, North Korea may not agree to the ban on medium-range missiles, which Japan and South Korea do not possess but North Korea has already deployed, without some forms of compensation. China would resist limiting or reducing land-based me-

dium-range ballistic missile forces which the United States and Russia have already renounced under the INF treaty. The United States, in turn, would refuse the ban of SLCMs such as Tomahawk, while North Korea and China may see US SLCM forces as a threat to their security [23]. Thus, the diversity of missile capabilities of the states concerned should be taken into account thoroughly in identifying a combination of merits and obligations for each major actor, which is acceptable to them all, so as to design a regional missile limitation regime.

Second, such a regional regime should regulate the development and deployment of missile defence in Northeast Asia. As we have seen before, the development and deployment of missile defence systems by the United States could become a major obstacle to achieve a regional agreement on missile control and disarmament in Northeast Asia. Thus, some forms of limitation of missile defence should be invented in creating a regional missile limitation regime. They could be both regional and global in scope, because the Bush administration has integrated two different missile defence systems known as the Theater Missile Defence (TMD) and the National Missile Defence (NMD) under the Clinton administration, pursuing the construction of a global missile defence architecture in co-operation with its friends and allies. The development and deployment of missile defence systems by other major actors in the region such as Japan and Taiwan should be regulated under the regime as well.

Third, since it is difficult, if not impossible, to distinguish the development of ballistic missiles from that of space launch vehicles (SLV) from a technological point of view, the issue of peaceful uses of outer space should be considered in designing a regional missile limitation regime in Northeast Asia. According to an expert analysis, Japan, which has an advanced space programme, is technologically capable to develop ICBMs independently [24]. Therefore, national space programmes of each actor should be discontinued or severely restricted to prevent ballistic missile proliferation. In fact, the development of non-military SLV launch capabilities of South Korea has lagged far behind Japan and North Korea, mainly because of the Memorandum of Understanding of 1979 on missiles between Seoul and Washington. Nevertheless, there is no legal foundation to deny the right for a country to pursue the peaceful uses of outer space. Acknowledging that, North Korea, for instance, alleged that the purpose of launching a Taepo Dong-1 missile in 1998 was placing a satellite into orbit [25]. Thus, a regional regime for missile control and disarmament would need to incorporate measures such as regional co-operation in the peaceful uses of outer space and the regionalisation of national space programmes, in order to satisfy interests of each actor in peaceful use of outer space while preventing the proliferation of ballistic missiles.

Finally, the issues of two Koreas and Taiwan cannot be ignored in designing a regional missile limitation regime in Northeast Asia, because they have been political hindrances against regional co-operation especially in political and military fields. Besides, there is no regional framework for political and security talks involving all of China, Taiwan, Japan, North Korea, South Korea, Russia and the United States today, except the ASEAN Regional Forum (ARF). This, however, should not mean that a proposal for such a regime is totally meaningless. Starting a process to pursue its establishment could have positive effects on efforts towards the peaceful solutions of the issues of two Koreas and Taiwan. Moreover, the thaw of political and military tension surrounding those issues, in turn, could improve political environments to form a regional missile limitation regime. Confidence-building and threat-reduction measures built in a regional missile limitation regime such as security assurances and the notification of missile flight-testing could help create this circle of positive feedbacks.

On the basis of the foregoing observations and analyses, I present a model road map for the formation of a regional missile limitation regime in Northeast Asia. The purpose of the regime is to comprehensively regulate missile armaments and missile related activities in the region. China, Japan, North Korea, Russia, South Korea and the United States are expected to participate in the regime. The regime would consist of multilateral agreements on missile control, peaceful uses of outer space, threat-reduction and confidence-building measures, and verification systems. Each one of them could be negotiated separately or combined with others. The proposed plan then aims at creating a 'non-offensive' missile posture zone covering the territories of Japan, North Korea and South Korea. Within the zone, each of the three countries would be prohibited to have military capabilities to attack ground targets in the others' territories by missiles of any kind directly from its own territories. This is designed to be a regionalised solution to the North Korean ballistic missile problem. In order to achieve this goal, the process of setting up the regime would be gradual and incremental in view of the current political and military conditions in Northeast Asia. More specifically, the regime would be established step-by-step through three negotiation stages.

Stage 1

- Japan, North Korea and South Korea agree to prohibit the development, acquisition, transfer and deployment of any missiles with a range over 300 km.
- Japan, North Korea and South Korea agree to prohibit the development, acquisition and deployment of any missile defence systems.
- China, Russia and the United States, individually or multilaterally, provide security assurances to Japan, North Korea, and South Korea.
- The six states agree to establish a regional organisation for missile technology control, the prior notice of missile flight test, the exchange of data on missile armaments, and inspection and verification.
- The six states declare the principles on regional co-operation on peaceful use of outer space.

Stage 2

- Japan, North Korea and South Korea agree to prohibit the development, acquisition, transfer and deployment of any missiles with a range over 180 km.
- China, Russia and the United States start negotiations on the limitation of the development, transfer and deployment of missile defence systems and the ban on multiple warhead missiles.

Stage 3

- Japan, North Korea and South Korea agree to prohibit the development, acquisition, transfer and deployment of any surface-to-surface and air-to-surface missiles that are designed to attack targets on the ground.
- China, Russia and the United States start negotiations on the limitation of short- and medium-range ballistic missiles and cruise missiles deployed in Northeast Asia.

Conclusion

This article focused on proposing an idea of a regional regime for missile control and disarmament in Northeast Asia and intended to avoid going much deeper into a discussion on the feasibility of such a regime. With regard to the feasibility, it is fair to say that the present political environment in the region is by no means apt to conclude any agreement on proposed measures for missile control and disarmament. The point, however, is to present a viable alternative to missile defence in light of a very dangerous trend towards a new missile arms race in the region. Therefore, this proposal is intended only to become a starting point for a future policy discussion on co-operative missile control and disarmament in Northeast Asia. The feasibility of a proposed regional missile limitation regime is uncertain. However, at least, it seems unquestionable that an initiative to start such a discussion is very much needed today.

Notes

1. Bill Gertz, Bush case on Defense Plan Cites N. Korea, The Washington Times, May 27, 2003; National Security Presidential Directive 23, National Policy on Ballistic Missile Defense, December 16, 2002 (see the Federation of American Scientists website, http://www.fas.org/irp/offdocs/nspd-23.htm).
2. David C. Wright, Assessment of North Korean Missile Threat, Nautilus Institute for Security and Sustainable Development. (http://www.nautilus.org/fora/security /0320A_%20Wright.html).
3. National Intelligence Council (NIC), Foreign Missile Development and the Ballistic Missile Threat Through 2015 (Unclassified Summary of a National Intelligence Estimate), December 2001, p. 9. (NIC website: http://www.cia.gov/nic/pubs/index.htm).
4. Wade Boese, Bush to deploy 'modest' missile defense in 2004, Arms Control Today, January/ February 2003, pp. 18, 29.
5. Asahi Shinbun, June 1, 2003.
6. Asahi Shinbun, March 12, 2003.
7. US, Japan extended missile defense co-operation, Arms Control Today, March 2003, p. 37.
8. Nihon Keizai Shinbun, February 17, 2003.
9. Taiwan plans low-altitude TMD system: defense minister, February 27, 2003, Taiwan Headlines website (http://www.taiwanheadlines.gov.tw/20030227/20030227p3.html).
10. Wade Boese, Bush to deploy 'modest' missile defense in 2004, Arms Control Today, January/ February 2003, p. 29.
11. Wade Boese, Russia considers missile defense, Arms Control Today, March 2003, p. 31.
12. Yomiuri Shinbun, February 8, 2003.
13. Paul Kerr, North Korea extends missile test moratrium; US to send Kelly, Arms Control Today, October 2002, p. 25.
14. Asahi Shinbun, March 27, 2003 (evening edition).
15. Mainichi Shinbun, March 28, 2003.
16. System Planning Corporation, Non-Proliferation Issues, South Korea, Appendix, Unclassified Working Paper, Report of Commission to Assess the Ballistic Missile Threat to the United States, July 15, 1998. (http://www.fas.org/irp/threat/missile/rumsfeld/pt3_skorea.htm).
17. Yomiuri Shinbun, January 18, 2001.
18. Sankei Shinbun, January 5, 2002.

19. Report of the Secretary-General, The Issue of Missiles in All Its Aspects, A/57/229, July 23, (http://ods-dds-ny.un.org/doc/UNDOC/GEN/N02/493/38/PDF/N0249338.pdf).
20. Ibid., pp. 13-18.
21. Ibid., pp. 14-15.
22. Ibid., p. 15.
23. In Yokohama, Japan, as many as 500 vertical launchers of the Tomahawk cruise missile are aboard six US naval warships homeported at Yokoshuka US Naval Base. It is assumed that about half of those launchers are fitted with cruise missiles, ready to fly with pinpoint accuracy. Hiromich Umebayashi, Theater missile defense: A confidence destructive measure in East Asia, in: David Krieger and Carah Ong (Eds.), A Maginot Line in the Sky: International Perspectives on Ballistic Missile Defense, Nuclear Age Peace Foundation, Santa Barbara, CA, 2001, p. 26.
24. System Planning Corporation, Non-Proliferation Issues, Japan, Appendix, Unclassified Working Paper, Report of Commission to Assess the Ballistic Missile Threat to the United States, July 15, 1998., (http://www.fas.org/irp/threat/missile/ rumsfeld/pt3_japan.htm).
25. N. Korea launches staged rocket that overflies Japanese territory, Arms Control Today, August/ September 1998, pp. 28-29
26. Sources: The International Institute for Strategic Studies, Military Balance 2002-2003, London, 2002. Federation of American Scientists website, http://www.fas.org/main/home.jsp, Global Security Org website, http://www.globalsecurity.org.

Appendix: Missiles in Northeast Asia

China

System	Status	Service Branch	Range/Payload
Range 50~100 km			
HY-1 (Ship to Ship)	Operational	Navy	80 km
SY-1 (Ship to Ship)	Operational	Navy	80 km
HY-2 (Surface to Ship)	Operational	Navy	95~100 km
YJ-6 (ALCM, Air to Ship)	Operational	Navy/Air Force	90~100 km
YJ-81K (Air to Ship)	Operational	Air Force	50 km
AA-12 (Air to Air)	Operational	Air Force	50 km
Range 100~500 km			
HY-4 (Surface to Ship)	Operational	Navy	150 km
SS-N-22 Sunburn (Ship to Ship)	Operational	Navy	250 km
YJ8-2 (ALCM, Air to Ship)	Operational	Navy	120 km
YJ-61 (ALCM, Air to Ship)	Operational	Navy/Air Force	185~200 km
AA-10 (Air to Air)	Operational	Air Force	70~170 km
M-7 (SRBM)	Operational	*1	150 km/190 kg
DF-11 (SRBM)	Operational	*1	300 km/800 kg
Range 500~1000 km			
DF-15 (SRBM)	Operational	*1	600 km/500 kg
Range 1000~5500 km			
Xia/JL-1 (SLBM)	Operational	*1	1000 km/600 kg
DF-21 (MRBM)	Operational	*1	2500 km/600 kg
DF-21A (MRBM)	Operational	*1	1800 km/2000 kg
DF-3A (MRBM)	Operational	*1	2800 km/2150 kg
DF-4 (IRBM)	Operational	*1	5500 km/2200 kg
Range 5500 km~			
DF-5A (ICBM)	Operational	*1	13000 km/3200 kg
DF-31 (ICBM)	Tested/Development		8000 km/700 kg
JL-2 (SLBM)	Tested/Development		8000 kg/700 kg

*1 Second Artillery Corps

Japan

System	Status	Service Branch	Range/Payload
Range 50~100 km			
ASM-1 (Air to Ship)	Operational	Air Force	50 km
AGN-84 Harpoon (ASCM, Ship to Ship)	Operational	Navy	90 km
Range over 100 km			
MIM-104 Patriot-2 (Surface to Air)	Operational	Air Force	70~160 km
ASM-2 (Air to Ship)	Operational	Air Force	100 km
SSM-1 (ASCM, Surface to Ship)	Operational	Army	180 km
SSM-1B (ASCM, Ship to Ship)	Operational	Navy	150 km

North Korea

System	Status	Service Branch	Range/Payload
Range 50~100 km			
CSS-C-2 (ASCM, Surface to Ship)	Operational	Navy	80 km
SS-N-2 Styx (Ship to Ship)	Operational	Navy	80 km
FROG-7 (Surface to Surface	Operational	Army	70 km
Range 100~500 km			
Scud-B (SRBM)	Operational	Army	300 km
Hwasong-5 (a variant of Scud-B, SRBM)	Operational	Army	330 km/1000 kg
Range 500~1000 km			
Hwasong-6 (Scud-C, SRBM)	Operational	Army	500 km/700 kg
Range 1000~5500km			
No Dong-1 (MRBM)	Operational	Army	1300 km/750 kg
No Dong-2 (MRBM)	Development		1500 km/770 kg
Taepo Dong-1 (MRBM)	Tested/Develop-ment		2000 km/1000 kg
Range 5500 km~			
Taepo Dong-2 (ICBM)	Development		5000~6000 km/ 1000kg

Russia

System	Status	Service Branch	Range/Payload
Range 50~100 km			
SA-4A/B (Surface to Air)	Operational	Army (a)	50 km, 55 km
SA-12A, B (Surface to Air)	Operational	Army (a)	6~75 km, 13~100
SA-N-6 (Ship to Air)	Operational	Navy (b)	km
SS-N-2C (Ship to Ship)	Operational	Navy (b)	45~90 km
SS-N-14 (SUGW)	Operational	Navy (b)	80 km 55 km
Range 100~500 km			
SS-21 (SRBM, Surface to Surface)	Operational	Army (a)	120 km
SS-N-22 (Ship to Ship)	Operational	Navy (b)	250 km
AS-4 (Air to Surface)	Operational	Navy (b)	460~500 km*1
AS-11 (Air to Surface)	Operational	Air Force (a)	120 km
AS-17 (Air to Surface)	Operational	Air Force (a)	50~200 km
AS-18 (Air to Surface)	Operational	Air Force (a)	115 km
AA-10 (Air to Air)	Operational	Air Force (a)	70~130 km
Range 500~1000 km			
SS-N-19 (USGW/Ship to Ship)	Operational	Navy (b)	625 km*1
Range 1000~5500 km			
SS-N-21 (SLCM)	Operational	Navy (b)	3000 km/150 kg*2
Range 5500 km~			
SS-N-18 (SLBM)	Operational	Navy (b)	5600 km/1650 kg*2

(a) Far Eastern Military Command (b) The Pacific Fleet
*1 Nuclear/Conventional *2 Nuclear

South Korea

System	Status	Service Branch	Range/Payload
Range 50~100 km			
AGN-84 Harpoon (Ship to Ship)	Operational	Navy	90 km
AIM-7 Sparrow (Air to Air)	Operational	Air Force	54 km~
AGM-88A/B HARM (Air to Surface)	Operational	Air Force	48 km~
AGM-142 (Air to Surface)	Operational	Air Force	75 km
Range 100 km~			
NHK-1 (SRBM, Surface to Surface)	Operational	Army	180 km/500 kg
NHK-2 (SRBM, Surface to Surface)	Operational	Army	260 km/450 kg
Hyunmoo (SRBM, Surface to Surface)	Operational	Army	180 km/300 kg
ATACM (SRBM, Surface to Surface)	Operational	Army	165 km/560 kg
ATACMS Block 1A (SRBM, Sfc. to Sfc.)	Operational	Army	300 km/560 kg
Nike Hercules (Surface to Air)	Operational	Army/Navy	180 km

Taiwan

System	Status	Service Branch	Range/Payload
Range 50~100 km			
Hsiung Feng 2 (Ship to Ship)	Operational	Navy	80 km
AGN-84 Harpoon (Ship to Ship)	Operational	Navy	90 km
Range 100~500 km			
Nike Hercules (Surface to Air)	Operational	Army	135 km~
Tien Kung (Sky Bow)-1 (Surface to Air)	Operational	Army	100 km
Tien Kung-2 (Surface to Air)	Operational	Army	200 km
MIM-104 Patriot-2 (Surface to Air)	Operational	Army	100 km~
Ching Feng (Green Bee) (SRBM)	Operational	Army	130 km/270 kg
Tien Chi (Sky Spear) (SRBM)	Development		300 km/500 kg

The United States

System	Status	Service Branch	Range/Payload
Range 50~100 km			
RIM-7 Sea Sparrow (Ship to Air)	Operational	Navy (c)	50 km
AGM-88A/B HARM (Air to Surface)	Operational	Air Force (a, b)	48 km~
AIM-7 Sparrow (Air to Air)	Operational	Air Force (a, b)	55 km~
Range 100~500 km			
AGN-84 Harpoon (Ship to Ship)	Operational	Navy (c)	110 km
SM-2 MR (Ship to Air/ASROC)	Operational	Navy (c)	45~110 km
SM-2 ER (Ship to Air)	Operational	Navy (c)	75~115 km
MIM-104 Patriot-2 (Surface to Air)	Operational	Army (b)	70~160? km
AGN-84 Harpoon (Air to Surface)	Operational	Navy (c)	110 km
AGM-154 (Air to Surface)	Operational	Air Force (a, b)	24~200 km
AIM-54A/C (Air to Air)	Operational	Navy (c)	184 km
Range 1000~5500 km			
BGM-109 Tomahawk (SLCM, Ship to Surface)	Operational	Navy (c)	1350 km non nuclear

(a) US Forces Japan (b) US Forces South Korea (c) The Seventh Fleet

SRBM: short-range ballistic missile (<1000 km); MRBM: medium-range ballistic missile (1000~3000 km); IRBM: intermediate-range ballistic missile (3000~5500 km); ICBM: intercontinental ballistic missile (>5500 km); SLBM: submarine-launched ballistic missile ; ASCM: anti-ship cruise missile; SLCM: sea-launched cruise missile ; SUGW: surface to underwater guided weapon; USGW: underwater to surface guided weapon

Space weapons: the urgent debate

William Marshall*, George Whitesides, Robert Schingler, Andre Nilsen & Kevin Parkin

*Belfer Centre for Science and International Affairs, Kennedy School, Harvard University, 79 JFK St., Cambridge, MA 02138; wsm@physics.ox.ac.uk

This article has been written by International Student/Young Pugwash (ISYP) in collaboration with the Space Generation Advisory Council in support of the UN Programme on Space Applications (SGAC). This follows on from our paper 'Militarization of space: a youth perspective' presented at the 52nd Pugwash Conference in La Jolla, 2002, which gave a summary of the reasons against space weapons. In that paper we included recommendations for ways forward, both for the international community at large, and Pugwash in particular. The current article aims to address one of our recommendations in that paper to 'encourage high-level debate' on this issue. To do this, we have been working together with a US Air Force General to develop a critical analysis of both the pros and cons of space weapons, for a nation considering deployment. By developing a balanced debate, we hope to set a framework for the discussion in which all sides can take part.

There is an urgent need for a discussion on the future military uses of space for several reasons. First, the technology for developing and deploying weapons systems in space is already available in major space faring nations. Second, conflicts are beginning to arise over space-based assets, both for economic and security reasons. Thirdly, there are few legal restrictions on the use of space weapons. Finally, a number of political and military leaders in some major powers have expressed their support for the deployment of space weapons. Deployment could therefore be imminent. Moreover, the stakes are high since once deployed, it may be impossible to eliminate space weapons, even if they prove unsuitable or destabilising. However, given that deployment has not yet taken place, we have a unique opportunity for thinking through these issues now.

The challenge is to find a way of managing space that avoids the 'tragedy of the commons', whereby the pursuit of individual rationality by every state leads to a collectively worse outcome for everyone. The costs and gains of space weapons must therefore be addressed in a comprehensive and balanced debate. In synopsis, short term advantages from

ISYP Journal on Science and World Affairs, Vol. 1, No. 1, 2005 19-32

acquiring offensive space weapons must be weighed against the medium and long term consequences of deployment, most importantly the risk of a destabilising arms race in space.

This article, the result of collaboration among a military officer, space professionals, and a political scientist, seeks to put the question of space weapons firmly on the security agenda of the 21st century. To that end, we offer a framework of analysis that places the issue of space weapons in appropriate technological, economic, political, and strategic contexts.

Diminishing constraints, growing incentives

A decision to deploy space weapons would not face many constraints, whether technological or legal. After years of development, the technology required for space weapons is now feasible, albeit still expensive. Both the US and Russia have the capability to deploy advanced space weapons in a matter of years. Several other nations have the capability to launch lower technology space weapons in a similar timeframe. The Reagan and Bush I administrations funded, on the order of ten billion dollars, a variety of initiatives which laid the groundwork for contemporary space weapons systems. As a result, the development and deployment of space weapons, is no longer a technological challenge, but a question of political will.

The legal framework governing space weapons is minimal. The only explicit rules regarding space weapons are those prohibiting conventional weapons on celestial bodies and weapons of mass destruction everywhere in space. Conventional space weapons are therefore legal as long as they are based on a satellite rather than the moon. The legal framework has been further weakened by the abolition of the Anti-Ballistic Missile Treaty. Law is therefore no obstacle to deployment.

At the same time as the technological and legal constraints on deployment are abating, the incentives are mounting. The critical role that space has become to play, in both civil and military activity, has created the potential for future conflict. The US military is now dependent on space assets to wage its preferred style of war. Perhaps even more important, the economic benefits of the Global Positioning System (GPS) and other space-based technologies gives the US and other countries a substantial interest in maintaining, protecting, and augmenting those assets. Discord between peer competitors, such as the one surrounding Galileo, the European satellite navigation system, are seen by some as early seeds of greater conflict. Other conflicts have arisen due to differences of opinion over the distribution of reconnaissance data and in controversies over the use of radio spectra. The effect of all these developments is that space policy is being increasingly securitised and framed as a core national interest.

Against the backdrop of waning constraints and rising incentives, it is no surprise that political will is emerging. There have recently been prominent voices within the US military (US Space Command Master Plan 2001 and Air Force 2025) and political (Commission to Assess United States National Security Space Management and Operations, Rumsfeld, 2000) leadership in favour of considering the acquisition of space weapons. In the US military document 'Vision 2020', for instance, it is argued that the United States should seek capacity to operate freely within all technological domains of land, sea, air, space, and information. A decision on deployment could therefore be impending.

Not business as usual

The decision on whether to acquire space weapons is not like any other strategic choice. One reason is the asymmetrical nature of the available options before and after deployment. Historically, the introduction of new weapons systems is generally an irreversible path-dependent process. Put another way, it is much easier not to deploy a new system than it is to withdraw it following deployment, even if they prove unsuitable or destabilising. Nations will indefinitely be able to choose to deploy space weapons, but once deployed it will be difficult ever to return to a situation of no such weapons. This irreversibility of deployment suggests that substantial consideration be put into debate.

The relative peace characterising the current international situation is a further reason why the decision on space weapons is different. Whereas the development of many new weapon systems, including weapons of mass destruction and many advances in aircraft and ships, have occurred during times of war, currently we have more breathing space to think before we act. This is a unique opportunity to consider the costs and benefits of space weapons, including those of the long term, prior to making a decision on their deployment. The long term consequences are far reaching and impinge fundamentally on humanity's prospects for a peaceful future.

All in all, given the nascent political will, a decision that could have irreversible and substantial long-term ramifications can happen within a few years timescale. In the meantime, effective regulation or prohibition of space weapons could be a rapidly disappearing opportunity. As such, the issue of space weapons deserves immediate and careful attention.

A brief history of space and defence

The military use of space is not new. Access and utilisation of space is of national interest. In addition to the economic potential of commercial exploitation of space and celestial bodies, space is the ultimate military high ground. Historically, space-based military assets have been largely passive, concentrating on activities such as reconnaissance, communications, and navigation. Indeed, expenditure on space by the military has consistently outweighed civil spending. Even some scientific exploration missions have arguably been dominated by military objectives, such as the pursuit of technological supremacy during the Cold War which led both to the first satellite (Sputnik, 1957) and human (Yuri Gagarin, 1961) in space and culminated in the manned lunar programme (Apollo, 1963-72).

To date, no offensive space-based weapon has been deployed. The closest it came was during the parallel anti-satellite (ASAT) programmes developed by the US and Soviet Union that were begun in the sixties. These programmes primarily developed a variety of 'kinetic kill' vehicles, though initiatives for ground-based laser systems were also begun. Specifically these included initiatives such as nuclear pumped X-ray lasers, space-based optical lasers, radiation-belt weapons, ground-based reflected laser systems, and space-based interceptors. While many of these initiatives were not carried through, the technology base they developed enable the near-term deployment of space weapons. In addition, many of the main components of space-weapon systems are already used in the civilian space sector. Telemetry, tracking, and control systems for a remote sensing communications satellite, for example, are very similar to analogous systems within a space weapon. Testing of such systems was periodically prohibited or

left unfunded by the US Congress during the eighties and nineties. The US military also expressed its disinclination to use kinetic kill ASATs that tend to create large clouds of space debris.

Meanwhile, the broader international community has repeatedly stated its support for space to be used for peaceful purposes only. This position was codified early in the space age by the 1967 Outer Space Treaty (OST), through which 96 states, including the US and former USSR, recognised the common interest of all humankind in the exploration and use of outer space for 'peaceful purposes'. The OST explicitly prohibits treaty states from placing weapons of mass destruction in space or weapons of any kind on celestial bodies. In 2001, the UN General Assembly approved by a 156-0 vote the basis for a treaty establishing a permanent prohibition on space-based weapons (Resolution 56/535). Recently, a joint working paper on preventing space weapons was introduced by China and Russia in the UN Conference on Disarmament (UNCD).

Against this background of inactivity and caution, new elements have in recent years begun advocating the consideration of new space weapons with strike capabilities. In April, 2003, for example, the US Congressman representing NASA's Florida base stated his support for weapons deployed in space: 'We must adopt a doctrine that states that we as a nation will vigorously pursue the ability to project power to, through and from space against any aggressor'. He also noted, 'It would be inappropriate to deny ourselves this advantage simply because of romantic notions of some that space is some type of sacred place'.

Perhaps more significantly, elements of the US military have advocated a strategy to include the deployment of space weapons within a matter of a few years. However, this position has not yet been adopted at the highest level. In fact, many military officers still regard space-based weapons with a dubious eye. The military focus on space, however, has been reaffirmed repeatedly in key documents such as Air Force Vision 2020 and other related strategic planning documents.

Definitions

There is no strict definition of a space weapon. Whether to include both weapons and targets located in space, direct and indirect applications of force, and temporary impairment as well as permanent destruction all shape the debate. In table 1, following the theme of this article, we characterise the generally agreed areas (black and white) as well as the grey areas. Military space activities are grouped into three categories. Activities in the white area are military applications of space that do not entail force application from assets stationed in space. The black area comprises technologies that fit the traditional definition of space weapons. The weapons in the interstitial grey area are more difficult to categorically classify because they span a range of technologies. These technologies may blur the line between space-based and space-transiting weapons; for example, one strategy that has been considered is the use of temporarily-emplaced weapons that orbit for days to weeks.

A representative example of this conception can be taken from a 1998 working group of the United Nations Institute for Disarmament Research (UNIDIR), which states: 'A space weapon is a device stationed in outer space (including the moon and other celestial bodies) or in the Earth's environment designed to destroy, damage or otherwise interfere with the normal functioning of an object or being in outer space, or being in the earth environment'.

Table 1: The spectrum of military space activity: what is a space weapon?

Space Weapons *(Generally or historically prohibited)*	**Intermediate Systems**	**Military activities not involving Space Weapons** *(Generally allowed)*
[Key Words: **Degrade, Destroy**] - WMD or radiological weapons - Space-based directed energy weapons - Space-based kinetic weapons - Anti-satellite satellites (ASAT) destruction or degrade other satellites	[Key words: **Deny, Disrupt**] - ASAT – Deny access to satellite or ground system, passive measures, encryption - ASAT – Temporarily interfere with satellite or ground system (cyber attacks etc.) operation - ASAT Disrupt operations of space or ground segments permanently - Ground-based directed (at space) weapons - Nuclear weapons for NEO defence - Ground based jamming - Suborbital intercept missiles for missile defence	- Communication - Navigation - Reconnaissance (space-based or high altitude platforms) - Space-monitoring networks - Early warning systems ICBM with suborbital trajectory - Suborbital delivery of troops or equipment

Not surprisingly, white activities are readily employed in today's world by many nations and some of the grey capabilities are maintained by a significant number of nations. Systems within the black area are not fully developed or deployed, but have been the subject of intense national and international discussion due to their potential to create instability in international affairs.

Though debatably outside the traditional definition of space weapons, it may be the technologies within the grey area that deserve the most immediate attention. They are the most likely to be deployed in the short term, and could certainly exert the effects of other traditional space-based weapons. A clear line needs to be agreed upon between states.

Space as a strategic domain

Space is a strategic domain, like the land, air, and sea. It can be viewed as the ultimate high ground, by analogy to traditionally successful land strategy, or as a vast unpopulated medium through which things travel, like the sea. Space is an observation platform, a communications hub, host to a highly accurate positioning system, a medium through which ICBMs pass, a pristine scientific environment, and a vast untapped commercial frontier.

The military significance of space is inextricably linked to its resource value and utility for both civilian and military purposes. Like it or not, military principles established over thousands of years of human conflict are extending into space, as they did for airspace in the last century. Overall military significance is particularly important in structuring a stable status quo. For example, Antarctica is a military-free zone by international treaty, and a large part of the

stability of this treaty is due to the low military value of Antarctica, which like space is unpopulated, hostile to life, and of unique scientific interest. If Antarctica was all temperate meadows, or had the strategic uses that space does, it is not clear that the same treaty alone would produce a stable peace.

Conflict in or through space could form one aspect of a ground-based war, arise from disputes over resources in space, or uses of space that interfere with others. In the present preferred style of warfare, military dominance on land relies on air dominance, and contributions from passive space-based systems in the form of battlefield intelligence, navigation, and communication are beneficial, but not a necessity for victory. In the future, space dominance could conceivably become a deciding factor as improvements in ground force capabilities stem from the use of space-related systems, leading to a tiered dominance with space at the top – 'the ultimate high ground' (see figure 1).

Space is unpopulated, and large-scale destruction in space does not imply the loss of life that might occur on land, though the way wars are fought may never make the two interchangeable. To achieve a military objective in any given conflict, the addition of air support to ground forces provides a 'sharper' tool with which to progress; by bombing selected targets ground forces encounter lower opposition, in effect sparing lives that would otherwise be lost by ground assault alone. Similarly, the evolution of air systems to employ space-based GPS guidance has further sharpened this approach. Combined with air and space-based imaging to identify weak points, this mode of combat more effectively than ever before combats an opponent by preventing them from fighting, rather than by attrition. An opponent seeking to win by pure numbers in a future conflict may wish to begin by disabling current passive space-based systems. The risk of militarising space to protect this capability therefore opposes the risk of fighting bloodier wars.

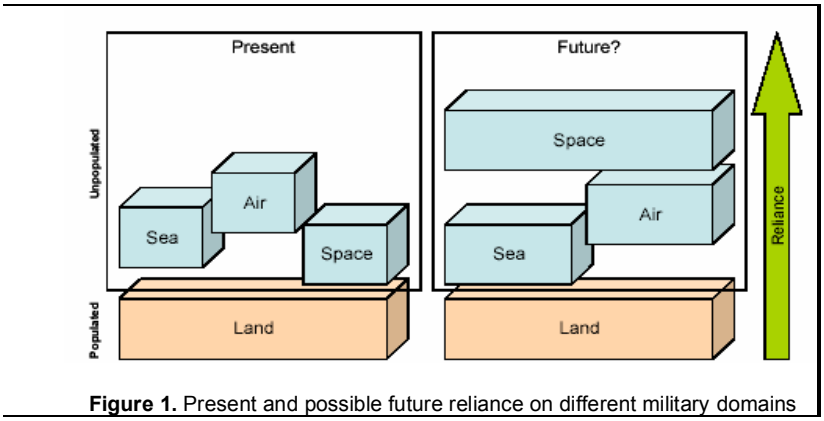


Figure 1. Present and possible future reliance on different military domains

Ultimately, the way space is used for defence, offence, and is itself defended is determined by the peculiarities of orbital mechanics and many other unique aspects of the Earth-Space boundary, which, unlike policy, force structure, and military technology, do not change. The timescale of space transit is minutes, in comparison with other more conventional arenas shown in table 2, in which transit timescales slow even the fastest conflict to a comparable crawl. An ascent to low earth orbit (LEO) takes 3-10 minutes, and the fastest LEO trajectory could take as little as 45 minutes to reach the opposite side of the planet. This is the expected timescale for an exchange of space-transiting weapons, such as intercontinental ballistic missiles (ICBMs). Space-based weapons, for example lasers, may occupy a more distant medium

Table 2. Fundamental characteristics of military domains

	Transit timescale	*Perceived defensibility*
Land	Days	High
Sea	Days	High
Air	Hours	High
Space	Minutes-hours	Low
Cyberspace	Seconds	High

earth orbit (MEO), increasing the intercept time to hours and allowing the possessor a near-instant strike from a weapon that has up to a third of the world's surface in its field of view at any one time. In contrast, the logistical build-up for major conventional military action takes months, and combat itself days to weeks – long enough for top-level international political and decision-making structures to operate, and the possibility of diplomacy to defer or diffuse the situation.

There are no bushes in space, no clouds, and no atmosphere to constrain viable ways to detect objects. The nearest naturally occurring obstacle is the moon, many hours away. Objects in space can in principle been seen by all, though the capabilities of individual nations vary, and limited stealth techniques can still be used in space. For this reason, an arms race of space-based weapons could occur in disguise or via 'dual use' technologies. It could occur on the ground in the form of space-transiting weapons that are stowed until used, similar to ICBMs of the cold war. Potentially, an outlawed and previously unknown space-transiting weapon need only be revealed by launching it, though one might reasonably expect to become aware of involved or widespread development efforts by means of intelligence gathering efforts or facility inspections.

The economic and security context

The issue of space weapons must be assessed in light of contemporary economic and security developments in space technology. Arguments over commercial and security, non-armament uses of space may have important effects on the issue of space weapons. Galileo, the European Union's embryonic satellite navigation system, to take one example, is in direct competition with the American GPS. GPS data is used worldwide for anything from cellular telephones to Automated Teller Machines (ATMs). With the United States suffering from trade (and now budget) deficits on the order of hundreds of billions annually, the tens of billions generated by GPS in US national income is a welcome contribution that the US Government would like to maintain in the future. Not only does the EU aim to capture a share of the GPS market, the Galileo system would also make the EU independent from US military data for modern warfare. The twin drivers of economics and security create a context of potential friction even between allies.

Another important example of such friction comes in the area of remote sensing surveillance satellites, and the specific issue of shutter control. The continuing proliferation of high-resolution imaging capability has reduced the superpowers' exclusive hold on this strategic resource. In general, this development has been positive and has increased the stability of the global system. However, during conflict, these capabilities may become a source of tension.

Table 3. Strategic analysis: deployment probabilities and outcomes

	Other states do not deploy space weapons	*Other states deploy state weapons*
Dominant state does not deploy space weapons	**Outcome 1**: Likely, Stable	**Outcome 2**: Less likely, Unstable
Dominant state deploys space weapons	**Outcome 3**: Less likely, Unstable	**Outcome 4**: Likely, Uncertain outcome: Arms race or Stable

One early suggestion of this came during the 1991 Gulf War, when SPOT, the French satellite imagery company, began receiving increasingly stern warnings from the US military about its data products over the Middle East.

Multiple outcomes

It is important to understand the strategic dimensions of the decision on whether to deploy space weapons or not. The choice should not be reduced to a question of whether the required technological capacity, financial wealth, and political will is available, since outcomes emerge out of the strategic interaction between all the relevant actors. Whether a dominant state will enhance its comparative advantage or gain national security by acquiring a new weapons system therefore depends on how the other states are responding.

As illustrated in table 3, there are multiple possible outcomes in such a strategic situation. The worst-case scenario after the deployment of space weapons would be an arms race in space. Other possible outcomes include a competitive but stable system, or a unipolar stable system akin to the current US dominance of the high seas.

Regardless of its power, a dominant actor cannot determine the outcome unilaterally. On the contrary, without due regard to the likely responses of other states, the rational choice of a dominant actor to make a first move could result in a collective outcome that makes everybody worse off, including the dominant actor. Any potential dominant actor should therefore carefully consider the probable response of other states to the placement of its weapons in space, and the effect these responses will have on global security.

In addition to the risk of starting an arms race with space weapons, states should also consider the likelihood of spill-over effects into other strategic areas. The impact on nuclear strategy is particularly important to assess. Space weapons, along with information warfare, could eventually replace nuclear deterrence as a central strategic policy. This strategy could provide the post-nuclear deterrence paradigm for the United States and other nations. Such a shift could be positive or negative on overall security: On the one hand, it could reduce the overall reliance on nuclear weapons by the dominant state – a positive effect. On the other hand, due to an increased military gap between the dominant state and other nations, the move could also lead to an increased likelihood of use of nuclear weapons by countries as a last resort and decrease the threshold for using a nuclear weapon in a conflict.

Many players

There is no shortage of potential actors that might respond to a first move by a state. While the US and Russia lead in capacity, the European Union, China and India all have the requisite technical capabilities for at least certain space weapons systems.

Given a first move by another state, the US is likely to act quickly to ensure dominance in this domain. The reaction of Russia, whose military strength still relies heavily on its nuclear weapons capability, to such a threat would also act to counter the initial deployment of space weapons with those of its own since any attempt to move from the nuclear deterrence paradigm would reduce its power.

The European Union may move to competitive behaviour as development of collective space defence infrastructure is initiated. Efforts to reduce reliance on the United States are considerable, as demonstrated by the effort in the Galileo navigation system. Explicitly addressing the connection between European Security and Space, European Research Commissioner Philippe Bus-quin has said that space-based observation, communication and navigation systems represent exceptional tools for the construction and reinforcement of the European Union, in particular with respect to European Security and Defence Policy.

China is also investing heavily in space and has publicly announced plans of lunar exploration. It is unlikely to want to be restricted and has proposed a treaty banning space weapons in the UN Conference on Disarmament.

Moreover, history suggests that if one strong player on the international arena gets too powerful, then the other smaller players may combine to produce a counterbalance. Such behaviour was in clear display by Germany, France, Russia and China, during the lead up to the war in Iraq. The dominant state should therefore not only consider the chance of single nations countering their actions, but the risk of many nations combining initiatives.

Short-term gains and costs

The judgment of whether to deploy space weapons should be based on a detailed analysis of their effects on stability and welfare in the short, medium and long term. Only by considering all of these time frames it is possible to make an informed cost-benefit analysis of space weapons and their impact on security. The following analysis is an attempt to outline some of the key issues that need to be taken into consideration. The main purpose is an impartial list of the potential pros and cons of such weapons. We will begin by assessing some of the most immediate aspects.

In a short-term perspective of less than a decade, several advantages of space weapons can be imagined:

1. *A superior weapon*: Space weapons are potentially a primary tool for information dominance, and thus may be a key to battlefield dominance in contemporary war. Space weapons enable an advantage in time and space over an adversary which enables a state to acquire and maintain the initiative. This would mean increased capability to halt potential aggressors more effectively, with less collateral damage and probably earlier, compared to conventional arms. [Table 3, Outcome 3]

2. *First mover advantage*: If the readiness for deployment of space weapons is low among other countries, the first state to deploy will enjoy a short-term advantage.
3. *Protection of space assets*: Assets in space are a critical part of modern communications, navigation and information gathering, vital to the economy, vital to security and in demand in everyday life. Damage to these assets could seriously cripple a nation. Thus the ability to prevent hostile attack, whether from the ground or from space, is desirable.
4. *Image of technical supremacy*: By bolstering the image of technological supremacy, space weapons could act as a deterrent to hostile action.
5. *Other*: Military and commercial industry can be bolstered by gains from long-term (>5 years) research and development projects.

On the other hand, a range of short term disadvantages are possible:

1. *Ineffective and expensive*: Space weapons could become the analogue of the 19th century Dreadnaught ships; very expensive to produce and deploy, with little tactical advantage. Worse, they could provide a false sense of superiority that justifies unwise actions. Actual performance of weapons placed in space may be overstated and not cost-effective. Most critically, due to orbital dynamics, space weapons require an entire orbit to strike (typically 90 minutes) which may not have a fast enough response time to have any 'revolutionary' effect. In addition, their expense is highlighted by the fact that whilst the United States continues to explore space solutions for missile defence, the very high cost and low availability of such weapons as space-based lasers has led the nation to defer pursuing space-based lasers for the indefinite future.
2. *Vulnerability*: Space weapons aimed at Earth targets will need to be in low earth orbit (LEO) for a quicker response time and greater effectiveness. Hardware in LEO is relatively easy to monitor and is more susceptible to ground-based attack. In fact, most military officials acknowledge that, at least for the time being, leo-based weapons run the risk of being orbital sitting ducks.
3. *Provocation to diplomatic and arms-control efforts*: Unilateral deployment of space weapons could spark an international backlash which compromises the interests of many other diplomatic efforts of the nations initiating such a move. This could make it more difficult to achieve goals on other strategic interests. While the Outer Space Treaty only explicitly bans 'weapons of mass destruction' from outer space, global political opinion tends strongly to the view that any weapon in outer space violates the spirit of that Treaty.
4. *Public unrest*: The majority of the public worldwide appears to oppose space weapons. There is also a history of civil unrest concerning issues of military uses of space and the use of nuclear power in space. Similar movements might accompany the deployment of space weapons. These movements perceive an opportunity for humanity to make a psychological leap in the way matters are solved by halting the spread of destructive weapons to the space frontier.

Medium-term gains and costs

Second, also in a medium-term perspective, looking between ten and twenty years ahead in time, there are certain advantages of space weapons:

1. *Stable domination*: Cognisant of the arms-race arguments against unilateral moves in space (see below), some argue that restraint on the part of a nation such as the United States may not persuade other nations from moving ahead to their own advantage. Seizing the initiative, they argue, could enable the United States to stop an arms race before it starts by establishing a globally dominant, stabilising force in space.
2. *Global stabilising effect on earth*: The past half-decade has seen considerable instability and conflict throughout the world. The latest threat is global terrorism. Space offers not only the ability to detect threats globally on very short time scales, but some believe it may also offer the ability to counter those threats from space on similarly short time scales.
3. *Basis for new multilateral security-co-operation regime*: While military use of space is still largely dominated by the United States and to a lesser extent a handful of other major powers, its benefits for support of other military operations are manifest. Space-based weapons systems might enhance these benefits even more. While such situations could lay the seeds of an arms race (see below), they might also be the basis of new co-operative security regimes in outer space. If placed at the service of global coalitions and following agreed 'rules of the road', space arms might serve as a stabilising influence.

At the same time, there are potential disadvantages also in the medium term:

1. *Arms race in space*: The current global perception is that the United States has a technical lead in the military use of space. This strategic advantage may lead other nations to accelerate their space security efforts. This might trigger an arms race. For example, the deployment of an ASAT could instigate the development and deployment of a 'DSAT' to counter an ASAT. Such an arms race might also blur the distinction between conventional and mass destruction weapons in space. [Table 3, Outcome 4]
2. *Asymmetric defence* (Nitze criteria): If there is an economic or tactical asymmetry in the relationship between a weapons system and that system's countermeasure, it could easily lead to an arms race – or to a situation in which an expensive weapon is rendered useless by a cheap defence. This is an elaboration on the point above. For example, a ton of gravel launched in an appropriate orbit could act as deliberate 'space debris', destroying billions of dollars in both national security and commercial space assets.

Long-term gains and costs

Third, some advantages of space weapons might only emerge in a long term perspective of at least twenty years:

1. *Basis of outer space 'Naval' Paradigm*: The existence of weaponry in global 'common' areas can be a long-term positive and welcome influence. The standard analogy of outer space is to the world's oceans including the presence of global, weaponised navies dominated by a single power (in the 19th Century Great Britain and in the 20th the United States). This regime may be applicable to space and could result in security in space akin to the world's oceans, with all nations operating free from interference based on an internationally recognised 'Law of the Sea'.
2. *Economic impetus to large-scale space exploitation*: Today much of the developmental spending on space, perhaps the majority of it, is spent on security-related expenditures. Indeed, the US Apollo programme and associated 'space race' was arguably based mostly on security-related competition. Some argue that large-scale military space spending, particularly on weapons and even with (and maybe in light of) an arms race, will ignite rapid development of space technologies at a pace not seen since Apollo. As with the opening of the American West, military pathfinders and operations might presage finance and enable large-scale civil and economic development of space assets.

Notwithstanding, the long term disadvantages must also be taken into account:

1. *Threat to long-term peace*: Many believe that the choice for or against the deployment of space weapons is fundamentally linked to whether humans will have weapons in their long-term future. Humanity has a shared interest in a peaceful future in space. Deploying space weapons might threaten that future rather than enable it. New strategically important weapons quickly become embedded into national security strategies. Such weapons become so deeply embedded in the dominant political paradigm that they are largely impossible to remove from the strategic arena – and certainly impossible to remove from the global arsenal. Nuclear weapons represent a good example, and in this regard there is no reason to think that space weapons shall be any different. Once space weapons are deployed, it may be impossible to eliminate them even if they prove unsuitable and dangerous to humanity. Humanity appears to be on the verge of expansion into space and this expansion will set precedents for our future civilisation. Whether or not future human settlements on other planets have to deal with weapons will depend on today's decisions
2. *Proliferation of weapons*: Arguably the biggest threat to a dominant nation's security is based on the proliferation of weapons which it has played a large part in developing: Certainly the biggest threat to the US has been the potential use of nuclear weapons on the US home soil. By analogy, the first state to deploy space weapons may find itself faced all too soon with these same weapons as they proliferate. This is particularly true of space weapons which are considerably easier to produce than nuclear weapons. As the current global superpower, the US has a choice to try to use space weapons to its advantage, but add these to its proliferation concerns or attempt to manage them by spearheading a reliable legal and verification regime for preventing their deployment by any nation.
3. *The unique environment of space*: Some argue that is important to keep in mind that space has a unique identity beyond a traditional arena of classical balance of power politics.

> Space is different. Space is humanity's shared resource and common heritage. The question of whether weapons should be deployed in space is therefore an issue beyond the interests of any one country or generation.

The way ahead

There are positive and negative attributes of space weapons: On the one hand it is necessary to recognise that space is integral to virtually all security operations through its communications, surveillance and other support functions and that there are potential advantages, particularly in the short term, of deploying weapons in space. Conversely, not all weapons systems are a good idea, even for the best intentioned, since they are not vastly more effective than conventional weapons and moreover, they can have political and unintended security ramifications in the long term which far outweigh their benefits. Despite these seemingly conflicting issues, there may be areas for fruitful compromise on space weapons.

Faced with a decision on deployment that might come sooner rather than later, nations have to think about how the international community should respond to this extraordinary issue on the security agenda of the 21st century. Three main options are available:

1. *Fairly comprehensive prohibition*: A ban of space weapons would halt the potential for an arms race. The disadvantage is that it may constrain states if a situation arises and a state decides to abrogate a ban. A legal regime would ideally be negotiated in an international forum such as the United Nations Conference on Disarmament. However, if stalemate persists, a less encompassing agreement could be agreed at an ad-hoc gathering. One possible solution is for a country, which supports the prohibition of space weapons, to host a treaty conference for interested nations. This model was followed successfully in the so-called 'Ottawa Process', which led to the successful Ottawa Land Mines Treaty. Means of verification for monitoring compliance would be vital to the successful implementation of a prohibition. In this regard, much could be learned from the Chemical Weapons Convention. A great challenge, however, would be to establish effective sanctions against violations of the treaty. Without sanctions, it is difficult to achieve credible commitments to the legal regime, which jeopardises international co-operation.
2. *A mid-ranging legal regime*: An international agreement on space weapons analogous to the International Law of Sea could be created. This could lead to a stable situation that avoids the earlier pitfalls. It could require an international regime backed up by global, real-time monitoring. The downside is that it is not concrete and might be overtaken by events.
3. *No regime*: In this current state of uncertainty, the global security in the mid-term future is unclear. The major concern is the potential for an arms race in space. Without establishing the rules of the road, even the lead nations are subject to consequences, especially in a domain as potentially asymmetric as space.

In essence, the challenge is to manage space in a way that avoids the 'tragedy of the commons'. In order to avoid this self-destructive logic, we have to escape ending up in a 'prisoner's dilemma', where co-operation is impossible due to lack of communication and trust

among the actors. Because of the strategic nature of the situation, all states, and in particular those with ambitions and capabilities regarding space, should work together. A frank and open discussion should begin in the nations closest to the possibility of much larger military uses of outer space. One possibly fruitful area for opening international negotiations leading towards a legal regime could be in defining hostile and prohibited acts in space. These efforts can be directed towards building agreement amongst the space powers of the 'Rules of the Road' in order to regulate the use of space.

Acknowledgements

We would like to acknowledge contributions from Bojan Pecnik (Croatia), Iole De Angelis (France), Simone Zumbo (Italy), Jo Catena (UK), Mark Lupisella (US), Alan Pritchard (UK), Yuri Takaya (Japan) and advice from Sir Timothy Garden (UK). An adapted version of this article was included in Pugwash Newsletter 39 (2) (2002) 102-105 (http://www.pugwash.org/publication/nl/nlv39n2/newsletter-dec2002.pdf).

Challenges in the creation of a Southern African sub-regional security community

Gina van Schalkwyk

P.O. Box 1787, 905-142, Garsfontein, 0042, Pretoria, South Africa; ginavanschalkwyk@yahoo.com

Conflict and political instability continue to characterise African states and global trends point toward the devolution of the responsibility for conflict management from the United Nations (UN) to regional and sub-regional levels. This poses a significant challenge to sub-regional security arrangements such as the Southern African Development Community Organ for Politics Defence and Security Co-operation (SADC OPDSC). This article resists the temptation to submit to OPDSC-pessimism in view of the failures of the Organ since its inception. Instead it focuses on the immediate short-term challenges as opportunities to be exploited through a partnership between the public and private sector with the active involvement of civil society and the international community. In particular, it emphasises the need for a clear, institutionalised, policy framework that will allow the sub-regional security system to operate (relatively) free from political interference by ruling elites and in the interest of all the citizens of Southern Africa.

At the dawn of the third millennium conflict and political instability continue to characterise African states and global trends point toward the devolution of the responsibility for conflict management from the United Nations (UN) to regional and sub-regional levels. This poses a significant challenge to sub-regional security arrangements such as the Southern African Development Community Organ for Politics Defence and Security Co-operation (SADC OPDSC, hereafter referred to as OPDSC or the Organ) [1].

Not since the height of Apartheid destabilisation of the region in the mid-1980s has there been such an urgent need for the establishment of a security arrangement that takes into account not only security from threats, but also security from want for the people of Southern Africa. However, the local and global environments in which the thirteen states that make up the Southern African Development Community [2] search for peace and security has changed considerably since the 1980s. The long-standing civil wars in Mozambique and Angola have come to an end; Namibia has gained independence; the oppressive Apartheid regime in South Africa has been replaced by a nascent democracy; and a conflict that erupted in the Democra-

ISYP Journal on Science and World Affairs, Vol. 1, No. 1, 2005 33-43

tic Republic of the Congo in 1998 continues to simmer. At the international level, the fall of the Berlin war in 1990 brought an end to the Cold War bipolar global security structure exposing hitherto hidden ethnic and geographic divides between and within states; the international capitalist system is flourishing and is rewarding fast-growing industrial economies leaving behind those that are struggling to emerge from the havoc wreaked by colonialism, socialism and war; China is emerging as a considerable economic and military entity; and the 'war on terror' dominates the international security agenda – often at the expense of pressing demands for United Nations attention to conflicts and humanitarian disasters in Africa and other developing nations.

Cognisant of these realities and the need to create a safe and secure environment in which accelerated development can take place, the leaders of Southern Africa have embarked upon efforts to revive and transform existing collective security arrangements amongst them and agree upon further mechanisms to this effect. But, the search for a common sub-regional agenda for peace, human security and conflict management has encountered a number of obstacles along the way and further challenges abound.

This article resists the temptation to submit to OPDSC-pessimism in view of the failures of the Organ since its inception. Instead it focuses on the immediate short-term challenges as opportunities to be exploited through a partnership between the public and private sector with the active involvement of civil society and the international community. In particular, it emphasises the need for a clear, institutionalised, policy framework that will allow the sub-regional security system to operate (relatively) free from political interference by ruling elites and in the interest of all the citizens of Southern Africa.

Security and security systems

In the 1990s the security debate shifted towards the recognition of a concept of 'human security' as a counter-balance to mere state- and/or regime security. Human security places the individual at the centre of security and emphasises not only freedom from threat, but also the need for economic, social and political security of the individual. However, since the terrorist attacks on the World Trade Centre in New York in 2001 there has been a return to neo-conservatism and the militarisation of security on a global scale. This has seen a resurgence of the debate on the merits of human security versus state security that will not be discussed at length in this article [3]. In the context of this article, the assumption is that the challenge is not a choice between the two perspectives, but rather the need to achieve the right balance between human and military security in the Southern African region.

In the Protocol establishing the SADC Organ there are a number of references which implicitly recognise the importance of an approach to security that emphasises the security of people and the non-military dimensions of security [4]. Amongst other in the preamble, where heads of state acknowledge that 'peace, security and strong political relations are critical factors in creating a conducive environment for regional co-operation and integration'; Article 2, 2(g) where they commit themselves to 'promote the development of democratic institutions and practices within the territories of State Parties and encourage the observance of universal human rights…'; and, Article 2, 2(i) that highlights the need to 'promote a community based approach to domestic security' [5].

As they are inextricably linked, the conceptual framework for the Organ should be read in conjunction with the Treaty establishing SADC [6]; the founding documents of the African Union (AU) [7] and in particular the protocol establishing the Peace and Security Council (PSC) [8] and the Conference on Security, Stability, Development and Co-operation in Africa (CSSDCA) [9]; the framework document of the New Partnership for Africa's Development (NEPAD) [10]; and the principles of the African Peer Review Mechanism (APRM) [11], which all acknowledge that developmental and integration goals/objectives need to be reconciled with the tasks of conflict prevention, conflict management, peacekeeping, and even, at times, peace enforcement.

The logical conclusion from these linkages between security and development would be the creation of a 'security community' in the Southern African region. Common security refers to a stage beyond the recognition of shared security interests towards the inculcation of shared norms and values. It furthermore dictates the need for aligning each and every country's domestic policy and behaviour with that of the community, implying a degree of 'loss of sovereignty' that is dependent upon a high level of mutual trust within the grouping of states.

While there is a recognised need for the creation of a security community in Southern Africa and numerous agreements are being concluded to this effect, such a community does not yet exist in the region. Many argue that while the legal basis exists in treaties and protocols, the political will to fully implement these arrangements lacks behind [12]. What currently exists in the region can at best be described as a collaborative or co-operative security regime characterised by instruments such as a mutual defence pact (that will be discussed in some detail later in the article) and a number of weak institutions aimed at identifying shared security interests.

As SADC moves to a common security system, a number of institutional, conceptual, and other challenges need to addressed in a systematic and sustainable manner.

Developments in the Southern African security architecture

Since the signing of the SADC Protocol on Politics, Defence and Security (hereafter referred to as the Protocol) in Blantyre in 2001, a number of significant developments have taken place. According to the Protocol the OPDSC is placed under the authority of the SADC Summit; is led by a leadership Troika (consisting of an outgoing, current and incoming chairperson [13]) that rotates on an annual basis and does not overlap with the leadership Troika of SADC itself [14]; will be provided with secretarial services by the SADC Secretariat in Gaborone; and will consist of a number of structures and sub-structures. As will be discussed in more detail further on in this article, the subsequent restructuring process is as yet incomplete.

While, theoretically, the Protocol resolves the impasse over the position of the Organ vis-à-vis the other institutions of regional integration in SADC, some issues remain to be resolved in the process of implementing the provisions of the Protocol. The tension between the military-security establishment on the one hand and the foreign policy-conflict management community on the other is not resolved in practical terms.

In principle the Protocol appears to affirm a conflict management regime that favours political, rather than military solutions [15]. It establishes an Inter-State Politics and Diplomacy Committee (ISPDC) to counterbalance the long-standing and powerful Inter-State Defence and Security Committee (ISDSC) [16], and contains specific references to the need for political co-

operation and the promotion of democratic institutions and practices. In reality, however, the ISPDC has only met twice and has not yet set up any sub-committees.

The ISPDC is composed of ministers responsible for foreign affairs from SADC member states while the ISDSC consists of ministers responsible for defence, public security and state security. The Ministerial Committee of the Organ, responsible for the coordination of the work of the Organ and its structures, is composed of all the above ministers. The implication is that ministers will have to report to themselves on a next level, an arrangement which may effectively render the Committee obsolete since the ISPDC and ISDSC may in certain circumstances also report directly to the Chairperson of the Organ. As Cedric de Coning argues [17], this 'create(s) a dangerous dualism by splitting the Political and Diplomatic Committee from the military, public security and state security interest of the ISDSC'. As such the problem of differences amongst member states in the preference for either diplomatic or military solutions to problems in the region is not addressed through the restructured Organ.

As if to re-affirm the perception that SADC states continue to shy away from the domestic implications of closer political co-operation, the Organ prioritised the finalisation of a Mutual Defence Pact (MDP) [18]. The Pact was subsequently adopted at the SADC Summit in Dar es Salaam in August 2003. A watered-down version of the North Atlantic Treaty Organisation (NATO) Pact which obliges members to respond to an attack on a member state as an attack on all, the MDP merely calls upon member states to 'participate in such collective action in any manner it deems appropriate' [19]. More worryingly, it recommits states to the principle of non-interference in the internal affairs of any of its members and opens the door for collective action in support of a non-democratic regime [20].

The current year and 2005 sees the majority of SADC states going to the polls, and encouragingly, SADC states have agreed on a number of principles to guide the holding of 'free and fair' elections in the region. The SADC Principles and Guidelines Governing Democratic Elections [21], adopted by Heads of State during their Summit in Mauritius in August 2004, contains brief reference to some principles for the conduct of democratic elections and then elaborates on the mandate and constitution of the SADC Observer Mission, guidelines for observers and their rights and obligations. Unfortunately they come a bit late as South Africa and Malawi have already held their elections and elections in Botswana, Lesotho, Mozambique, Namibia and Zimbabwe will be held in the next six months, leaving little time for these states to amend their electoral policies where required and for the preparation of mechanisms to support a SADC Observer Mission. The guidelines also fail to go beyond the actual election period to include the critical run-up phase during which much is determined in terms of the 'environment' in which elections will be taking place. A further critique of the guidelines points out that while the country holding elections may choose to invite the SADC Observer Mission, they are not compelled to do so; that there are no particular guidelines for the composition of the Observer Mission other than that it will be constituted by the Chairman of the Organ; and there are no punitive measures to be employed against a state which fails to comply with these guidelines.

Both the MDP and the SADC Principles and Guidelines Governing Democratic Elections thus, for the time being, remain paper tigers along with so many other Protocols and Agreements signed by Southern African leaders.

Challenges of implementation

In 2001 the Ministerial Committee of the Organ, in line with instructions by the Summit, embarked upon the development of a regional Strategic Indicative Plan for the Organ (SIPO). After many delays the SIPO was finally adopted by SADC heads of state at their summit in Dar es Salaam in 2003 and officially launched by the then chairperson of the Organ, the prime minister of Lesotho, at the August 2004 Summit in Mauritius. While certainly indicative, the plan still lacks clear guidelines for implementation, and remains to be integrated into SADC's more general Regional Indicative Strategic Development Plan (RISDP) [22]. In the meantime, progress will be limited and ad hoc until the restructuring process of SADC is completed and the SADC Secretariat is fully staffed in order to be able to carry out its extensive mandate.

An incomplete restructuring process

The first and foremost challenge to the implementation of all of SADC's regional agreements is the conclusion of the lingering restructuring process [23]. With regard to peace and security issues, this includes the establishment of all the committees and sub-committees envisaged in the Protocol and in particular, a department of politics and security at the SADC Secretariat and a conflict management unit including an early warning system and training capacity. At present, there are only two individuals at the Secretariat with a mandate to deal with issues of peace and security.

According to the SADC Treaty [24] and Article 9 of the Protocol, the SADC Secretariat is responsible for providing services to the OPDSC. As an interim measure, the country chairing the Organ has been providing secretarial and administrative support. This arrangement has created problems of continuity and institutional memory that will have to be addressed at the earliest possible stage through the creation of relevant processes and policies to manage the transfer of control to the Secretariat. A recent decision to establish an 'Office of the Chairperson' (under the guise of it being a measure to assist 'weaker' member states to execute their duties) as an additional SADC-supported structure may further delay the transfer of the 'Organ Secretariat' to its rightful place in Gaborone. Keeping the administrative body responsible for issues of security separate from the one that manages regional integration in the economic and social spheres does not bode well for the institutionalisation of a human security perspective in the sub-region. The current arrangement furthermore creates the danger that the Organ agenda is vulnerable to manipulation by the Chair or other political interests in the region.

Regional dynamics and the lack of domestic security

Despite much progress, Southern Africa remains plagued by instability and conflict. The peace process in the Democratic Republic of the Congo (DRC) is threatened by continued violence in the east of that vast country and political instability in Zimbabwe continues to escalate. Angola is still faced by a myriad of problems pertaining to post-conflict reconstruction and rehabilitation in a country destroyed by 27 years of virtually uninterrupted war.

To date SADC has failed to respond to the conflict in the DRC in a coordinated manner. The military intervention, on behalf of the government, of Angola, Namibia and Zimbabwe into the conflict in 1998 was neither mandated, nor rejected by SADC – amounting to a de facto

approval thereof. On the other hand, the political and diplomatic efforts of, in particular Zambia, Tanzania, and South Africa, have not enjoyed SADC's broad-based support either. Efforts by erstwhile chairs of the Organ, Mozambique and Lesotho, to convene a SADC task force to visit the Congo have failed repeatedly. Neither has the DRC formally requested SADC as such to assist in its peacemaking and peacebuilding process.

The case of the DRC is illustrative of the ideological divisions that continue to characterise the region. On the one side there is the militarist block dominated by Angola and Zimbabwe, and on the other we find those who prefer political and diplomatic options for conflict management led by South Africa and Mozambique. Other states are aligned to either block or have opted to sit on the fence.

Angola is an undisputed military giant in the region and with its abundant combination of diamonds and oil has the potential to rise to considerable economic significance as well. As such, a coordinated SADC programme of action to assist in peace building and post-conflict reconstruction at all levels in Angola ought to be a regional priority. The OPDSC, as the SADC structure with primary responsibility for the maintenance of peace and security in the region, has an important role to play in this regard.

The Zimbabwean situation is a little trickier and presents an instance of a lack of political stability, rather than open violent conflict as in the case of the DRC. If the concept of political stability is expanded to include principles of 'good governance', as implied by the Protocol, even more countries would fail to make the cut. With due consideration for the developments on the continental level [25], the implication of the Zimbabwean situation is to compound the urgency of the need for the region to develop and agree upon a set of minimum standards of good governance (such as, fewer restrictions on press freedoms, freedom of association, and the like) and create a sub-structure to carry out reviews. This needs to be supplemented by the design of a mechanism to deal with signatories who do not comply with these minimum standards [26]. The Organ should, at the same time, set in motion the necessary processes for the establishment of a sub-committee on democracy and human rights under the ISPDC. The adoption of the abovementioned SADC Principles and Guidelines Governing Democratic Elections is a step in the right direction, but there is a long way to go.

In the absence of clear external threats to peace and security in Southern Africa, the lack of domestic security presents the gravest challenge. John Dzimba [27] argues that the fact that most of the threats to the security of people Southern Africa derive from internal, rather than external factors paradoxically represents an advantage – it places the region's destiny in its own hands. Most security threats, particularly within states, are non-military [28], and a holistic approach to addressing these issues needs to overshadow any military considerations. At present Angola and Zimbabwe are the most daunting examples, but human security is not a given in the majority of countries in the region. Close to 50% of SADC's population live on less than a dollar a day, few people can expect to reach the age of 50, and HIV/AIDS is rampant. Such extreme levels of depravation create a breeding ground for political mobilisation, ethnic rivalry and religious extremism, especially if compounded by a lack of mechanisms to ensure the equitable distribution of resources through legitimate political processes. This points to a need for ever-closer co-operation between SADC itself and the OPDSC and also calls for the active involvement of civil society, the private sector and the international community in the Organ's initiatives. Consultation processes with the aforementioned groups ought to be institutionalised, and perhaps a sub-structure needs to be created to this effect.

The need for conceptual clarification [29]

A number of issues and concepts within the Protocol, the Organ, and the collective memory of southern African states beg for clarification. The issue of continued conflict of political values amongst states in the region finds its way into almost all explanations of the failure of the OPDSC and discussions of the challenges to the future of the Organ. Finding common ground is a matter of extreme urgency [30] that would require open and honest dialogue complemented by a free flow of information and due consideration for the domestic conditions of different states.

Certain aspects of the SADC Protocol are ambiguous and may lead to disputes on the basis of divergent interpretations if conceptual clarity is not achieved through additional consultation and, where necessary, agreements and amendments to the Protocol. Brief mention may be made of the apparent negligence to consider instances where conflicts do not conform to either the traditional definition of an inter- or an intra-state conflict, but where the lines are blurred (such as the DRC). The mechanisms for dealing with inter-state war, as entrenched in the UN system and replicated in regional and sub-regional organisations, are not appropriate for resolving such conflicts, and the appropriateness of intervention into the internal affairs of a state appears to be judged post hoc and on political, rather than legal grounds at this point in time. The OPDSC will have to clarify these issues in the regional context and agree upon decision-making and substantive procedures to be institutionalised.

It is also necessary that the SADC and the OPDSC in particular obtain clarity as to the level of integration desired within the region as this has far-reaching implications.

Another potential source of contention in need of clarification is the exact use of, and meaning attached to, collective security and collective defence. Else, as Anthoni van Nieuwkerk warns [31], the Organ may remain 'an instrument in the hands of state elites who will use it to protect and advance their interests…The distinction between the two is crucial. The former is based on political and security protocols and co-operation, whilst the latter entails a more ambitious commitment by states to defend each other against external attack'.

Linking SADC's security architecture to continental developments

As mentioned earlier, Southern Africa's security architecture is inextricably linked to developments at the continental and international level. In the year 2002 the OAU was transformed into the AU and, in recognition of the fact that economic growth and human development cannot take place amid war and violent conflict, its mandate to work towards peace and stability on the continent was reiterated and reinforced. The Protocol establishing the AU Peace and Security Council (PSC) [32] was signed by African Heads of State and entered into force on 26 December 2003. While not all that much different from the OAU Mechanism for Conflict Prevention, Management and Resolution in its principles and objectives, the PSC seems to be regarded with much more seriousness by decision-makers within and outside the region. The trend to delegate peacemaking, -keeping, -enforcement and -building activities to the regional level appears irreversible and African leaders' desire to seek 'African solutions to African problems' acts as a further driver. While the guiding principles of the PSC still respect the sovereignty of member states, it now enjoys the right to 'intervene in a member state pursuant to a decision of the assembly in respect of grave circumstances, namely war crimes, genocide and crimes against humanity' [33].

Another relevant development at the continental level include the reaffirmation (through the adoption of a relevant Memorandum of Understanding signed in this regard in 2002) of the core values, commitments and performance indicators contained in the Conference on Security, Stability, Development, and Co-operation in Africa (CSSDCA) [9].

Also significant is the commencement of voluntary country reviews of economic and political governance by the African Peer Review Mechanism (APRM) of the New Partnership for Africa's Development (NEPAD) [10].

While the horizontal relationship between these different continental mechanisms remains to be resolved, there is also a need to explore the vertical linkages between these continental structures and sub-regional entities such as SADC. Southern Africa should create the capacity to contribute to the African Standby Force, the continental Early Warning System, and should replicate the African Peer Review Mechanism (APRM) at the sub-regional level to assess the progress of member states in terms of 'good' political and economic governance. There is considerable pressure on sub-regional entities to sign Memoranda of Understanding with the AU to cement their role as building blocks of the continental security arrangements, but SADC needs to clarify its own objectives and structures first (informed of course by continental requirements) to be able to enter into such negotiations from a position of certainty and strength.

Other immediate challenges

The issue of funding presents another major challenge. SADC is financed by equal contributions from member states, and donations. In order to operate as envisaged, the SADC OPDSC needs a sustainable source of revenue. Already cash-strapped member states may not be able to provide sufficient contributions to maintain a permanent secretariat, a peacekeeping training centre and other standing sub-committees, and reservations with regard to relying upon donor funding are justified. Various options for funding both within the entire SADC structure and independently need to be explored. Beyond the institutional requirements of the Organ, the issue of funding has implications for broad overall capacity and will specifically affect the capacity of the OPDSC to coordinate and accept delegated conflict management responsibilities.

Communication and information sharing represents a historical challenge [34] that could remain an impediment to coordination and integration if it is left unaddressed. Communiqués issued at the end of meetings have been blunt working instruments, not allowing much insight into what really transpired [35]. This effectively excluded not only independent analysts, civil society and national constituencies from participation, but even kept average SADC ministers and officials in the dark. This unhealthy state of affairs was compounded by the fact that SADC did not have a functioning website until recently, and that even official legal documents (i.e. protocols and treaties) were difficult to get hold of. There is a need for the OPDSC to change this situation, use the Secretariat to accurately record all meetings, including Summits, in order to avoid divergent readings, act as an institutional memory and vehicle for continuity, and allow for the broad participation of civil society and other stakeholders while ensuring transparency and accountability. Attention to these kinds of issues should also bode well for relations with the international donor community.

Training and capacity building should take place at various levels within the SADC OPDSC structures. Extending from training the secretariat and SADC diplomats to the creation of an ef-

ficient and credible regional peacekeeping force and community level (peace) education, these activities should form a part of the core functions of the Organ, and might be overseen by a special representative or various subcommittees. The OPDSC should also consider involving civil society capacity in these efforts.

Conclusion

These challenges highlight some of the issues that will be faced by the proponents and drivers of the SADC OPDSC in the near future. They are by no means exhaustive or representative of the complexity of the challenge of creating a well-functioning sub-regional security community. Only a few examples of those exist in the world.

Once the main problem, that of gathering sufficient political will has been overcome, systematic and consultative efforts at confronting the remaining challenges should yield positive outcomes.

The global climate is characterised to a large extent by contraction and a loss of faith in international structures as the principal providers of security and well-being. This presents an environment that encourages regional integration and rewards political stability, good governance and fiscal responsibility.

With regard to security co-operation in Southern Africa, windows of opportunity have been missed in the past. At the advent of a new era in African affairs another opportunity is knocking, and there is justifiable cause for optimism that this time around the time is ripe for inclusive co-operation around the concept of human security that will improve the lives of all the people in Southern Africa.

Notes

1. This article is in essence and updated version of an article by the same author that appeared in Africa Insight 32 (4) (2003), entitled 'Challenges facing the newly restructured SADC Organ for Politics, Defence and Security'.
2. Angola, Botswana, the Democratic Republic of the Congo (DRC), Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. Seychelles was a member of SADC until July 2004.
3. For a detailed discussion of this debate see A. Hammerstadt, Defending the State or Protecting the People: SADC Security Integration at a Crossroads?, SAIIA Report Number 39, South African Institute of International Affairs, Johannesburg, 2003.
4. The broader concept of human security to which the 1996 communiqué establishing the Organ had made specific references represents a noticeable omission in the protocol.
5. SADC, SADC Protocol on Politics, Defence and Security Co-operation, SADC Secretariat, Gaborone, Botswana, 2001. Also available on SADC's web site: www.sadc.int.
6. SADC, Consolidated Text of the Treaty of the Southern African Development Community as Amended, SADC Secretariat, Gaborone, Botswana, 2001. Also available on SADC's web site: www.sadc.int.
7. African Union, Constitutive Act of the African Union, au Secretariat, Addis Abeba, Ethiopia, 2000. Also available on the iss web site: www.iss.org.za.

8. African Union, Protocol Relating to the Establishment of the Peace and Security Council of the African Union, au Secretariat, Addis Abeba, Ethiopia, 2002. Also available on the ISS web site: www.iss.org.za.
9. See CSSDCA Kampala Document (1991) and the CSSDCA Solemn Declaration of AU Heads of State and Government (2000). Both documents are available from the AU in Addis Abeba or at http://www.iss.org.za/AF/RegOrg/ unity_to_union/oaukey.html (2 September 2004).
10. NEPAD, The New Partnership for Africa's Development, October 2001. Available from the NEPAD web site: www.nepad.org.
11. For more information on the African Peer Review Mechanism refer to the NEPAD web site: www.nepad.org and the various articles that have been written on this topic.
12. Refer in particular to articles contained in the SADC Barometer published by the South African Institute of International Affairs and available on their web site: www.wits.ac.za/saiia.
13. These are Lesotho (outgoing), South Africa (current) and Namibia (deputy chairperson).
14. Tanzania is the outgoing chair of SADC, Mauritius currently occupies the chair and Botswana was elected as deputy chairperson at the SADC Summit in Mauritius in August 2004.
15. SADC, SADC Protocol on Politics, Defence and Security Co-operation, SADC Secretariat, Gaborone, Botswana, 2001. Also available on SADC's web site: www.sadc.int.
16. The ISDSC developed out of the Front Line States and has for long been the only funtioning component of the sub-region's security mechanism.
17. C. de Coning, Breaking the SADC Organ Impasse: Report of a Seminar on the Operationalisation of the SADC Organ, accord Occasional Paper, No. 6, 1999.
18. SADC, SADC Mutual Defence Pact, SADC Secretariat, Gaborone, Botswana, 2003.
19. Article 6 (4) of the SADC Mutual Defence Pact.
20. A. Hammerstadt, Defending the State or Protecting the People: SADC Security Integration at a Crossroads?, SAIIA Report Number 39, South African Institute of International Affairs, Johannesburg, 2003.
21. SADC, SADC Principles and Guidelines Governing Democratic Elections, SADC Secretariat, Gaborone, Botswana, 2004. (http://www.sadc.int/index.p-hp? action=a2001&news_id=158& language_id=1; 20 August 2004).
22. SADC, Regional Indicative Strategic Development Plan, SADC Secretariat, Gaborone, Botswana, 2004.
23. For a discussion of SADC's restructuring process see G. van Schalkwyk, SADC restructuring: Progress and difficulties, in SADC Barometer, issue 1 (2003) (www.wits.ac.za/saiia) and J. Isaksen, Restructuring SADC – Progress and Problems,. Report R2002:15, Christian Michelson Institute, Norway (www.cmi.no).
24. Article 10(a).
25. Note here the cssdca and the nepad African Peer Review Mechanism (APRM).
26. Again, this should be coordinated with broader SADC and Continental efforts.
27. J. Dzimba, A common sub-regional agenda for peace, human security and conflict prevention: A view from SADC, in Peace, Human Security and Conflict Prevention in Africa, Proceedings of the UNESCO-ISS Expert Meeting held in Pretoria, 23 - 24 July 2001.
28. Barry Buzan (People, States, and Fear: An Agenda for International Security Studies in the Post-Cold War Era, Hemel Hempstead, Wheatsheaf (Boulder, Lynne Rienner), 2nd edition, 1991) argues that human security can be affected by threats emanating from five sectors: military, political, economic, social and environmental.

29. G. van Schalkwyk, Challenges facing the newly restructured SADC Organ for Politics, Defence and Security, Africa Insight 32 (4) (2003).
30. Article 8 of the Protocol states that decision within the committees shall be taken by consensus.
31. A. van Nieuwkerk, Looking ahead: peace-building in southern Africa, in Global Dialogue, Volume 5, 1 May 2000, IGD, Johannesburg.
32. The PSC is a standing decision-making organ of the au and has six objectives: 1) to promote peace, security and stability in Africa; 2) to anticipate and prevent conflicts; 3) to promote an implement peace-building and post-conflict reconstruction activities to consolidate peace; 4) to co-ordinate and harmonise continental efforts in the prevention and combating of international terrorism; 5) to develop a common defence policy (in accordance with article 4(d) of the act); and to promote and encourage democratic practices and protect human rights as part of efforts for preventing conflicts.
33. Article 4 (h) of the Constitutive Act of the African Union. See also A. van Nieuwkerk, The Role of the au and nepad in Africa's New Security Regime, in: S Field (Ed.), Peace in Africa: Towards a Collaborative Security Regime, Institute for Global Dialogue, Johannesburg, 2004, for a more detailed discussion of the continental security architecture.
34. 'Inevitably national rivalries and suspicions have undercut any attempts at real information sharing at regional and international levels'. Quoted from J. Cilliers Regional African peacekeeping capacity – Mythical construct or essential tool?, in: Jakkie Cilliers and Greg Mills (Eds.), From Peacekeeping to Complex Emergencies: Peace Support Missions in Africa, ISS, Halfway House, and SAIIA, Johannesburg, 1999.
35. A. Tapfumaneyi, The SADC Organ on Politics, Defence and Security: Interpreting the Decision of the Maputo 1997 SADC Summit, accord Occasional Paper, No. 9, 1999.

Biotechnology and food security in developing countries

The case for strengthening international environmental regimes

Magdalena Kropiwnicka

ActionAid International, Via Volta 39 B, 00153 Rome, Italy;
m.kropiwnicka@actionaidinternational.it

'*Whoever controls the seed today could rule over nations tomorrow*'.
Mary C. Carras

This article discusses and evaluates the potential impact of the modern biotechnological revolution (genetic engineering) on food security in developing countries. It finds that within the present framework, where innovations are driven by profit rather than by need-oriented research and development, the biotechnological revolution can have an adverse effect on small farms and exacerbate social, economic and environmental problems. Given that the current debate on biotechnology entered a period of intensified conflict over questions of ownership and control over biological materials, the role of patenting and Intellectual Property Rights (IPRs) is specifically highlighted. In conclusion, much emphasis is given to the international attempts at control of biotechnology within the UN system with particular regard to the Cartagena Protocol on Biosafety and the FAO International Treaty on Plant Genetic Resources for Food and Agriculture and their attempts to set guidelines governing trade in genetically modified organisms and to strengthen the concept of 'farmer's rights'.

The new technologies associated with genetic engineering and commonly referred to as biotechnology are increasingly perceived by their promoters and critics as so ground-breaking that their impact on farming, agriculture and food systems will far surpass that of the twentieth century industrial revolution. Consequently, many authors dealing with the issue of biotechnology and development point to the lessons learned from the 'Green Revolution' when the western industrial model of agriculture was exported to the developing world, producing mixed results [1,2,14,15,18]. In this article, first these lessons are reviewed and the current genetic revolution in developing countries is outlined. Subsequently, food security is redefined and agro-industry myths are debunked. The article continues with a discussion of intellectual prop-

ISYP Journal on Science and World Affairs, Vol. 1, No. 1, 2005 45-60

erty rights applied to biotechnology. Finally, international environmental regimes that aim to defend biodiversity and farmer's rights are reviewed.

Lessons from the Green Revolution and the current pace of the genetic revolution in developing countries

Though it is true that the Green Revolution was highly successful in initially increasing crop yields and aggregate food supplies, it has also been responsible for causing many environmental and socio-economic problems. By its promotion of the industrial farming model, favouring mostly export cash crops producing farms that have enough resources to purchase expensive chemical and mechanic inputs, the Green Revolution has failed to address the issue of food access and contributed to the erosion of genetic varieties in the food systems [1,2,10,18]. The technological change introduced by the Green Revolution has discriminated against small, sustenance-level production, contributing to the loss of food self-sufficiency and agro-biodiversity at the local level among many areas of Asia, Latin America and Africa [21]. In addition, the reliance on chemical fertilisers has not only led to a major environmental crisis by leading to new 'ecological diseases' [22] but has also made developing countries' food production dependent on expensive imports of agro-chemicals and machinery [1]. Essentially, although the Green Revolution contributed to the overall global food security in an aggregate sense, it has failed to address specific food security needs at household, intra-household and community levels and failed to deliver its promise of ending world hunger with today more than 850 million people being undernourished [23]. At the same time the Green Revolution is partially responsible for entrenching an unsustainable food production system favouring monocultures and exacerbating both environmental degradation and an unequal distribution of resources.

It is within this context that ironically virtually the same few firms that have profited the most from agro-chemical sales to developing countries are today's leaders of biotechnological research and development (R&D), marketing their new products as a solution to hunger that will turn farming into an environmentally friendly process with increased yields and profitability. 'According to FAO (Food and Agriculture Organisation of the United Nations), the five largest plant biotechnology companies are all large multinational corporations with important interests in agro-chemical sales: DuPont, ICI, Monsanto, Sandoz and Ciba-Geigy' [12]. The majority of biotechnological R&D takes place within the rich OECD countries, 'where most expenditures are directly accounted for by private-sector firms with much public-sector R&D undertaken for the indirect benefit of private firms' [3]. Overall, 70 percent of agricultural biotechnology investments are by private sector research and only four firms – DuPont, Monsanto, Syngenta and Bayer – control nearly 100 percent of the market in genetically modified (GM) products for agriculture. Only a handful of advanced developing countries have their own biotechnological programmes, among them being Argentina, India, Mexico, Brazil and China. By 2001, over 75% of GM crops have been planted in industrialised countries and substantial planting concerns only four crops – soybean, maize, cotton and canola – while there are no serious investments in most important crops for the semi-arid tropics. Additionally, given that increasing market share and control has become the guiding principle of the present-day biotechnological revolution in agriculture, the two greatest advances and most common traits of genetic modification are insect resistance and herbicide tolerance [9,12].

Concentration of research in biotechnology in the private domain, controlled by a few multinational companies of the North, and coupled with development of an international patenting regime, are the most crucial factors in shaping the socio-economic, environmental and the food-security consequences of biotechnological innovations for the developing countries.

Biotechnology via 'genetic engineering' involves 'the excision of individual genes or sections of chromosomes from a particular genome and their transfer into a different cell and, thus, a different genomic background' [13]. This extraction and replacement of genes allows for overcoming the species' biological and chemical barriers as well as for rapid movement of genetic material to create new micro-organisms, plants, and animals. Given that genetic material can now be exchanged among all living organisms within a short time combined with the new developments in patenting rights has put biotechnological R&D largely outside of the public domain's regulations. 'Companies are striving to develop novel biotechnology products as quickly as possible, while simultaneously lobbying to reduce as much as possible the public regulatory processes' [15]. In fact, companies are massively deploying genetically engineered plants around the world, usually without proper short and long term testing of their impact on health and environment. The rate of growth in the cultivation of genetically modified organisms (GMOs) during the past 5 years has been truly striking: in 2003 over 67 million hectares were cultivated with GMO crops as compared with only 11 million hectares in 1998 [24]. This rapid release of GMOs into environment has brought with it the consequences of genetic contamination of traditional varieties due to effects of cross-pollination, mixing with batches of GM seeds or illegal introduction of seeds without the explicit consent of a particular developing country. The location of transgenic maize crops in Mexican fields in 2001 [25], despite the Mexican moratorium on GMO crops established in 1998, is particularly disturbing as it serves to demonstrate the ease with which the GMO crops have contaminated other non-GMO varieties at the centres of origin of the crop's biodiversity [26].

The FAO [48] lists two levels of potential risks posed by genetic engineering: its effects on human and animal health as well as its effects on the environment. Among the risks to human and animal health is the potentiality of transfer of toxins from one life form to another, including substances responsible for allergic reactions. Risks to the environment are many, including the loss of biodiversity in favour of fewer new GMO crops and associated problems related to upsetting balance of the ecosystem. Some examples are the risk of contamination of the world's genetic resources and the risk of development of new more aggressive weeds with resistance to diseases and pesticides [27].

The present structure of the 'gene revolution' based on profit rather than need-motivated deployment of seed products coupled with enforcement of IPRs and absence of a fully implemented regulatory and biosafety framework, could have a disastrous effect on the developing countries' food security. This is why it is necessary to conduct research that addresses particular countries' environmental and socio-economic circumstances as well as the needs of the smallholder farmers. Furthermore, independent risk assessment of GMOs needs to be strengthened and national and international guidelines must be developed and supported on biosafety and preservation of biodiversity. All this is necessary to assure that the new technologies will not have a negative effect on global food security.

Redefining food security and debunking agro-industry myths

The concept of 'food security' has been undergoing many changes during the last 50 years and today it is widely acknowledged to mean much more than physical availability of food on the market in proportion to population. Although Malthusian anticipation over two centuries ago that food production would not keep up with population growth has never materialised in view of the fact that the world produces more food per inhabitant today then ever before, somehow the myth that hunger is rooted in the gap between food production and human population density and growth rate seems to persist in the mainstream view. The aftermath of the Green Revolution as well as ground-breaking studies of the roots of famines by Noble price winning economist Amartya Sen and others have moved the focus from aggregate production to the role of economic access and distribution. Sen has repeatedly shown that famines occur even without any decline in food production or availability (e.g., the Bangladesh famine of 1974 during the country's peak level of food production) and FAO's statistics demonstrate that on the global scale the food production rate, despite sometimes serious regional variations, is going upwards and in tune with population growth [17].

FAO defines food security as existing when 'all people at all times have access to safe nutritious food to maintain a healthy and active life'. There are three dimensions of food security according to FAO: availability, access and utilisation [28]. Each of these components needs to be considered at the level of individuals, households, nations and international relations. Additionally, the UN Conference on Environment and Development (1992) and the World Conference on Women (1995) have highlighted the principle of social access to food of women (the feminisation of agriculture and poverty, distribution within households) and the role of environmental factors in food security. In particular, sustainability of agricultural practices and the role of other environmental aspects, such as clean drinking water, have come into the forefront in the assessment and accounting for today's food security.

It is within this context that M. S. Swaminathan has proposed a comprehensive definition of food security in preparation for the 1996 World Food Summit:

> Policies and technologies for sustainable food security should ensure:
> That every individual has the physical, economic, social and environmental access to a balanced diet that includes the necessary macro- and micro-nutrients, safe drinking water, sanitation, environmental hygiene, primary health care, and education so as to lead a healthy and productive life.
> That food originates from efficient and environmentally benign production technologies that conserve and enhance the natural resource base of crops, animal husbandry, forestry, inland and marine fisheries [19].

Swaminathan's definition captures both the complexity and the multi-dimen sionality of food security with particular regard to environmental constraints and preservation of ecosystems. Keeping in mind that the majority of developing countries rely on smallholder farms and that hunger is caused by poverty, inequality and lack of access to food and to land, allows us to scrutinise the promises of agro-chemical industries.

Today, the main products of biotechnology revolve around patent-protected crops that are either herbicide resistant (e.g., Monsanto's 'Roundup Ready' soybean seeds that are tolerant to Monsanto's herbicide Roudup) or Bt (*Bacillus thuringensis*) crops engineered to produce their own insecticide. The logic behind herbicide resistance crops is the hope for the increased sales of herbicides from the same company. In the case of Bt crops, the expectation is to boost sales of patented crops while damaging the use of pest-management products used by most organic farmers instead of insecticides (the *Bacillus thuringiensis* is a bacterium that normally lives in the soil and produces toxins which kill the larvae of moths and almost nothing else). In fact, over one third of all biotechnological research on biological control agents focuses on transfer of the Bt gene into major crops [2,12]. According to entomologist Fred Gould, 'if pesticidal plants are developed and used in a way that leads to rapid pest adaptation, the efficacy of these plants will be lost and agriculture will be pushed back to reliance on conventional pesticides with their inherent problems' [12]. Since the expensive products of biotechnology require further input dependence from resource-poor farmers and lead to a probable damage to the environment, the result will be a higher risk to food security.

Another use of biotechnology to the potential detriment of developing farmers' interests is in industrial bio-processing and tissue culture. Present technology allows for the development of industrial substitutes for plant-derived products, which can be produced in factories of developed countries. Such production of many typical Third World exports such as spices, fragrances and sweeteners is already well entrenched in the modern agro-industry. For example, the High Fructose Corn Syrope (HFCS) is presently being produced by converting corn into a sweetener and has already gained wide use in such products as soft drinks. When HFCS attained widespread use, the world demand for sugar went down, threatening the livelihoods of an estimated eight to ten million people in the South and a total collapse of entire economies in the Caribbean and of sugar-producing regions in the Philippines [15,12]. The trend for development of sugar substitution products in the West is on the rise with aspartame being already consumed in large quantities. Among other modern R&D advances that have an adverse impact on major Third World products is cocoa and vanilla in-vitro production. The possibility that protein engineering techniques will be applied to conversion of low price oils (e.g., olive, sunflower and palm oil) into cocoa butter or utilising cell culture for the 'biosynthesis' of cocoa butter in a factory is also on the horizon [3]. According to Buttel [3], the impacts of such developments on developing countries will depend on the importance that a given raw material has as a source of export revenues. Therefore, for example countries such as Ghana and Cameroon, who earn most of their foreign exchange from cocoa, will be most dramatically affected and risk high levels of poverty and unemployment in areas where the crop has been cultivated. Other major cocoa suppliers, such as Brazil and Malaysia, having more diversified exports and production systems dominated by large-scale plantations, will probably be less affected in comparison to small producers in Africa. Keeping in mind that promotion of single export crops for raising export revenues has been heavily promoted in Africa by multilateral financial organisations, the countries' risk to food security due to bio-processing could be paramount. 'Biotechnology thus raises the possibility of a significant restructuring of the world food economy caused by the possible industrialisation of food production, and the relegation of agriculture to production of biotechnology feedstocks' [3].

A major argument used by biotechnology industries is that transgenic crops will significantly increase crop yields. Even putting aside the fact that increased yields alone might lead to

increased development of monocultures and do not address developing countries' food security dilemma, studies conducted by the US Department of Agriculture (USDA) Economic Research Service and University of Nebraska shed doubt on the increased yields hypothesis. USDA analysed data collected in 1997 and 1998 from different region/crop combinations of Bt corn and cotton, herbicide tolerant corn, cotton and soybeans, and their non-engineered counterparts. No conclusive difference was found between GMO and non-GMO crops yield increases [29]. Additionally, the University of Nebraska Institute of Agriculture and Natural Resources grew five different Monsanto soybean varieties and their closest non-engineered relatives and found that, on average, the genetically engineered crops produced six percent less than their conventional relatives and eleven percent less then the highest yielding conventional crops [2].

Altieri in his comprehensive study of biotechnological industry products points out that, in terms of increased yields, land reforms produce best results: 'While industry proponents will often forecast 15, 20 or even 30 percent yield gains from biotechnology, smaller farms today produce from 200-1,000 percent more per unit area than larger farms world wide' [2].

When the multi-dimensional aspects of food security are acknowledged, it becomes clear that as long as biotechnological companies operate under the premise that hunger and poverty can be fixed by increased production and that the only way to do so is by genetic engineering of crops – without due regard for ecosystems, farmers control and access to crops and biodiversity –, the future food security of the developing world is most definitely not going to improve.

The patently problematic biotechnology

Perhaps the most voiced and contested aspect of biotechnology involves questions of patenting and expansion of Intellectual Property Rights (IPRs) within the realm of international and national laws. From the perspective of developing countries, patents can be seen as both obstacles to the transfer of available technologies – keeping poor farmers from affordably obtaining currently expensive seeds – as well as a new form of control over biological material and 'traditional knowledge'.

According to Fowler and Shiva, the developing countries' criticism of patents has a long history and patents are often perceived as an extension of colonial control over Third World natural resources. From this perspective 'patents may be seen by some as a civil right, but it would be more appropriate to view them as a legal mechanism of control in the marketplace' [8].

The consolidation and industrialisation of the seed industry with the growing importance of plant-breeding methods gave rise to the modern patent system related to the creation of new life forms. The Union for Protection of New Varieties of Plants was established in 1961 in order to promote 'plant breeders rights' (PBRs). The PBRs still provided for 'research' and 'farmers' exemptions, meaning that the farmers were allowed to save seeds for replanting. For developing country's farmers consolidation of plant breeders rights meant that the reinterpretation of invention to include discovery had begun. Nevertheless, the direct patenting of life forms remained very problematic for long, with the European Patent Convention expressively prohibiting patenting of plant varieties and with conflicts of interest over international patent reform at the World Intellectual Property Organisation. Already back in the 1960s developing countries have been firm in voicing their opposition to patenting rights via the United Nations

Conference on Trade and Development. According to Fowler, such developing countries' opposition to patents has led the United States to push for change of the arena for discussion of international enforcement of IPRs. It is not a coincidence that IPRs gained a new level of significance at the GATT (General Agreement on Tariffs and Trade), known today as the World Trade Organisation (WTO) [8,51].

Undoubtedly the advent of the biotechnological revolution has been one of the driving forces behind the US's and other developed countries' insistence on the importance of IPRs. The scope of coverage of patents given in the US and Europe have begun to include genes and variety characteristics by treating the new genetically modified product as an invention. The landmark event for patenting of plants has been the 1985 judgement in the United States in which molecular genetic scientist Kenneth Hibberd was granted patents on the tissue culture and the seed and whole plant of maize line selected from the tissue culture. This application included 260 separate claims giving him the right to exclude others from the use of any of the 260 aspects [18]. For the developing country farmer it meant that she could no longer save and replant such a protected seed without violating a law. In fact one of the greatest controversies surrounding the present day patents protecting genetically modified seeds deals with the prerequisite that a farmer purchases the GMO seed from a company each year without resorting to the age-old tradition of saving seeds for the next year's cultivation.

Another major conflict in the IPR domain is the patenting of products and processes derived from plants on the basis of indigenous knowledge. There are many examples of plant and micro-organism varieties that have been granted a patent in the West in ignorance of the fact that the patented subject has been used for centuries in some ethnic community. The examples range from the patent applications on the traditional African plant Eddod to kill Zebra mussels [30] to the biopesticidal properties of the Indian plant Neem known as Azarichdita Indica [31]. In both cases knowledge of the properties of these plants existed and was applied in the respective communities since centuries. Although the patent system is often defended by its promoters as a human right that rewards creativity of an inventor, in the cases mentioned above the real inventors, that is the developing countries' farmers, are not expected to see any benefits while at the same time the concept of common heritage on which development of indigenous knowledge depends is being eroded. Although the value of the patent is dependent on its source from nature's diversity, it is what Shiva defines as 'tinkering' that becomes the source of creation. 'The issue of IPRs is closely related to the issue of value. If all value is seen as being associated with capital, tinkering becomes necessary to add value. Simultaneously, value is taken away from the source (biological resources as well as indigenous knowledge), which is reduced to raw material' [18]. In effect, the rich resources of indigenous knowledge due to their communal ownership, uncertain date of creation and unwritten form do not fit the requirements of the western system of IPRs. This helps to explain why although a vast majority of Western patents issued on derived properties originates from the developing countries' biodiversity, less than 5 percent of the patents granted in developing countries are used there in production processes while fewer than 1 percent of the patents issued in developing countries go to developing countries' nationals. Additionally, inventors in poor countries would find it hard to patent their discoveries in the West given the high costs associated with securing a patent (at least $ 4,000 in the US) [32] not to mention the legal costs associated with defending it. An insight to the functioning of IPRs in the American system is

illustrated by the fact that Genetech, a major US biotech company, has four times as many lawsuits to protect its patents as it has products [8].

Since the 1990s the push towards internationally recognised patents has gained momentum under the World Trade Organisation's TRIPS (Trade Related Aspects of Intellectual Property Rights) [50], which set standards for the legal protection of intellectual property. The world's poorest countries were given until 2006 to comply in full with the requirements of the TRIPS treaty [33]. The TRIPS lay the ground rules describing the IPR protections that each member country must provide, or to put it in other words, the absence of intellectual property rights protection constitutes an unfair trade barrier under WTO. Although the TRIPS Article 27.3 excludes from patentability 'plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animal other than non-biological and microbiological processes' (emphasis added), this wording creates specific constraints for developing countries' own research and development in the area of bio-engineering, given the patent walls constructed around these 'non-biological' processes [34]. Moreover, the patent protections of biotech companies put public independent research on risk assessment of their products at the mercy of the corporate willingness to release their seeds for testing [4].

So how can the IPR system work to benefit the world's poor countries? The United Kingdom's Department for International Development (DFID) has set up a Commission on Intellectual Property Rights which has produced a report published in September 2002 affirming that developing countries should take their time to committing themselves to the Western system of IPR protection unless such systems are beneficial to their needs and that the West should not push for stronger requirements than those already contained in the TRIPS. The Commission in its Report entitled 'Integrating Intellectual Property Rights and Development Policy' recognises that IPRs have done little to recognise the services of farmers in selection, development and conservation of their traditional varieties on the basis of which modern breeding techniques have been built. The Report distinguishes between the needs of poor developing countries and of those with a solid base for conducting their own R&D in agricultural biotechnology. Consequently the Commission recommends that:

> Developing countries should generally not provide patent protection for plants and animals, as is allowed under Article 27.3(b) of TRIPS, because of the restrictions patents may place on use of seed by farmers and researchers. Rather they should consider different forms of sui generis systems for plant varieties.
> Those developing countries with limited technological capacity should restrict the application of patenting in agricultural biotechnology consistent with TRIPS, and they should adopt a restrictive definition of the term 'micro-organ-ism'. [35]

Furthermore, the Commission recommends that the TRIPS that are undergoing review of its provisions in the TRIPS Council should preserve the right of countries not to grant patents for plants and animals, including genes and genetically modified plants and animals. More so, it lists the ways in which developing countries can meet TRIPS obligations by adopting alternative modes of protections such as Plant Variety Protections (UPOV) style legislation based on the 1978 or 1991 Convention (although they may now only join the 1991 Convention), another form of sui generis system including landraces or patents on plant varieties. In terms of the Low Income Developing Countries, the Report advocates that they should be granted an

extended transition period for implementation of TRIPS until at least 2016. In addition, the Commission wishes to see more funding for public directed research in agricultural R&D and for preservation of the world's 'gene banks'.

Most importantly, the Report strongly encourages all countries to ratify multilateral treaties strengthening the concept of 'farmer's rights', aiming at the protection of biodiversity and enforcement of biosafety such as the FAO's International Treaty on Plant Genetic Resources for Food and Agriculture [49] and the Cartagena Protocol on Biosafety [46].

International environmental regimes in defence of biodiversity and farmer's rights

Both the developing and the developed world are seeking viable solutions to preserve the delicate balance between gaining maximal societal rewards from newly available technologies while at the same time assuring preservation of the world's rich resources, including biodiversity and indigenous knowledge. Humanity's food security depends on the judicious utilisation of the latter resources. As with all technologies, biotechnology offers both great promises and many risks. Minimising those risks requires international co-operation and strengthening of the multilateral initiatives in environmental regulatory regimes. The UN Conference on Environment and Development held in Rio de Janeiro [36] has led to adoption of the Convention on Biological Diversity [47] which in turn led to the breakthrough in the work of FAO addressing issues of protection of biodiversity and farmer's rights as well as to the adoption of the Cartagena Protocol on Biosafety in 2000.

The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

The foundation for international action to ensure conservation, use and availability of plant genetic resources was the FAO Undertaking on Plant Genetic Resources agreed in 1983. In 1989 the Undertaking has incorporated Farmers' Rights 'arising from the past, present and future contributions of farmers in conserving, improving, and making available plant genetic resources, particularly those in the centers of origin/diversity' [37].

The breakthrough came with the adoption of the Convention on Biological Diversity of 1992 which has allowed to transform the Undertaking into the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) that came into force on 29 June 2004 [38]. The Treaty has the specific objective of facilitating access to plant genetic resources held by contracting parties, and those in international collections, for the common good, recognising that these are an indispensable raw material for crop genetic improvement and that many countries depend on genetic resources which have originated elsewhere. The ITPGRFA also recognises the contribution of farmers in conserving, improving and making available these resources, and that this contribution is the basis of Farmers' Rights. It does not limit in any form the rights that farmers may enjoy under national law to save, use, exchange and sell farm-saved seed. Nevertheless, the Treaty's provisions leave it entirely up to national governments to implement Farmer's Rights which on one hand gives countries autonomy in developing such legal protections while on the other does not protect countries that do not devise their own national mechanisms [39].

The rationale for Farmers' Rights combines arguments about equity and economics. Plant breeders and the world at large benefit from conservation and development of plant genetic resources undertaken by farmers, but farmers are not recompensed for the economic value

they have contributed. The Commission on Intellectual Property states that 'Farmers' Rights may be seen as a means of providing incentives for farmers to continue to provide services of conservation and maintenance of biodiversity' [40]. Moreover, by adopting the ITPGRFA, countries have a guarantee that possible extension of intellectual property protection does not carry risks of restricting farmers' rights to reuse, exchange and sell seed, the very practices which form the basis of their traditional role in conservation and development of plant genetic resources.

Provisions of ITPGRFA have also developed a 'Multilateral System' through which signatories agree to provide access to plant genetic resources from an agreed on list of crops that are deemed as important to food security. Signatories are also to encourage other institutions to become part of the 'Multilateral System' such as Consultative Group on International Agricultural Research (CGIAR) and other national and private collections of genetic material.

The Treaty has established an important principle by which any user of germoplasm material should sign a standard Material Transfer Agreement (MTA) [41], which will incorporate the conditions for access agreed in the Treaty (paragraph 12.3) and provide for benefit sharing of proceeds from any commercialisation arising from the material through a Fund established under the Treaty.

Notably, the Treaty provides for the establishment of a financing mechanism, funded by contributions and a share of the proceeds from commercialisation of regulated seeds. It is hoped that the financing mechanism will enable implementation of agreed plans for farmers 'who conserve and sustainably utilise plant genetic resources for food and agriculture' [42] and lead to innovative methods of managing traditional knowledge of plant genetic resources. Inclusion of such a funding mechanism has proved to be the single most important ingredient in assuring the success and compliance in the past environmental agreements such as the Montreal Protocol on Substances that Deplete the Ozone Layer [16].

Ironically, due to the fast-track ratification of the Treaty its entry into force in June 2004 has taken place before many of its aspects have been defined, including financial regulations and application criteria of the Multilateral Transfer Agreement. The Commission for Genetic Resources for Food and Agriculture (CGRFA) continued to act as the Interim Committee for the Treaty's implementation during the CGRFA's last meeting in November 2004 which has laid the groundwork for the first meeting of its Governing Body scheduled for 2006 [43]. Yet, the second meeting of the Commission acting as Interim Committee of the Treaty has postponed discussions on the definition of relations between the Treaty, NGOs and Inter-Governmental Organisations with respect to the Treaty's financing mechanisms. The November 2004 meeting, however, has been successful in developing the terms of reference for the creation of a group of experts who will work on the terms of the standard Multilateral Transfer Agreement (MTA) and in providing for a meeting of legal experts assigned the task of evaluating the procedures and operating mechanisms of the Governing Body. Currently, the provision of the necessary financial resources for the management and administrative tools is still not sufficiently addressed in order to make the Treaty a vital mechanism for the governance of plant genetic material and its uses [44].

The investment of western countries in ITPGRFA is consistent with their goal of assuring that biotechnology tools will not threaten conservation of biodiversity while creating an incentive for developing countries to support actions aimed at protecting biodiversity and indigenous knowledge.

The Cartagena Protocol on Biosafety

According to the provisions of the Convention on Biological Diversity (Article 19.1), the work on a separate protocol on biosafety has begun through the establishment of the Working Group on Biosafety which met between 1996 and 1999 with the aim to finalise the text of the Cartagena Protocol on Biosafety at the meeting in Cartagena, Colombia in February 1999. Nevertheless, due to the widespread differences on the contentious issues of trade in genetically modified organisms such as the definition of LMOs (Living Modified Organisms) and the scope of the LMOs covered by the Protocol, the final document was adopted at the subsequent meeting in Montreal in January 2000 [11].

The goal of the protocol is to protect biological diversity from potential risks posed by introduction of LMOs, which is the Protocol's way of deferring to GMOs, resulting from modern biotechnology. The backbone of the Protocol consists of the so-called Advanced Informed Agreement procedure for ensuring that countries are agreeing to the import of such organisms into their territory. The party of export is obliged to notify in writing the party of import of any given type of LMO covered by the Protocol. Then the importing party has 90 days to acknowledge receipt of the notification and to either proceed with the Protocol's decision procedure [45], or according to its domestic regulatory framework. The Protocol also establishes an Internet-based Biosafety Clearing House, to which all decisions must be relayed. There are, however, five types of LMOs that due to the compromise between negotiating parties were kept outside of the Advanced Informed Agreement Procedure. These include most pharmaceuticals, LMOs in transit to a third Party, LMOs destined for contained use, LMO-FFPs (intended for direct use as food or feed or for processing) and LMOs declared as safe by the Parties of the Protocol. In essence, it means that only LMOs destined for direct introduction to environment such as seeds and micro-organisms are covered by the Advanced Informed Agreement [46]. Still, other LMOs such as LMO-FFPs are subject to a less restrictive procedure (Article 11) in which parties making domestic decisions about the use of LMOs must still notify the Biosafety Clearing House and the importing party is responsible to develop and announce its own regulations with respect to LMOs. This means that the burden of proof and the development of the regulatory system in relation to LMOs not covered by the Advanced Informed Agreement lies with the importing party. The Protocol also requires that shipments of commodities that contain or may contain LMO-FFPs must be identified in their accompanying documentation, hence allowing countries to enforce their own labelling schemes for genetically modified products. According to Gupta, stating the exclusion for non Advanced Informed Agreement covered LMOs leaves open the possibility that in the future provisions of liability can also be applied to cover all LMOs [11].

Of the most breakthrough importance in international environmental law is that the Cartagena Protocol contains a strong reference to the precautionary principle. The precautionary principle holds that when a new technology may cause suspected harm, scientific uncertainty should not be used as the basis to prevent precautionary action [47]. The final text of the Protocol not only retains the reference to the principle in its objectives but also gives the right to the parties to take import-restrictive actions in operating articles dealing with the decision-making on commodities and LMOs for planting. The Article 1 states that the objective of the Protocol is to be pursued 'in accordance with the precautionary approach contained in Princi-

ple 15 of the Rio Declaration on Environment and Development'. The Article 10 then states that 'lack of scientific certainty…shall not prevent a party from taking a decision, as appropriate, with regard to the import of the living modified organism in question (…)' [48].

Given the strong incorporation of the precautionary principle into the text, the relationship of the Protocol to the WTO remains a highly contested issue. Although the text states that 'this Protocol shall not be interpreted as implying a change in the rights and obligations of a Party under any existing international agreement' another paragraph states that 'the above recital is not intended to subordinate this Protocol to other international agreements' [49]. The analysis of the International Institute on Sustainable Development suggests that the wording means that in case of a conflict both the Protocol and the WTO rules will have to be read as mutually supportive or, in other words, will be interpreted to suit different needs of the parties. At the moment the Protocol still lacks a dispute settlement mechanism and the issue of liability has been postponed giving the parties of the protocol 5 years for the completion of the drafting of the rules and procedures on this matter. Yet, the Cartagena Protocol has been a great success so far in allowing for a compromise between different interests of negotiating parties and the fact that liability issues have been given more time to be addressed only strengthens its possibility of becoming a viable Treaty by allowing time and flexibility to address this issue, especially taking into consideration that it took as much as 10 years to draft an agreement on liability in the highly successful Basel Convention [11].

Many policy analysts hailed the Cartagena Protocol to be the best example so far of a workable structure in the body of international law that allows for reconciliation of trade and environmental objectives. It is also very specific in addressing both developed and developing countries' concerns relating to the introduction of GMOs, hence ensuring that food security of all, specifically in terms of the environmental and health risks, can be sufficiently protected.

Conclusions

Although this article's assessment of the impact of the biotechnological revolution on developing countries' food systems began from a discussion on lessons learned from the Green Revolution, the present-day revolutionary force is different in one main respect: the biotechnological revolution in the food systems is being largely driven by private entities whereas the Green Revolution was supported by the publicly funded network of research institutes. Many policy advisors and institutes recommend that this imbalance between the private and public access to biotechnology should be addressed by increased funding towards public research institutes, hence assuring independent risk assessment and democratic control over the fruits of biotechnological research. Yet, beyond the well-acknowledged need for expensive research funding, governments should demonstrate their commitment to food security by strengthening and implementing existing environmental legal mechanisms. As stipulated in the previous sections, the developing countries' food security can suffer negative consequences not only in terms of the potential of environmental risks but also in terms of the risk of allowing the technological advancements to bypass the needs and interests of developing countries, with potentially disastrous consequences for their economies and ecosystems. Given today's context of globalisation, the protection and enhancement of developing countries' food security necessitates actions on global forums such as that provided by the FAO's instruments and by the new body of environmental law enshrined in the painstakingly negotiated Cartagena Protocol on

Biosafety and the International Treaty on Plant Genetic Resources for Food and Agriculture. Furthermore, urgent implementation and more widespread ratification of these instruments, which have operationalised the compromise needed in order to minimise the risks and maximise the benefits of the new technologies, are not only in interest of the developing countries but in interest of any developed country government paying lip service to food security and environmental concerns. Preservation of biodiversity and farmer's rights – coupled with research and development directed towards addressing the needs of developing countries – is the only strategy through which food security not only of the developing countries but of humanity at large can be improved and assured for the future generations. It is high time to press the world's governments for further ratification and the provision of sufficient financial commitments towards full implementation of these Treaties.

Notes

1. Miquel A. Altieri, Ecological impacts of industrial agriculture and the possibilities for truly sustainable farming, in: Fred Magdoff, John Bellamy Foster and Frederick H. Buttel (Eds.), Hungry for Profit: The Agribusiness Threat to Farmers, Food and the Environment, Monthly Review Press, New York, 2000, pp. 77-90.
2. Miquel A. Altieri, Agricultural biotechnology in the developing world: The myths, the risks and the alternatives, Paper presented at the 52nd Pugwash Conference on Science and World Affairs, University of California San Diego, La Jolla, August 2002.
3. Frederick Buttel, Biotechnology and agricultural development in the Third World, in Henry Bernstein et al. (Eds.), The Food Question: Profits Versus People?, Earthscan Publications, London, 1990, pp. 163-179.
4. Mary C. Carras, The mother of all life: Indian agricultural interests at the WTO's ministerial conference in Seattle, Washington, World Affairs 3 (4) (1999) 1-9.
5. Commission on Intellectual Property Rights, Integrating Intellectual Property Rights and Development Policy, Report of the Commission on Intellectual Property Rights, London, 2002. (http://www.iprcommission.org).
6. FAO, Socio-Political and Economic Environment for Food Security, World Food Summit, Volume 1, Section 1.4, Food and Agriculture Organisation of the United Nations, Rome, 1996.
7. FAO, The State of Food Insecurity in The World 2001, Food and Agriculture Organisation of the United nations, Rome, 2001.
8. Cary Fowler, Biotechnology, patents and the Third World, in Vandana Shiva and Ingunn Moser (Eds.), Biopolitics: A Feminist and Ecological Reader on Biotechnology, Zen Books, London and New Jersey, 1995, pp. 214-226.
9. Louise Fresco, Genetically modified organisms in food and agriculture: Where are we? Where are we going?, Keynote address by Assistant Director General of FAO's Agriculture Department at Conference on Crop and Forest Biotechnology for the Future, Royal Swedish Academy of Agriculture and Forestry, September 2001. (http://www.fao.org/agriculture).
10. Harriet Friedmann, The origins of Third World food dependence, in Henry Bernstein et al. (Eds.), The Food Question: Profits Versus People?, Earthscan Publications, London, 1990, pp. 13-31.
11. Aarti Gupta, Governing trade in genetically modified organisms: The Cartagena Protocol on Biosafety, Environment (May 2000) 1-18.

12. Henk Hobbelink, Biotechnology and the future of agriculture, in Vandana Shiva and Ingunn Moser (Eds.), Biopolitics: A Feminist and Ecological Reader on Biotechnology, Zen Books, London and New Jersey, 1995, pp. 226-234.
13. Regine Kollek, The limits of experimental knowledge: A feminist perspective on the ecological risks of genetic engineering, in Vandana Shiva and Ingunn Moser (Eds.), Biopolitics: A Feminist and Ecological Reader on Biotechnology, Zen Books, London and New Jersey, 1995, pp. 95-112.
14. Philip McMichael, Global food politics, in: Fred Magdoff, John Bellamy Foster and Frederick H. Buttel (Eds.), Hungry for Profit: The Agribusiness Threat to Farmers, Food and the Environment, Monthly Review Press, New York, 2000, pp. 125-145.
15. Gerad Middendorf, Mike Skladany, Elizabeth Ransom, and Lawrence Busch, New agricultural biotechnologies: The struggle for democratic choice, in Fred Magdoff, John Bellamy Foster and Frederick H. Buttel (Eds.), Hungry for Profit: The Agribusiness Threat to Farmers, Food and the Environment, Monthly Review Press, New York, 2000, pp. 107-123.
16. Gareth Porter et al., Global Environmental Politics, Westview Press, 2000.
17. Amartya Sen, Development as Freedom, Anchor Books, 2000.
18. Vandana Shiva, Biopiracy: The Plunder of Nature and Knowledge, Green Books in association with Gaia Foundation, 1998.
19. M. S. Swaminathan, From Rio de Janeiro to Johannesburg: Action Today and Not Promises for Tomorrow, East West Books, Madras, 2002.
20. Science and technology: Patently problematic, intellectual property, The Economist, September 14, 2002, p. 86.
21. For the discussion of the impact of technological changes on displacement of small farming units and subsequent concentration of food production and processing among few private companies see an excellent article by William D. Heffernan, Concentration of ownership and control in agriculture, in Fred Magdoff, John Bellamy Foster and Frederick H. Buttel (Eds.), Hungry for Profit: The Agribusiness Threat to Farmers, Food and the Environment, Monthly Review Press, New York, 2000, pp. 61-75. Heffernan points out how food processing has also led to displacement of small-farm production in the developed countries, particularly in the United States where the majority of the main food production is controlled by oligopolies of few companies.
22. Altieri (2000) lists two levels of environmental problems inherent in the modern agro-industrial system of food production based on favoring monocultures. 'A number of what might be called 'ecological diseases' have been associated with the intensification of food production and can be grouped into two categories. There are problems directly associated with the basic resources of soil and water, which include soil erosion, loss of inherent soil productivity and depletion of nutrient reserves, salinisation, and alkalisation (especially in arid and semi arid regions), pollution of surface and groundwater, and loss of croplands to urban development. Problems directly related to crops, animals, and pests include loss of crop, wild plant, and animal genetic resources, elimination of natural enemies of pests, resurgence and genetic resistance to pesticides, chemical contamination, and destruction of natural control mechanisms. Each 'ecological disease' is usually viewed as an independent problem, rather than what it really is – symptom of a poorly designed and poorly functioning system'.
23. See [7]. FAO estimates that 852 million people worldwide were undernourished in 2000-2002. This figure includes 815 million in developing countries.
24. ISAAA, Global Status of Commercialized Transgenic Crops 2003, December 2003.

25. Report on Pugwash Workshop The Impact of Agricultural Biotechnology on Environment and Food Security (Mexico City, Mexico, 28-31 May 2002), Pugwash Newsletter 39 (1) (2002) 55-59. For the original publication regarding documented presence of transgenes in local varieties of maize from Oaxaca and Puebla see D. Quist and I. H. Chapela, Transgenic DNA introgressed into traditional maize landraces in Qaxaca, Mexico, Nature 414 (2001) 541-543.
26. See FAO Statement on Biotechnology, published on the occasion of the Codex Alimentarius Ad Hoc Intergovernmental Task Force on Foods Derived from Biotechnology meeting in Japan, March 2000. (http://www.fao.org/ biotech/stat.asp).
27. For the definition of 'food security' see [6].
28. The study was published in the US Department of Agriculture (USDA) Economic Research Service Report (1999) and cited in [2].
29. Endnod, also known as African soapberry plant has been selected and cultivated for centuries by indigenous people in several parts of Africa where it was used as a soap and for its fish-killing properties. The US scientists have found that it is also effective in killing Zebra mussels disturbing water flows in Northern American pipe system. US scientists applied for a patent of Endod based on their 'discovery' of its Zebra mussels killing properties. See [12, p. 231].
30. Azarichdita indica or Neem, is widely known for its antibacterial and pesticidal properties in India since centuries. In the face of Western opposition to chemical pesticides Neem was 'discovered' by US and Japanese scientists and since 1985 over dozens of patents have been granted to Neem-based solutions and emulsions. For a detailed discussion see [18, pp. 73-75].
31. TRIPS, Part 2- Standards concerning the availability, scope and use of Intellectual Property Rights, Section 5 and 6. For the full text see [50].
32. See [5, p. 75].
33. See [16, p. 25] and [47].
34. IUPGR Resolution 5/89. (http://www.mtnforum.org/resources/library/ iupgr91a.htm).
35. For the text of the International Treaty on Plant Genetic Resources see [49].
36. See [5, pp. 75-78] and [33].
37. See [5, p. 77].
38. ITPGRFA, Article 18.5. See [33].
39. See Commission on Plant Genetic Resources for Food and Agriculture, 2nd Meeting of the Commission as Interim Com on the Treaty on Plant Genetic Resources for Food and Agriculture. (http://www.fao.org/ag/cgrfa/ docsic2.htm).
40. See http://www.iisd.ca/biodiv/itpgr2.
41. The decision procedure works as follows: 'A risk assessment must be carried out for all decisions made. Within 90 days of notification, the Party of import must inform that either it will have to wait for written consent or that if may proceed with the import without written consent. If the verdict is to wait for written consent, the Party of import has 270 days from the date of notification to decide either to: approve the import, adding conditions as appropriate, including conditions for future imports of the same LMO, prohibit the import, request additional information, extend the deadline for response by a defined period.' See: Aaron Cosbey and Stas Burgiel, The Cartagena Protocol on Biosafety: An Analysis of Results, IISD (International Institute For Sustainable Development) Briefing Note, 2000. (http//iisd.ca/trade).
42. See [46].
43. The precautionary principle is widely used in international environmental law and is even contended by some as the principle of customary international law. The text of the Cartagena Protocol uses a

reference to the 'precautionary approach' in its preamble and the wording in Article 10 and 11 of the Protocol are a direct derivative of Principle 15 of the Rio Declaration on Environment and Development. For the discussion of how the precautionary principle relates to trade and sustainable development see Halina Ward, Science and Precaution in the Trading System, RIIA/IISD, Winnipeg, 2000. (http://iisd.ca/pdf/ sci&precaution.pdf).

44. See [46].
45. See [40].
46. Cartagena Protocol on Biosafety: http://www.biodiv.org/biosafety.
47. Convention on Biological Diversity: http://www.biodiv.org.
48. Food and Agriculture Organisation, Agriculture Department, Biotechnology: http://www.fao.org and http://www.fao.org/ag guides/subject/b.htm.
49. International Treaty on Plant Genetic Resources: http://www.fao.org/ag/ cgrfa/IU.htm.
50. Trade Related Aspects of Intellectual Property Rights (TRIPS): http://www.wto.org/english/docs_e/ legal_e/27-trips_ 04c_e.htm#5.
51. World Trade Organisation: http://www.wto.org.

Grassroots science – an ISYP Ideal?

Tom Børsen Hansen

Center for Philosophy of Nature and Science Studies, University of Copenhagen, Blegdamsvej 17, DK-2100 Copenhagen, Denmark; borsen@nbi.dk

This article argues that a mix of different values guides contemporary scientists and engineers in their work. The conventional dichotomy between academic science and technological research and development is hereby transcended. However, on the analytical level distinctions between different kinds of research activities are considered helpful. Three sets of norms that define different categories of research activities are presented: The CUDOS ethos that defines academic science, the PLACE set of norms that defines industrial and military technological research, and the 'ISYP Ideal' that defines 'grassroots science' – a scientific endeavour that explicitly addresses the problems facing humanity. This analytical tool (i.e. the three sets of norms) is used to analyse the activities of International Student/Young Pugwash.

In this article the concept of 'grassroots science' is introduced. It covers and refers to techno-scientific activities that explicitly address the problems facing humanity. Reorientation of science and research activities is currently being debated both in society and in scholarly journals. Hence, the present seems like an appropriate time for launching a concept that suggests that the problems facing humanity should be on the research agendas, thereby legitimising such endeavours by categorising them as scientific. Grassroots science is not thought of as a substitution for either academic science or technological research and development. Rather, the idea is to complement our understanding of techno-science, and add something qualitatively new to it: ethical reasoning at the structural level.

Norms of different types of research activities

At present it is not clear to me to whether grassroots science is actually an existing category capturing a certain type of research activity or whether it primarily is an idea after which future research activities can be modelled. This question is an important one. However, it needs a thorough empirical answer, one which is not presented in this article. Here my motives are more explanatory and normative. If academic science and technological research (or any mix of

ISYP Journal on Science and World Affairs, Vol. 1, No. 1, 2005 61-72

the two) cannot alone solve many of the serious problems facing humanity, can we then imagine a third form of knowledge production that is more successful in promoting this aim?

Sociologically, one can distinguish between different forms of research activities by referring to the set of norms that the practitioners are expected to follow [1]. In table 1, I have summarised in three columns the norms for different types of research activities: 'academic science', 'technological research', and 'grassroots science'.

The purpose of table 1 is not to reduce contemporary research activities to, or categorise them as, academic science, technological research or grassroots science. The purpose is rather to set up an analytical tool that can be used to analyse concrete research activities in a 'both ... and' manner – not in an 'either … or' fashion.

The ethos that guides academic science is known under the abbreviation 'CUDOS' ('communism', 'universality', 'disinterestedness', and 'organised scepticism') [4], the set of norms describing technological research being 'PLACE' ('proprietary', 'local', 'authority', 'commissioned', and 'expert') [5]. In the third column of table 1, I have sketched the ethos defining a third type of knowledge production: 'Grassroots science'. This ethos I abbreviate as the 'ISYP Ideal' ('interdisciplinary', 'social responsibility', '¡Ya basta!', 'public opinion', and 'idealism').

As the CUDOS and PLACE sets of norms are well described in the literature, I now directly proceed to explore the ISYP Ideal.

The ethos of grassroots science: the ISYP Ideal

In this section I expand on the set of norms I have called the ISYP Ideal, which constitutes the ethos of grassroots science. I will do so by describing each of the norms one by one, simultaneously relating them to some of the CUDOS and PLACE norms:

Interdisciplinary: In one punch line one can say that grassroots science is the systematic and non-commercial attempt to solve the problems facing humanity, and its results are analysis of and strategies for solving these problems. As technological research, grassroots science is a problem-solving enterprise (cf. the norm of being an expert). Grassroots scientists should be experts – but experts on what? Conventionally an expert is seen as a person who, on the basis of objective scientific knowledge, can solve technical problems. However this perception of the expert does not apply to the complex problems facing humanity. Within the sphere of grassroots science experts also focus on risks, uncertainties, potential problems et cetera.

Grassroots science differs from industrial research by not being driven by proprietary/commercial aims. Hence the results of grassroots science should not be considered as private property, but as the property of humanity. In this regard grassroots science resembles academic science. An important task for groups of grassroots scientists is to develop carriers of these results – i.e. write books, reports, and articles, establish journals and websites, develop literature lists et cetera.

Grassroots science transcends the conventional disciplinary boundaries, thereby differing from normal academic science (cf. Kuhn's philosophy of science). The problems facing humanity are not given by established paradigms, so no single scientific community possesses the power to evaluate grassroots scientific results. Grassroots science is an interdisciplinary and sometimes even transdisciplinary activity, as it confronts the problems facing humanity with insights from many scientific disciplines. The process of formulating the standards used for

Table 1. The norms of different types of research activities

Academic science (CUDOS)	**Technological research** (PLACE)	**Grassroots science** (ISYP Ideal)
Communism. This norm requires that scientific findings be openly published in scientific journals, and hence in principle available for everybody. Academic scientific knowledge is the property of humankind.	*Proprietary*. This norm states that knowledge produced in an industrial or military laboratory is the property of an industry or of a state (cf. the fact that inventions can be patented).	*Interdisciplinary*. This norm states that grassroots science takes on an interdisciplinary approach in its attempts to solve the problems facing humanity.
Universality. This norm states that no scientific result should be excluded because of the finder's nationality, religion, social status etc. Academic knowledge claims must be evaluated against impersonal standards.	*Local*. Industrial and military research is aimed at solving local technical problems.	*Social responsibility*. Grassroots science is a socially responsible enterprise. The problems addressed are related to the betterment of humanity.
Disinterestedness. This norm warns us against trusting knowledge claims that come from a tainted source, such as the research laboratory of a tobacco company or of a racist government.	*Authority*. Industrial and military researchers work under managerial authority. For example in industries it is the board of directors that decide on which research projects are launched.	*¡Ya basta!* This slogan represents the idea that current practices cannot continue, and must be changed fundamentally. Grassroots science is a revolutionary activity, as it tries to develop radically new lines of thinking.
Organised Scepticism. Scientific claims should be systematically and critically tested with regard to consistency and reliability (cf. the peer review system of scientific journals)	*Commissioned*. Industrial and military research et cetera is commissioned to achieve practical goals – not universal knowledge.	*Public opinion*. When addressing the problems facing humanity, grassroots scientists often need the support from public opinion to put the key-questions on the research and political agendas.
	Expert. Industrial and military researchers are hired as expert problem-solvers – they are not supposed to be 'organic intellectuals'	*Idealism*. Grassroots scientists are idealists. They get involved in grassroots science, because they consider it the right thing to do.

evaluating the activities of grassroots science is also an inter- or transdisciplinary endeavour, and a task for grassroots scientists. Hence they should (also) ask: how do we evaluate the outcomes of grassroots scientific projects? Are the attempts to solve the problems facing humanity beneficial?

The emergence of new 'mixed' disciplines, such as nanoscience and technology, biochemistry, physics and technology, and social pharmacy and medicine, shows that also academic science and technological research are becoming increasingly interdisciplinary.

Social responsibility: The problems that grassroots science tries to solve are those that concern humanity, such as achieving world peace, a nuclear weapon-free world, global environmental sustainability, a world free of hunger, and improving world health. Many of these issues have conventionally been pursued by grassroots organisations such as the Pugwash Conferences on Science and World Affairs (nuclear weapon-free world), Medecins sans frontières (universal access to essential medicines), and Greenpeace (prevention of environmental degradation).

In which settings do grassroots scientists carry out their endeavours? The paragraph above hints at a potential answer: Grassroots scientists are organised in networks, and are not associated with any particular category of workplace. Hereby grassroots science differs from academic science, as academic scientists primarily work at universities, and from technological research, as developers of new technology usually work in closed research settings.

How can one more explicitly define the problems that deserve the attention of grassroots scientists? This is a difficult question and I find it hard to formulate a clear-cut answer. Pieces to an answer were given at the exhibition conceived by the French philosopher Paul Virilio: 'Ce qui arrive' (English: 'Unknown Quantities') that took place at the 'Foundation Cartier pour l'art contemporain' in Paris, November 29, 2002 to March 30, 2003. In the introduction to the exhibition Virilio states:

> 'Progress and catastrophe are the opposite faces of the same coin', observed Hannah Arendt… The twentieth century, the century of liberation, the century of the emancipation from Earth's gravity and of the acquisition of escape velocity, also unleashed atrocities on the world and fostered the exponential growth of major catastrophes, such as Bhopal, Chernobyl or, more recently, Toulouse.
>
> The qualitative achievements of discoveries that have benefited humanity has stealthily come to be conjoined with the quantitative, harmful depredations of progress.
>
> Local accidents of the past (the Titanic or Seveso disaster) and global accidents of the present (the Chernobyl meltdown or the threat of weapons of mass destruction) provide many reasons for opening, alongside war museums, the first 'Museum of Major Accidents'. The museum's purpose would not be to 'spread fear', but to confront what is no longer a chance event. There is an increasingly present cumulative reality related to a sudden globalisation in which accidents and terrorist attacks have merged to become an anonymous undeclared war. We shall not be able to uphold the imperative of responsibility or the precautionary principle for long if we do not remember the disasters that have plunged history into mourning. [6]

Hence Virilio argues that in modern cultures we need to increase our attention to the backside of techno-scientific progress. I agree with Virilio in this regard. But simultaneously with organising such enlightenment projects, new knowledge needs to be produced about, for example, human induced catastrophes [7].

Hans Jonas has formulated what he calls 'the imperative of responsibility', which I find applies to the socially responsible scientist (even though Jonas states that the 'imperative ad-

dresses itself to public policy rather than private conduct, which is not the causal dimension to which that imperative applies') [8]:

> Act so that the effects of your action are compatible with the permanence of genuine human life'; or expressed negatively: 'Act so that the effects of your action are not destructive of the future possibility of such life'; or simply: 'Do not compromise the conditions for an indefinite continuation of humanity on earth'; or, again turned positive: 'In your present choices, include the future wholeness of Man among the objects of your will [9].

In other words, the grassroots scientist is socially responsible. By this phrase I refer to an individual quality possessed by the grassroots scientist that guides his or her choices of research problems in the direction of what he or she thinks is beneficial to humankind.

One can say that the results that grassroots science is trying to achieve are universal. Not because the results are universally applicable or valid, as academic scientific knowledge is said to be, but because of the universal interest humans have in the solutions of the problems grassroots science pursue. Grassroots science is also local. The way towards for example a nuclear weapon-free world is characterised by the solutions of many local problems.

¡Ya basta! was a slogan used by Los Zapatistas (EZNL) in Mexico when on January 1, 1994 they declared 'war' against the Mexican government and its inability to prevent racism and oppression of the indigenous Mexicans in the province of Chiapas [10]. Los Zapatistas felt that the conditions of indigenous people of Mexico were so oppressive and unjust that they needed to be changed radically. I also use this slogan to characterise grassroots science. In that context it represents the idea that current practices, power relations, social structures, et cetera cannot continue, and must be changed fundamentally [11]. Hence grassroots science is a revolutionary activity in the sense that – by developing radical new lines of thinking – it tries to break problem-causing prejudice, unequal power relations, rigid social structures etc. But just as Los Zapatistas in Mexico are using the word as their weapon, so are grassroots scientists [12].

In other words, grassroots science is not disinterested as academic science tries to be. Grassroots science is actively promoting the interests of humanity. Neither is grassroots science practiced under managerial authority as industrial and technological research conventionally is. It is the individual grassroots scientist that chooses the problems with which he or she wants to work (cf. the norm of social responsibility dealt with above).

Public opinion: Trying to solve the problems facing humanity needs the support of public opinion. One of the reasons is that such endeavours might be in conflict with special interests (including commercial, cultural, military, political, and others). Hence, grassroots scientists can easily encounter powerful opponents to their work. (Opponents' weapons might be marginalisation, lack of funding, or, in extreme cases, psychological and physical violence.) Consequently, grassroots science only stands a chance if it is supported by public opinion, which is a prerequisite for political action and allocation of resources.

One crucial question that needs to be addressed by grassroots scientists is how is the support of public opinion won? Personally I consider clarity and transparency regarding objectives, underlying values, assumptions and methods important in the process of gaining the support of public opinion.

In his speech at a conference on nuclear policy and proliferation organised in London on January 8, 2003 by The Guardian, the Royal United Services Institute for Defence Studies and the US Physicians for Social Responsibility, Sir Joseph Rotblat called for the support of public opinion in the struggle for avoiding nuclear war:

> How can we prevent such catastrophes [nuclear war]? The traditional method of dealing with such situations – by partial agreements, damage-limitation treaties, confidence-building measures – does not seem to work any more. In its determination to maintain world dominance, particularly on the nuclear issue, the present administration [in the US] will pay no attention to reasoned and sophisticated arguments. Arms control is as good as dead. As I see it, the only way is to go back to basics, to put the goal of total nuclear disarmament back on the agenda. The only way to compel the current decision-makers to change their minds is by pressure of public opinion. For this purpose, the public must be awakened to the danger. The general public is not sufficiently informed about the recent changes in military doctrine, and the perils arising from them. We have to convince the public that the continuation of current policies, in which security of the world is maintained by the indefinite retention of nuclear weapons, is not realistic in the long run because it is bound eventually to result in a nuclear holocaust in which the future of the human race would be at stake. We must convince public opinion that the only alternative is the total elimination of nuclear weapons [13].

One can say that grassroots science is commissioned by humanity to solve the serious problems facing all of us. In this regard one can view grassroots science as technological research and development applied to worldwide problems.

Idealistic: Many might criticise grassroots science for being idealistic and naïve. Indeed grassroots scientists are idealistic people, as they believe that a better world is possible. However, I consider this to be a question of ethics rather than of naïvety: do we want to live in a peaceful and sustainable world based on compassion, not on greed; on generosity, not jealousy; on persuasion, not force; on equity, not oppression [14]? And if we do, are we not committed to do something about? (Though, I admit that it is problematic if or when the idealistic character of grassroots scientists contradicts the norm of organised scepticism that also applies to grassroots science.)

The antithesis to the norm of being idealistic is that of being pragmatic and opportunistic. Hence, I consider the idealistic character of grassroots science as the motor that drives this activity forward. People get involved in grassroots activities because they consider it the morally right thing to do, not because they gain from it personally (in a narrow sense) or because they are following orders.

* * *

Let me sum up: I have in this section drafted a set of norms which I envision guide grassroots scientists working on problems facing humanity. The set of norms shall not be seen as a complete list of norms – meaning that new norms can be added, and the ones I include in the ISYP

Ideal can be modified or removed. Neither shall the ISYP Ideal be seen as isolated from the CUDOS nor the PLACE set of norms. Grassroots science is in some aspects situated in between academic science and technological research, as the norms of communism and organised scepticism as well as those of work being commissioned and people being expert also apply to grassroots science.

Is the name grassroots science a good one? Personally, I like it as it directs the attention towards the focus areas of grassroots organisations which is identical to that of grassroots science (constructing a culture of peace, eradication of hunger and deceases, sustainability et cetera) Furthermore, the name might facilitate collaboration between scientists and the so-called 'New Social Movement'.

The problem of techno-science

Before I use the analytical tool presented above, I will discuss the question of whether academic science and technological research (or any mix of the two) can on themselves solve many of the serious problems facing humanity.

According to Thomas Kuhn, normal science, which is the most predominant form of academic science, is about riddle-solving. Scientists compete in solving the riddles defined by the disciplinary matrix under which they work. This has (at least) two consequences. The first one is that it is the scientists' fascination of solving scientific riddles that drives academic science forward [15]. The second consequence is that normal research does not aim to solve the really pressing problems, e.g. a cure for cancer or the design for a lasting peace, are often not puzzles at all, largely because they may not have any solution [16].

Also technological research has been exposed to criticism, in particular the consequences of its commercial affiliation. For example Vandana Shiva argues that technological development – which only has a proprietary agenda – cannot solve many of the problems facing the poor majority of the earth's population (as they have few economic resources). Shiva writes: Over the past two decades every issue I have been engaged in as an ecological activist and organic intellectual has revealed that what the industrial economy calls 'growth' is really a form of theft from nature and people [3]. This rather strong claim is supported by examples from the Third World, especially from India [17].

The criticism of contemporary science and technology I am addressing in this article mirrors the claim that the major problems facing humanity do not appear on the agendas of contemporary science and technology. It is doubtful that contemporary CUDOS science and PLACE technological research alone are capable of solving the majority of the problems facing humanity.

Science and research as we know it are under pressure and as a result transforming. John Ziman states, 'academic' science and 'industrial' science are merging into a new societal form – 'post-academic science'. This is obvious for example, in the way that university scientists are being directly funded by the private sector, or are expected to patent their findings and exploit them commercially [18].

John Ziman is not the only sociologist of science claiming such transformation. Also John Gibbons, Helga Nowotny, Peter Scott and others argue that a novel understanding of contemporary science and research is needed (on the descriptive level). They argue that knowledge production is changing from primary being an academic endeavour (they use the concept

'mode 1' to denote the conventional academic knowledge production), to becoming more interdisciplinary and problem-oriented ('mode 2' research) [19].

Henry Etzkowitz and Loet Leydesdorff believe that a clear-cut division of research institutions in three sectors (universities, industrial research laboratories, and governmental institutions) can no longer be upheld, as they interact and collaborate to a high degree ('Triple Helix' activities) [20].

One can argue that the 'new' forms of scientific and research activities (post-academic science, mode 2 research, and triple helix activities) are not affected by the criticism posed towards academic science and technological research. Or to be more specific, that these new forms of techno-science will put the problems facing humanity on their research agendas.

I perceive the 'new' forms of research activities as primarily being mixtures of CUDOS-science and PLACE-research [21]. Or said in the words of John Ziman: What were previously quite distinct social practices are being performed almost simultaneously, day by day, by the same individuals. On Mondays, Wednesdays and Fridays, in my 'academic' role, I write an article for a learned journal: On Tuesdays, Thursdays and Saturdays, I prepare a secret report on certain aspects of the same research for my industrial supporters [22].

I see no reason why mixed CUDOS-PLACE forms of research would put the problems facing humanity high on their research agendas.

An ISYP Ideal?

In this section I use the analytical tool presented in table 1 to analyse the activities of the organisation 'International Student/Young Pugwash' (ISYP).

ISYP consists of concerned students and young professionals from all over the world. The organisation is a superstructure of national Student/Young Pugwash groups located on five continents. ISYP is, according to its homepage (http://www.student-pugwash.org), committed to seeking alternative and viable solutions to critical global challenges at the intersection of science, technology, and society. International Student/Young Pugwash is the student/young affiliate of the Pugwash Conferences on Science and World Affairs (Pugwash).

The activities of ISYP are, at the moment, centred on:

- Maintaining a website that coordinates and distributes information about ISYP initiatives as well as national groups' activities.
- Organising yearly conferences for students and young professionals, who afterwards participate in the annual Pugwash Conference on Science and World Affairs.
- Promoting student and young participation in Pugwash workshops.
- Issuing a peer reviewed journal entitled 'ISYP Journal on Science and World Affairs'.
- Setting up an e-based course 'The Duality of Science and the Social Responsibility of Scientists'.

I will end by returning to the question posed in the headline of this article: Is 'the ISYP Ideal' really an ISYP ideal?

Let me start by the norm of social responsibility, which regards the selection of problems potentially addressed by ISYP. As the student/young affiliate of Pugwash, the questions dealt with by ISYP are to be found within the Pugwash programme areas: Nuclear Weapons, Chemi-

cal & Biological Weapons, Regional Conflict & Global Security (i.e. Regional Conflicts; Terrorism; and World Governance), Space Security, and Science & Society (i.e. Impact of Biotechnology on Environment and Food Security; Economic & Social Inequality; Security Aspects of HIV/AIDS; and Science, Ethics & Society).

The Pugwash issues do focus on the problems facing humanity. However, the activities of ISYP seem to be process oriented rather than product oriented. One can say that ISYP has accumulated the power to identify the new key questions for Pugwash. This might be due to the fact that ISYP was formed in 2000, and hence is a very young organisation. With ISYP's process focus the two CUDOS norms communism and organised scepticism co-form ISYP activities.

It is my impression that ISYP is interdisciplinary when it comes to the disciplinary background of the participants in ISYP's conferences. This impression is based on my personal participation in five student/young pre-conferences [23]. The distribution between young natural and social scientists is approximately one to one. Few persons with a disciplinary background in the humanities participate in the ISYP pre-conferences.

It is also my impression that ISYP members are idealistic. They get and stay involved in ISYP as they consider it the right thing to do – not only because it benefits their carriers.

According to ISYP's website the ISYP community cherishes the slogan 'Thinking in new ways' (cf. note [11]). Hence, the norm ¡Ya basta! also applies to ISYP activities.

ISYP's activities are targeted towards students and young professionals rather than towards public opinion. These two target groups are not necessarily contradictory.

To sum up: ISYP activities are located in between the categories: Academic science and grassroots science, as the norms communism, organised scepticism, interdisciplinary, social responsibility, ¡Ya basta!, and idealism constitute the ethos of ISYP.

Acknowledgements

Previous versions of this article were presented and discussed at the 1st Pugwash Workshop on Science, Ethics and Society, which took place 27-29 June 2003, in Paris, France, and in the working group New Technology For Human Development and Security at the 53rd Pugwash Conference on Science and World Affairs. Advancing Human Security: The Role of Technology and Politics, that took place 17-21 July 2003, in Halifax, Nova Scotia, Canada. I want to thank the participants at these two meetings for their constructive comments. I also want to thank the journal's reviewer of this article, for helpful suggestions for improvement. Finally, I want to thank Arthur Petersen and Juan Pablo Pardo-Guerra of the ISYP Board for longstanding and fruitful co-operation.

Notes

1. It is not my intention to imply that sociological analysis of norms is more important than other kinds of categorisation. Philosophical distinctions, focussing on the metaphysical assumptions underlying institutionalised activities, and categorisation of research products (for example knowledge claims) is also important.
2. John Ziman, Is science losing its objectivity?, Nature 382 (1996) 751-754. John Ziman splits up Merton's norm 'organised scepticism' into two distinct norms: 'scepticism', which is identical to Merton's norm 'organised scepticism' and 'originality' that commits scientific investigations to discover fundamentally new and original knowledge.

3. The term 'organic intellectual' is used in Vandana Shiva, Stolen Harvest: The Hijacking of the Global Food Supply, South End Press, Cambridge, MA, 2000.
4. The sociologist of science Robert Merton originally formulated the CUDOS set of norms in an article of 1942, reprinted in Robert Merton, The Sociology of Science, University of Chicago Press, Chicago, 1973. A contemporary interpretation of the CUDOS ethos is found in [2].
5. The set of norms abbreviated as PLACE, is taken from John Ziman, Real Science: What It Is and What It Means, Cambridge University Press, Cambridge, 2000, pp. 78-79. The documentary 'Dreams with deadlines' directed by Pola Bonfils gives the spectator an impression of how technological research is performed at 'Novo Nordisk' – a large Danish pharmaceutical company.
6. Press Brochure: Unknown Quantities – An exhibition conceived by Paul Virilio, Foundation Cartier pour l'art contemporain, Paris, 2002, p. 3.
7. I would like to mention two additional examples of such enlightenment projects. One is entitled 'Science Friction. Accidents – waiting to happen? Hazards revisited' organised by Learning Lab Denmark. This project has developed an electronic card game, where one can 'play with' techno-scientific disasters and hazards. Also thorough background material, describing the catastrophes addressed by the card game, has been developed (http:// www.hazardcards.com). The other project is a planned e-learning university course with the title 'The Duality of Science and the Social Responsibility of Scientists', initiated by International Student/Young Pugwash. The course will focus on the two faces of science and technology – on examples where science and technology have had beneficial respectively harmful consequences.
8. Hans Jonas, The Imperative of Responsibility: In Search of an Ethics for the Technological Age, University of Chicago Press, Chicago, 1984, p. 12. (The German edition is from 1979.)
9. Ibid., p. 11.
10. I quote from the declaration of war: Pero nosotros HOY DECIMOS ¡BASTA!, somos los herederos de los verdaderos forjadores de nuestra nacionalidad, los desposeídos somo millones y llamamos a todos nuestros hermanos a que se sumen a este llamado como el único camino para no morir de hambre ante la ambición insaciable de una dictadura de más de 70 años encabezada por una camarilla de traidores que representan a los grupos más conservadores y vendepatrias. (http://www.ezln.org/documentos/1994/199312xx.es.htm).
11. Cf. the ISYP slogan thinking in new ways (http://www.student-pugwash.org) that is based on the following quotation from the Russell-Einstein Manifesto: We have to learn to think in a new way. We have to learn to ask ourselves, not what steps can be taken to give military victory to whatever group we prefer, for there no longer are such steps; the question we have to ask ourselves is: what steps can be taken to prevent a military contest of which the issue must be disastrous to all parties? (http://www.pugwash.org/about/manifesto.htm).
12. Daniel Barrón Pastor (Ed.), La Guerra por la palabra – A siete años de luchar Zapatista, Rizoma, 2001.
13. Rotblat's speech is available at http://www.guardian.co.uk/nuclear/article/0,2763,870939,00.html.
14. Ibid.
15. Hans Primas presents a similar point of view: Why are scientists fascinated by their research work? Of course, there are people in science who are doing very important work for science, but who are not involved in creative research work. In the following, I will consider only the genuine creative work by scientists. There are many research scientists who over many years work sixty or eighty or even more hours a week. There are scientists so fascinated by their work that they neglect their families. What is the point - for the welfare of mankind? Perhaps in some very rare cases. If one asks

a research scientist for his own motives, one gets usually an evasive answer like intellectual curiosity, potential usefulness of the research, a sense of duty towards the institution where one happens to work, or the desire for promotion, fame, financial gain, power or even vanity. All of these factors may play a role, but they do not strike at the core of the matter. Intellectual curiosity is certainly an important point. But there are much easier ways to satisfy the thirst for knowledge than to conduct research work. Reading the incredibly rich and interesting scientific literature leads quickly and conveniently to new insights. So why should anyone engage in tedious research work? I would like to encourage you to deliberate about the deeper motives for your own research work. The truth pursues the researcher. I think that many scientists are not content with the role of a spectator. They want to participate actively in the disclosure of the mysteries of nature and to experience the thrill of following out a chain of reasoning for themselves. If instead of 'intellectual curiosity' we speak of a 'Faustian striving for knowledge', then we move gradually to the point. Quotation taken from Hans Primas, Fascination and inflation in science, in: Tom Børsen Hansen (Ed.), The Role of Philosophy of Science and Ethics in University Science Education, NSU Press, Göteborg, 2002.

16. Thomas Kuhn, The Structure of Scientific Revolutions, 2nd enlarged edition, University of Chicago Press, Chicago, 1970, p. 37.
17. A similar critique is presented in the Institute of Science in Society – Scientists for Global Responsibility – Trans World Network's discussion paper 'Towards A Convention on Knowledge', found at http://www.i-sis.org.uk/conventiononknowledge.php.
18. The quotation is taken from John Ziman, Getting scientists to think about what they are doing, in: Tom Børsen Hansen (Ed.), The Role of Philosophy of Science and Ethics in University Science Education, NSU Press, Göteborg, 2002, p. 40. See also [5].
19. Michael Gibbons, Camille Ligomges, Helga Nowotny, Simon Schwartzman, Peter Scott, Martin Trow, The New Production of Knowledge – The Dynasty of Science and Research in Contemporary Societies, Sage Publications, London, 1994 and Helga Nowotny, Peter Scott, Michael Gibbons, Re-thinking Science – Knowledge and the Public in an Age of Uncertainty, Polity Press, Cambridge, 2001.
20. Henry Etzkowitz and Loet Leydesdorff (Eds.), Universities and the Global Knowledge Economy: A Triple Helix of University-industry-government (Science, Technology and the International Political Economy), Continuum International Publishing Group – Pinter, 1997.
21. A look at website of the 4th Triple Helix conference – that took place in Copenhagen, Denmark, November 2002 – qualifies this impression (http:// www.triplehelix.dk).
22. John Ziman, Getting scientists to think about what they are doing, in: Tom Børsen Hansen (Ed.), The Role of Philosophy of Science and Ethics in University Science Education, NSU Press, Göteborg, 2002, p. 40.
23. I participated in my first student/young pre-conference in Lillehammer, 1997, which was the first formal student/young pre-conferences to an annual Pugwash Conference. I also participated in the pre-conferences in Jurica 1998, in Cambridge 2000, in La Jolla 2002, and in Halifax 2003.

The UN after Iraq

Tasks for Student/Young Pugwash

Joseph Rotblat

Nobel Peace Prize 1995. Speech given at the ISYP Symposium 'The Role of the UN and Other International Actors after Iraq', Halifax, Nova Scotia, 15 July 2003

The main theme of this Symposium is the role of the United Nations after the Iraq debacle. There is no doubt that the UN has come out deeply wounded, but even more painful is the resulting assault on fundamental values in a civilised society; I am referring to morality in the conduct of world affairs, and adherence to international law.

Indeed, the Iraq War itself is only one aspect of the sustained aggressive policy pursued by the Bush Administration, since it has been taken over by the neo-conservatives. One of the most bizarre events of the Iraqi war was the non-event. The official reason for the attack on Iraq was the threat to world security – including the security of the US and UK – that was posed by the possession by Saddam Hussein of weapons of mass destruction. But, despite the extensive search these weapons have not been found, and by now we must conclude that they do not exist. On these grounds alone, the attack on Iraq was illegal in international law. This does not seem to bother the Bush Administration; for them the war in Iraq was the implementation of policies formulated a decade earlier.

Nowadays, any criticism of these policies is branded as anti-Americanism. This is partly a consequence of the Bush slogan: 'You are either with us or against us'. Initially, this referred to the action against terrorism, but there are many, perhaps the majority in the world, who are strongly against the terrorists, and ready to join in a campaign to eradicate them, but at the same time are not happy about the Bush policies.

I was among those who opposed the war, but it would be hypocritical of me not to rejoice over the downfall of a tyrannical regime, or not to admit that this would not have come so rapidly without military intervention. But the price that we have paid for this is far too high: it has reinstated in world affairs the cynical doctrine that 'the ends justify the means', a doctrine inherently incompatible with moral values.

The acquisition of military might began in the US even before the Bush Administration. Those of you who were in La Jolla a year ago, will remember the keynote address by William Perry, Secretary for Defence under Clinton, in which he boasted about the tremendous US military strength. Indeed, since the end of the Cold War, the Americans have built up an enormous military potential. Making use of the latest advances in science and the achievements

ISYP Journal on Science and World Affairs, Vol. 1, No. 1, 2005 73-77 (Comment)

in technology – and maintained by budgets of astronomical proportions – the United States has become the greatest military power that ever existed, exceeding in sophistication all other nations combined. With the neo-conservatives coming to power under George W. Bush, this military potential was used to justify and enforce political doctrine in accordance with the maxim:'Might is Right'. We have the might, therefore we have the right, even if this means disregarding the United Nations. In abiding by international treaties the deciding factor is whether they are in the interest of the United States. If they are not, they can be disregarded.

We have seen this policy being implemented time and time again, since George W. Bush came to power. The withdrawal from the ABM Treaty and the start of the National Missile Defence Program; the refusal to ratify the Comprehensive Test Ban Treaty (CTBT); the refusal to negotiate a Verification Protocol to the Biological Weapons Convention; the withdrawal from the Kyoto Protocol to the Convention on Climate Change; the opposition to the International Criminal Court.

To those examples of Pax Americana we have now to add the decision about the future of Iraq; a return to the old practices by which the victor is justified in claiming the spoils of war, such as allocation of lucrative contracts in the oil industry.

Above all, it is the United Nations that is being punished for not obeying Bush's dictates. The Bush Administration was never shy of showing its contempt for the United Nations, which it has always considered to be a useless and enfeebled organ, incapable of reaching any decision. Long discussions and protracted negotiations are an inherent feature of a democratic system, in which the aspirations of a large number of nations have to be reconciled in a peaceful manner. All the same, some of the criticism is valid, and it is important that the UN is made more effective in fulfilling its mandate. The present Charter, which is based on the principle of the sovereignty of member-states, is not sustainable in this age of globalisation and the ever growing interdependence in all walks of life.

Intervention in internal affairs of a state, e.g. against a tyrannical regime, should be legalised, provided that any military action is taken under the aegis of the Security Council. The Bush Administration, while claiming to be a champion of democracy, actually imposes its policies in a dictatorial manner: 'behave as we tell you or else…'. This is a shocking misuse of the term 'democracy'. But, whatever the real feelings of people, I fear that the governments of many countries may feel obliged to adopt a pragmatic policy, acknowledge that there is now a single superpower, and accept the United States as the world's policeman.

I fear that this is going to happen, but it is not yet a fait accompli, and we must do our utmost to prevent this. My main hope is that the opposition will come from the United States itself. Somehow, I do not see the American people accepting for long the role assigned to them by the clique that has hijacked the Administration. Public opinion is bound to turn when the dangers associated with the current policies become apparent. And these dangers will become apparent above all in relation to the nuclear doctrine promulgated by the Bush Administration.

Nearly a year ago, at the meeting of your Board in La Jolla, I presented an outline of these dangers. Since then the situation has become worse, with the new policies on pre-emptive strikes. A radical change has been made in the whole doctrine of nuclear weapons. The general public – and perhaps even some in this audience – do not seem to appreciate the magnitude of that change. Throughout the period of the Cold War, and during the first decade after it, the policy of the US and most of the other nuclear states was based on the doctrine of deterrence, the actual use of nuclear weapons was seen as a last resort, when everything else had failed.

What the Bush Administration has done is to change the basic policy from a defensive one to an offensive one. It has spelled out a strategy which incorporates nuclear capability into conventional war planning. Nuclear weapons have become a standard part of military strategy; they would be used in a conflict just like any other high explosives. This represents a major shift in the whole rationale for nuclear weapons.

The implementation of the policy has already begun. There is now open talk about the development of a new nuclear warhead, the 'Robust Nuclear Earth Penetrator'. It is intended to destroy bunkers with very thick concrete wall, in which weapons of mass destruction may be stored or leaders of rogue states may seek shelter. To give the military commanders confidence in the performance of the new warhead, it will have to be tested. At present we have the Comprehensive Test Ban Treaty, which the US has signed but not ratified. There is already open talk in Washington about America withdrawing from the CTBT. If the US resumes testing, it would be a signal for other nuclear states to do the same. I think primarily of China, but India and Pakistan may also be tempted. The danger of a new nuclear arms race is real.

But the situation has become even more dangerous under the National Security Strategy on Weapons of Mass Destruction announced by Bush in December last year. 'To forestall or prevent… hostile acts by our adversaries, the United States will, if necessary, act pre-emptively'. The US may actually use nuclear weapons in a pre-emptive attack on a hostile country.

The situation is really bizarre. The G-8 statement from the June 2003 summit in Evian speaks of nuclear weapons as 'the pre-eminent threat to international security', yet the United States arrogates to itself the right to use them whenever it feels that the situation demands it. How long will it be before other nations follow suit? All of a sudden, the danger of a nuclear war is looming large.

What can be done to avert the danger? In particular, what can Student/Young Pugwash contribute to the prevention of a catastrophe? It seems to me that in the first instance we must return to basics. We have to remind the general public of the need to safeguard the basic principles on which modern society is built. Thanks to the advances in science and technology, there is no longer the need for our actions to be motivated by the instinct for survival. Thanks to the applications of science, we can now afford to be guided by humanitarian principles, adherence to justice and generosity, equity and compassion, tolerance and peace.

You will be berated for taking such a stand. First, you will be told that all this is self-evident truth, like re-affirming motherhood and apple pie, despite the fact that relations between people and nations are often based not on generosity but jealousy, not on compassion but greed, not on equity but oppression; not on tolerance but force.

At the same time, you will be told the opposite – that it is futile to fight for these principles; you will be accused of being naïve, and divorced from reality. You will be told that conflict and war have always existed, even that we are biologically programmed for aggression. Sadly, you will find such views expressed not only by hawks. Even in senior Pugwash, where we have been fighting for nearly half-a-century for these principles, we are becoming frustrated and – to some extent - jaded.

I am going to call on Senior Pugwash to return to these principles, but I want you too to take up the cause. You have the enthusiasm of the youth, the indignation of the idealist. Specifically, I suggest to you to take up the two guiding principles with which I started this talk: morality in the conduct of world affairs, and adherence to international law.

The general public is not aware that these principles are being violated in relation to nuclear weapons. There is ignorance about the real situation and lack of information about the dangers. You can try to do something in this respect. You can make a start by getting yourselves better informed, by reading the material published on the subject. Within each of the National Student/Young Pugwash Groups, arrangements can be made for sharing the effort; to allocate to individual members the task of keeping track of the material on the Internet, to read it, and then transmit the acquired information to others.

Having acquired this knowledge yourselves, it can then be transmitted to student groups at your universities, as well as the general public by lecturing, writing articles to the Press, appearing on TV, etc. The process of educating the public about the immorality of the policies being conducted in their names, and about violation of international obligations, will be very slow at the beginning, and at times frustrating, but with perseverance I am sure it will be growing and rewarding.

This project, under a title such as: 'Public Awareness of the Nuclear Issue' could be run by the ISYP national groups, in collaboration with each other. In addition, national groups, or individuals within them, can undertake more specialised projects. An example is the weaponisation of space problem. Will Marshall will be talking about this here, therefore, at this stage, I will say only that I find it an excellent case study to be undertaken by young Pugwashites, or, for that matter, by old ones.

As intimated in my talk, the present structure of the United Nations makes it a rather ineffective instrument for peace keeping and peace enforcement, and ways to improve it is a desirable topic for study.

For a group, or an individual, interested in legal aspects, there is room for a study of the grounds for indictment, before an international court, of the American government, or President Bush himself, for US policies on the nuclear issue; in particular, policies contradictory to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). A number of individuals, as well as some organisations, have advocated such indictments, and it would be useful to put the material together, to study the practicality of this step.

For National Student/Young Pugwash Groups in Asia, the menacing situation in that continent deserves attention by them. Of particular concern is the increasing militarism in Japan and the growing campaign to change the present constitution which forbids any act of war.

To summarise, I have indicated five items for study by ISYP, namely:

1. Public Awareness of the Nuclear Threat.
2. Weaponisation of Space.
3. Up-dating the UN.
4. Legal action on the US violation of the NPT.
5. The Nuclear Issue in East Asia.

Ideas for other projects may emerge from the discussions at the symposium. Projects may have different purposes, from self-education to dissemination of information, to original research. They may involve individuals or whole national groups, or collaboration between groups. I hope that they will be mainly on the nuclear issue, because this has been the top issue for Pugwash throughout its history, and, clearly, should still be at present. This should not,

however, preclude other issues, indirectly linked to the nuclear one, such as the elimination of other types of weapons, or of war itself, or the social and ethical responsibilities of scientists, in which some of you are already involved.

The main emphasis is on 'involvement'. You can afford to spend only a small proportion of your time away from your career work, and this should be spent more on substantive issues and rather less on organisational matters. It is both natural and important that younger people, who have more reason to worry about the future than the older ones, should not leave the job to the latter, but take on themselves the task of ensuring a peaceful world.

The importance of Nuclear Weapons Free Zones

Wakana Mukai

Graduate School of Public Policy, University of Tokyo, 7-3-1 Hongo,
Bunkyo, Tokyo 113-0033, Japan; wakanam33@hotmail.com

Some say that it is nothing but an illusion to think of a world totally without nuclear weapons. This might be true. Nonetheless, although the total abolition of nuclear weapons seems, at present, to be quite difficult, promoting Nuclear Weapons Free Zones (NWFZs) from a regional standpoint might encourage further large-scale non-proliferation processes. NWFZs are important elements to be brought into the debate when dealing with the non-proliferation of nuclear weapons on a global scale. Also for regional security reasons, NWFZs are crucial. In particular, there is a need for an NWFZ in Northeast Asia.

The ultimate goal of a Nuclear Weapons Free Zone (NWFZ) is to establish the abolishment of nuclear weapons in a certain geographical sphere; moreover, an essential issue to be promoted is the elimination of the danger of being involved in a nuclear war [1]. States that are included in a NWFZ promote security in the area by making an agreement neither to manufacture nuclear weapons of their own nor to host any nuclear weapons of others [1,2]. Furthermore, prevention for the area from being attacked by nuclear weapons, as specified in respective treaties, is achieved by obtaining security guarantees from nuclear-weapon states (also called 'negative security').

Since NWFZs are based on international treaties, they can be perceived as truly trustworthy measures with regards to the non-proliferation of nuclear weapons. Furthermore, NWFZs play a crucial role in nuclear disarmament as well, since they enhance regional (and ultimately, universal) security, regional detente, regional reliance, and they promote the complete elimination of nuclear weapons.

The proliferation of nuclear weapons is an issue which must not be left behind. It is a matter of common security and the common good. In this sense, the creation of new NWFZs is an effective way for achieving security on a regional basis, which in the end can be sewed up into a global 'quilt' of nuclear weaponless regions [3]. Whereas focusing on a global image from the beginning is difficult, focusing on the regional level allows us to ground our thoughts and actions.

ISYP Journal on Science and World Affairs, Vol. 1, No. 2, 2005 79-86

The relation between the NPT and Nuclear Weapons Free Zones

The core of the global non-proliferation regime is the wide-spanning Treaty on the Non-Proliferation of Nuclear Weapons (NPT). The NPT prohibits transfer to, acceptance of, as well as the manufacture of any nuclear weapons or other military explosive nuclear devices whatsoever by non-nuclear-weapon states. However, as is clear from Article 2 of the Treaty, the stationing of nuclear weapons is not prohibited; in other words, a loophole to the regime exists. In contrast, Nuclear Weapons Free Zone treaties, in addition to all the matters that the NPT prohibits, do not allow for the stationing of nuclear weapons or of other nuclear explosive devices within the territories of state parties. Needless to say, NWFZ treaties are more rigorous than the NPT in terms of proliferation. To sign and ratify NWFZ treaties (and certain additional protocols) along with the NPT therefore promotes a healthy path towards nuclear disarmament and non-proliferation [1]. The establishment of an NWFZ should be seen not just as a measure for non-proliferation, but also as one for nuclear disarmament.

This fact is well recognised by the non-proliferation regime: Article VII of the NPT states that nothing in the Treaty 'affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories'; likewise, 'in the principles and objectives for nuclear non-proliferation and disarmament' adopted by the NPT Review and Extension Conference held in 1995, establishing NWFZs was recognised as a sophisticated approach which is strongly welcomed and valued by the international community [4]. There exists an exceedingly essential and mutually complementary relation between the different treaties belonging to the nuclear weapons regime, NWFZ treaties included.

The concept of a Nuclear Weapons Free Zone

The ultimate goals of NWFZs are accomplished through a binding legal instrument between two or more States which agree on the absence of nuclear weapons in a specific region, along with a series of verification and compliance mechanisms, as well as negative security guarantees by all nuclear-weapon states [5]. Nuclear weapons free regions, in a more general sense, need not be defined by groups of countries: Mongolia declared itself a Nuclear Weapons Free State and had its status confirmed by the UN General Assembly; in addition, following the end of the Cold War and the unification of the Federal Republic of Germany and the German Democratic Republic (DDR), the former DDR territory, now part of the NATO territory, was declared a nuclear weapons free area.

In defining an NWFZ, it is necessary to consider whether the area in question is populated [6]. To this extent, we can say that there exist five NWFZs in the world today; the Latin and Caribbean NWFZ, the South Pacific NWFZ, the Southeast Asia NWFZ, the African NWFZ, and the Central Asian NWFZ. Each zone is legitimised by specific treaties, namely, the Treaty for Prohibition of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco), the South Pacific Nuclear Free Zone Treaty (Rarotonga Treaty), the Treaty on the Southeast Asia Nuclear Weapons Free Zone (Bangkok Treaty), the Treaty on the Nuclear Weapons Free Zone in Africa (Pelindaba Treaty), and the Central Asia Nuclear Weapons Free Zone Treaty (Semipalatinsk Treaty) [7].

The main and most obvious objective of an NWFZ is the 'total abolition of nuclear weapons' [8]. As mentioned above, NWFZ treaties comprehend both aspects that are considered by the NPT (the production, transfer, and so forth of nuclear explosive devices) and aspects that

are neglected by the NPT (the stationing of nuclear weapons). However, NWFZs are also meant to guarantee that State Parties will not be targeted by existing nuclear-weapon states. This, in brief, is granted by negative security assurances which are granted by the nuclear-weapon states. Such assurances raise the security level of non-nuclear states which take the path down permanent disarmament to an even higher and definite stage.

Brief historical background

The idea of NWFZs arose in 1956, prior to the constitution of the NPT. In March 1956, a proposal was presented to a United Nations Committee on Disarmament which sought to obtain partial arms restrictions, the establishment of regions under constant inspection, as well as a prohibition of the stationing of nuclear equipped forces, nuclear weapons and hydrogen weapons, on German soil and in neighbouring states [9]. This proposal, which had been presented by the Soviet Union, was adopted and rephrased in a more sophisticated form by the Foreign Minister of Poland, Adam Rapacki, and presented during a session of the United Nations General Assembly in October 1957 [10]. Nevertheless, this idea to establish a denuclearised zone in Central Europe was suppressed due to the Cold War; more in general, although several proposals were made towards the denuclearisation of Europe – for example, of the Balkan Peninsula (1957) and of Northern Europe (1959) [11] – none have come to fruition.

Analysing NWFZs

Although it is clear that the establishment of NWFZs is a vital step in the direction of non-proliferation and disarmament, doing so involves many steps and is thus a complicated process. However, history proves that, albeit complicated, it is not impossible: today there are three established Nuclear Weapons Free Zones supported by treaties that have entered into force (The Pelindaba Treaty and the Semipalatinsk Treaty have not yet entered into force.) Today, 74% of all of the territories not encompassed by nuclear weapon powers (these territories include Antarctica) are situated within NWFZs, including 99% of all the land in the southern hemisphere. Out of 195 States, 114 belong to such denuclearised zones, comprising about 1.8 billion people who do not live under the direct shadow of nuclear war. This means that, indeed, there are successful models for establishing further similar zones. The existing zones can be analysed and compared in order find defining features, common strengths, and particular weaknesses.

A quick overview of the three active NWFZs reveals two fundamental criteria for the creation of a successful denuclearised zone: a strong bondage between regional states and stable relations with the nuclear-weapon states. The first highlights the necessity of strong regional organisations such as the Organisation for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) in Latin America, the Pacific Islands Forum (PIF) in the South Pacific, Association of South East Asian Nations (ASEAN) in Southeast Asia, and African Union (AU) in Africa. From this point of view, the NWFZ being established in Central Asia (between Turkmenistan, Kyrgizia, Uzbekistan, Tajikistan, and Kazakhstan) does not have a strong and reliable regional organisation. And although establishing an NWFZ does not require as a sine qua non such an organisation, its presence will be central to the success of the project in the long run.

Furthermore, many states that live under the umbrella of an NWFZ possess a common history. Common historical understandings among regional states work to strengthen the bondage within the region. One of the qualifications for the establishment of an NWFZ derives from the historical question of whether states were 'directly' involved in the Cold War or not [12]. The bondage/history relation becomes controversial when dealing with countries that were not at the periphery of the Cold War. For regions, however, that were not strongly involved in the Cold War and that are also linked by strong regional organisations, it is easier to establish an NWFZ. Still, for such regions, the end of the Cold War provided a trigger. For example, the establishment of an NWFZ in Southeast Asia was largely conditioned to the withdrawal of the United States' army from the Philippines. Nuclear weapons were a symbol of the Cold War; thus, it can be assumed that some – though not strong – involvement in the Cold War and the legacy which derived from it did not hinder but rather endorsed the establishment of an NWFZ.

The aftermath of the Cold War also reveals the importance of having stable relations with the nuclear powers. In order for an NWFZ to be effective, it requires recognition from nuclear-weapon states so as to ensure the absolute denuclearisation of the region, even in the event of war. Therefore, co-operation from these states is necessary.

In his thesis, Tosaki describes four obstacles in establishing NWFZs: the existence of threshold states; the possibility of being attacked by neighbouring nuclear-weapon states; the temptation of possessing nuclear weapons as a deterrent to deal with the proliferation of biological and chemical weapons; and as a means to forge an alliance with nuclear-weapon states [8]. In considering these obstacles, the first and the last can be solved, as proven by the Latin American, South African, and Asian cases.

The problem is that although many emphasise the importance of establishing more NWFZs, there is little succes in achieving this goal. Not enough qualifications do yet exist that stimulate the establishment of NWFZs. These qualifications are the existence of an initiative state, time for negotiation, assured transcendence of states, detainment of the neutrality for denuclearisation, environmental preparation, and general détente [13].

Peaceful and military uses: what differentiates the two?

Another key issue, and probably one of the most difficult issues in establishing NWFZs, is that the borderline between peaceful and military uses of nuclear devices is quite ambiguous.

There are two possibilities for contemplating this issue. The first is that there is an urgent need in drawing a legal line between peaceful and military uses of nuclear technologies. This is based on the anxiety of the dual use of these technologies. As we face a serious energy shortage in the years to come, the need to secure energy will emerge as an essential issue: therefore to use and develop energy-supplying systems via nuclear power is inevitable and indispensable. However, proliferation is the dark side of nuclear energy [14], and reaching a consensus in this context is a difficult task which involves many actors and their expectations.

The second possibility is to distinguish between types of nuclear explosions, namely, whether they are for peaceful uses or not. The reason why the nuclear non-proliferation regime still retains its value is because there is a formal treaty on which the regime is based. However, the criterion to define whether an explosion is a peaceful one or not has yet to be decided upon. NWFZ treaties prohibit nuclear weapons but do not prohibit the peaceful use of nuclear

energy, explosives included. But to what extent is the legal framework sensitive to the boundaries between peaceful and not peaceful? The question remains unsolved. One can only mention that the recognition of this borderline problem has resulted in the provisions in the Rarotonga, Bangkok, and Pelindaba treaties that prohibit all nuclear explosive devices regardless of their intended use. While peaceful nuclear explosions for landscaping or other purposes were seriously considered in the 1960s, those ideas seem to have been abandoned.

A Nuclear Weapons Free zone in Northeast Asia?

Among the various proposals to establish NWFZs that followed the end of the Cold War, there is one in particular which deals with Northeast Asia.

The proposal of the Northeast Asia NWFZ arose out of a series of meetings that began in 1991 between retired diplomats and officers from South Korea, Russia, Japan, China, and the United States. Today, the proposal for an NWFZ in Northeast Asia is being promoted in a limited way and through a Track-II level process (i.e. through non-official channels). Official conferences and discussions are not yet held, which means that there are many high hurdles to overcome.

The main actors that are promoting the establishment of this zone are Peace Depot [15], the International Physicians for the Prevention of Nuclear War (IPPNW) [16], and the Tokyo Physicians for Elimination of Nuclear Weapons (TPENW) [17]. These organisations have held a number of sessions at a non-governmental level and advocated the importance and necessity of establishing an NWFZ in Northeast Asia, as well as the process that must be taken to achieve this task.

When defining Northeast Asia, there are several different opinions. In general, this scheme is thought to contain Japan, South Korea, North Korea, and parts of China and Russia, though some also include Mongolia. The important element in this proposal is that this region of the world contains two of the nuclear-weapon states as accepted in the current non-proliferation regime (i.e. China and Russia). This is an unprecedented challenge since none of the four existing NWFZs contain mainland areas that are part of the territory of nuclear-weapon states; in other words, there is no model for what could become a treaty that establishes an NWFZ in Northeast Asia. The Latin American, South Pacific and African zones include, however, small dependencies of nuclear-weapon states. Therefore, the criteria and measures of participation of states within the presupposed area are the keys in promoting this idea of establishing an NWFZ in the region.

The establishment of an NWFZ in Northeast Asia would be a crucial act in coping with the security issues of the Korean Peninsula and Japan. Hence, initiatives by South Korea and Japan are indispensable. Both countries are under the umbrella of nuclear security of the United States and in order to take initiatives, both states must grow out of this military and mental dependence. However, this step must be taken simultaneously. This is because both South Korea and Japan are restraining each other in the field of security policy, and since nuclear policy is firmly attached to this issue, security will not be achieved if the two states take steps individually. Walking the same path will take the two states to obtain the same goal, which will lead the region to achieve increased security. Also, movements for establishing an NWFZ will bring about a trust-building processes as well as a sense of common security for the region:

this is not just a by-product of denuclearising the region, but has an even more crucial meaning [18].

In assessing the establishment of an NWFZ in Northeast Asia, there are several issues to keep in mind. First, there is the matter of American bases located in the region; specifically in South Korea and Japan. These locations have long been in dispute in the context of the presence of nuclear missiles and materials in the region. The United States regards itself as the authority broker in Northeast Asia and, needless to say, the security within this specific region cannot be considered without the coordination of the United States. Therefore, it would be truly risky to exclude the presence of the United States from the region.

There is also the problem of the remainder of the total eradication of historical hostilities. In order to create a certain NWFZ, there is a strong need of a well-built organisation as a integrity-enhancing factor for the region. This integrity could be based on the common and cultural background of the region. Therefore, measures toward the mediation of hostilities and a certain form of integrated identity are crucial in the establishment process of an NWFZ in Northeast Asia. Political and economic diversity and constant transfigurations are facts that must also be intensely studied. There may be ways is which the Six Party Talks might serve as a ground for negotiations towards a more concrete proposal for an NWFZ in the region. However, the talks have not yet seen significant achievements considering nuclear disarmament at the moment.

Conclusion

Nuclear Weapons Free Zones have a tremendously important role to play in non-proliferation and disarmament issues. Since nuclear non-proliferation and disarmament are enormously complex tasks, it is impossible to achieve the ultimate goal of complete disarmament by approaching this issue globally from the very beginning. Thus, I propose to start from regional approaches and ultimately sew them up into a one big global quilt. In this sense, using the logic of NWFZs to reinforce the nuclear non-proliferation and disarmament regime can be understood as an effective measure towards universal disarmament. NWFZs themselves will not and cannot stop proliferation of nuclear weapons; they are just one of the many options in the non-proliferation regime that must be used adequately. Reciprocal actions and strong mutual relations with global approaches such as the NPT are needed. This essential connection will further reinforce the capability that the NWFZs retain.

As the proverb goes, 'many a little makes a mickle'. I believe this idea also applies to nuclear non-proliferation and disarmament. It is still too early to give up. As a highly sophisticated scholar once noted, 'the desire to concur a nuclear war is nothing but a proof of arrogance of people that have forgotten respect to this beautiful earth' [19]. Consideration of the proliferation of nuclear weapons is an invariable issue which all of us must not leave behind. It is a matter of common security, as was said by the Palme Committee (1982). We must contemplate nuclear weapons issues not just as a state-based interest issue, but rather as an overall issue posed to all of humanity.

Notes

1. Mitsuru Kurosawa, Issues in Disarmament: An Introduction, 2nd ed., Toshindo, Tokyo, 1999.
2. Ben Sanders, Nuclear non-proliferation: a survey of the world after the NPT Conference, in: Disarmament in the Last Half Century and its Future Prospects, Disarmament Topic Paper 21, United Nations Publications, New York, 1995.
3. See Yoko Okashiwa, The denuclearisation of the South Hemisphere, in: Disarmament in the 21st Century, Hiroshima Peace Institute, Hiroshima, 2002. Okashiwa proposes a state in which all the existing NWFZs must work together in creating a more larger-scale zone, so called a 'Patchwork System'.
4. For more information, see NPT/CONF.1995/32 (Part I), 1995 Review and Extension Conference of the Party to the Treaty on the Non-Proliferation of Nuclear Weapons Final Document Part I, Organisation and work of the Conference, New York, 1995. Decisions considering NWFZs are listed in Decision 2 'the Principles and objectives for nuclear non-proliferation and disarmament', articles 5-7.
5. See United Nations General Assembly Resolution 3472B, adopted December 11 1975.
6. The Antarctic Treaty, which entered into force on June 23, 1961, is a treaty that has the character of an NWFZ Treaty. However, when defining an NWFZ as a permanently populated region, Antarctica does not fit in. However, that does not mean that the state of Antarctica is insignificant; on the contrary, it is truly an important landscape for nuclear non-proliferation and disarmament process macrocosmically.
7. The Central Asian Nuclear Weapon-Free Zone and the attached Protocol were adopted in February 2005 by the significant initiative of the United Nations Regional Centre for Peace and Disarmament in Asia and the Pacific. Although it was adopted by the five Central Asian countries that are involved, the signing of the Treaty is not yet completed. However, in the joint statement adopted in Tashkent (A/59/733, S/2005/155), the five countries expressed their desire to sign the Treaty as soon as possible. The ceremony is expected to take place in Semipalatinsk, Kazakhstan.
8. Hirofumi Tosaki, Nuclear Weapons-Free-Zone and nuclear non-proliferation, in: International Politics in the non-Proliferation of Weapons of Mass Destruction, Yushindo-Kobunsha, Tokyo, 2001.
9. Hiroshi Ide, The History on Nuclear Disarmament Negotiation, Shin-Nippon Syuppannsya, Tokyo, 1987, p. 72.
10. See James R. Ozinga, (1989.) The Rapacki Plan: the 1957 proposal to denuclearise Central Europe, and an analysis of its rejection, Mcfarland & Company, Jefferson, NC, 1989.
11. The concept for an NWFZ in Northern Europe was proposed repeatedly: the first proposal was made by the former Soviet Union in 1959, followed by Sweden in 1961, Finland in 1963 and 1978.
12. Hisaichi Fujita, Qualifications to the denuclearisation of Northeast Asia, in: Disarmament Issue References, No. 254, Utsunomiya Disarmament Research Institute, Tokyo, 2001, p. 12.
13. From the Asahi Shimbun, August 8, 1998.
14. United Nations, The United Nations and Nuclear Non-Proliferation, The United Nations Blue Books Series Volume III), United Nations Publications, New York, 1995, p. 30.
15. Launched in November 1997, The Peace Depot is a non-profit, independent peace research, education and information institution which aims to build a security system that does not rely on military power. It became incorporated as a non-profit organisation (NPO) in January 2000 under the

Japanese NPO Act. For more information, see the Peace Depot homepage (http://www.peacedepot.org/index.html).

16. Founded in 1980, awarded the Nobel Peace Prize in 1985, the International Physicians for the Prevention of Nuclear War is a non-partisan, global federation of national medical organisations in 58 countries dedicated to research, education, and advocacy relevant to the prevention of nuclear war. For more information, see the IPPNW homepage (http://www.ippnw.org).
17. Inaugurated in 1988, the Tokyo Physicians for Elimination of Nuclear Weapons is a society of physicians and those working in medical fields protesting against nuclear war and appealing for the elimination of nuclear weapons. For more information, see the TPENW homepage (http://www.ask.ne.jp/~hankaku).
18. See John E. Endicott, A Limited Nuclear-Weapons-Free-Zone in Northeast Asia: A Track-II Initiative, The Acronym Institute (http://disarm.igc.org/Plnwfznea.html). See also Captain Mark E. Rosen, Nuclear Weapons Free Zones: Time for a fresh look, Duke Journal of Comparative and International Law 8 (1) (1997) 29-78.
19. A phrase used by Kuniko Inokuchi, the former ambassador of disarmament from Japan. See Kuniko Inokuchi, War and Peace, The University of Tokyo Press, Tokyo, 1989.

Recent developments in the non-proliferation of nuclear weapons

Safeguards by the International Atomic Energy Agency

Ryoko Kusumi

Graduate School of Law, Hitotsubashi University, 2-1 Naka, Kunitachi City, Tokyo, 186-8601, Japan; ryoko@mercury.ne.jp

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) has played a central role in sustaining the non-proliferation system. The effectiveness of the NPT has been secured by verifying its obligations through the safeguards of the International Atomic Energy Agency (IAEA) that have been in place since the treaty entered into force in 1970. However, its limitations came to be known through unprecedented cases which surfaced after the end of cold war in the early 1990s. The purpose of this article is to examine how effective the NPT has been in preventing nuclear proliferation by analysing the course of events through the 1990s.

The proliferation of nuclear weapons is defined as the process by which an entity (whether state, sub-national body, or person) acquires the credible means to possess, use, threaten, or attempt to use fissile nuclear material that could produce significant physical or radiological damage (most seriously in the form of an explosive device) [1]. Since 1945, the international nuclear non-proliferation system has maintained several instruments, such as technology controls, export/import control, physical protection, measures against illicit trafficking, disarmament, restraints on testing, and some special initiatives (United Nations Special Commission for overseeing the elimination of weapons of mass destruction and ballistic missiles in Iraq, UNSCOM; United Nations Monitoring, Verification and Inspection Commission, UNMOVIC; and Korean Peninsula Energy Development Organisation, KEDO) [2].

In order to determine the effectiveness of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in preventing nuclear proliferation, this article examines basic characteristics of the NPT first and then summarises how the International Atomic Energy Agency (IAEA) safeguards were strengthened in the 1990s to secure the implementation of the treaty. Lastly, it goes on to discuss the effectiveness of the NPT by mentioning the examples of South Africa, Iraq, the Democratic People's Republic of Korea (DPRK) and Iran.

ISYP Journal on Science and World Affairs, Vol. 1, No. 2, 2005 87-102

Treaty on the Non-Proliferation of Nuclear Weapons (NPT)

On 1 July 1968 the NPT was opened for signatories and it entered into force on 5 March 1970. As of January 2005, it had a membership of 188 countries [3], making it one of the largest existing international treaties.

The NPT consists of a preamble and eleven articles. Article 1 provides that each Nuclear-Weapon State (NWS) Party shall not transfer to any Non-Nuclear-Weapon State (NNWS) nuclear weapons or other nuclear explosive devices and shall not assist any NNWS to manufacture nuclear weapons or other nuclear explosive devices. Article 2 prohibits the receipt, manufacture, and/or development of nuclear weapons or other nuclear explosive devices. For the purposes of the NPT, a NWS is one which has manufactured and exploded a nuclear weapon or any other nuclear explosive device prior to 1 January 1967 (Article 9 III), i.e. US, Russia, UK, France and China.

Furthermore, the treaty establishes IAEA safeguards as a main measure to verify the fulfilment of its obligations. Each NNWS undertakes to accept the safeguards, as set forth in the agreement to be negotiated and concluded with the IAEA in accordance with the Statute of the IAEA (the "Statute") and its safeguards system. This is for the exclusive purpose of verifying the fulfilment of obligations assumed under the Treaty with a view to preventing the diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. The safeguards required by this Article are to be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of the State, under its jurisdiction, or carried out under its control (Article 3 I).

Pursuant to Article 10 II, in May 1995, twenty-five years after the entry into force of the Treaty, the NPT Review and Extension Conference was held and adopted the indefinite extension of the NPT.

IAEA safeguards

Before the NPT

Soon after World War II, the international community turned its eye to setting up an international atomic energy organisation with the authority to make world-wide inspections. This idea fell in line with the United Nations Atomic Energy Commission, the American Baruch draft, the Russian Gromyko draft, and a speech entitled 'Atoms for Peace' made by then American President Dwight D. Eisenhower. The idea of the IAEA was presented to the United Nations General Assembly (UNGA) in 1953. Further arguments led to the adoption of the Statute of the IAEA, including safeguard provisions, during the tenth UNGA on the 23rd of October, 1956. The Statute came into effect on the 29th of July 1957, thereby establishing the IAEA.

Article 2 of the Statute provides that the IAEA shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control, is not used in such way as to further any military purpose. For this reason, Article 3 V establishes safeguards to ensure that nuclear materials are not used in such a way as to further military purposes. Article 12 provides the IAEA's rights and responsibilities in applying safeguards, remedial actions to any non-compliance or failure if any, a right to report any non-compliance to the

UNGA and the Security Council of the United Nations (UNSC) as well as corresponding sanctions.

In reality, even after the IAEA was established, setting the safeguard procedures in accordance with these provisions progressed at a snail's pace. This could be attributed to the fact that no state requested the IAEA to apply its safeguards. Most states sought for bilateral agreements that provided for not only the supply of nuclear materials and facilities but also bilateral safeguards, following the American model of refusing mediation by an international organisation for fear of nuclear proliferation resulting from peaceful nuclear activities, although the US was both the first advocate of the IAEA and the main actor in global nuclear activities.

The first State that requested inspection by the IAEA was Japan. Although poor in natural energy resources, Japan had to cope with increasing demands for electricity as a result of rapid economic growth and thus turned its attention to nuclear power generation. However, due to political concerns, it decided to accept inspections by an international organisation rather than establish a bilateral relationship with specific States such as the United States or the United Kingdom [4]. One of the reasons for Japan's initiative was the international circumstances of the time: among the many States that launched massive nuclear power generation projects, US, UK, USSR, and France were not obliged to accept inspections as being NWSs, while many European countries such as West Germany and Italy hoped for inspections by the EURATOM.

The Board of Governors of the IAEA (BOG) adopted the first safeguard agreement INFCIRC/26 in January 1961, then INFCIRC/26/Add.1 in February 1964, followed by a new document INFCIRC/66 in 1965. From this point, safeguards which had been applied according to bilateral agreements were to be gradually placed under the control of the IAEA.

Safeguards required in connection with the NPT

INFCIRC/66-type safeguard agreements leave a broad scope of practical decisions to the IAEA as well as to the discretion of its inspectors. The agreement does not strictly define its target nor the inspectors' duty to maintain confidentiality, while allowing a broad frequency of inspections. The NPT came into force on the eve of large-scale nuclear power generation, when states such as Japan and West Germany, which had high expectations of nuclear power generation, strongly feared that NWSs would abuse the safeguard system to infringe industrial secrets. Thus, those states claimed to revise INFCIRC/66 as soon as it became clear that the NPT applied IAEA safeguards. Hence, the revision put an emphasis on not inflicting a loss on the technological and economic aspects of NNWSs, while maintaining its original function of non-proliferation [5]. Article 4 of the NPT, which provides inalienable rights to use nuclear energy for peaceful purposes, was the strength of this argument.

Consequently, in March 1971, the 'Structure and Content of Agreements between the agency and States required in connection with the treaty of the non-proliferation of nuclear weapons' (INFCIRC/153) was adopted. According to INFCIRC/153 (Paragraph 1), inspections are applied to all source or special fissionable material in all peaceful nuclear activities. However, in practice the frequency of inspections is based upon the quantity of nuclear material each state possesses. Therefore, it targeted mainly industrialised NNWSs such as western European countries, Japan and Canada.

Meanwhile, the five NWSs concluded voluntary offer agreements (VOA) with the IAEA to accept its safeguards. A VOA is usually an INFCIRC/153-type agreement, but what form it takes

is ultimately up to each individual state. As stated above, the NPT system was settled by gaining verification measures to secure its implementation under an international organisation, the IAEA. As of 1991, 180 safeguard agreements had been concluded between the IAEA and 105 countries.

Strengthened safeguards

Controversial points of INFCIRC/153

As mentioned above, the implementation of the NPT is secured by the IAEA according to INFCIRC/153-type agreements, but INFIRC/153 has two major controversial points.

Firstly, the IAEA was not designed to be an organisation for verification of the NPT, so that the objectives of the NPT are not always consistent with those of the IAEA. As a result, there are some variations between the scope of the NPT and that of the IAEA safeguards. In reality, the IAEA cannot work on the verification of the receipt of nuclear weapons among the duties imposed on NNWSs as provided in Article 2 of the NPT. Also, whereas the NPT aims to prevent proliferation of nuclear weapons or other nuclear explosive devices in general (NPT Article 1 and 2), the IAEA aims solely to prevent nuclear energy from being diverted to 'any military purpose' (the Statute Article 2). This means that the NPT requires verification of not only nuclear materials for peaceful purposes but also military not-nuclear-explosive devices (e.g., nuclear fuel for nuclear-powered submarines), while at the same time the application of IAEA safeguards is limited to nuclear materials used exclusively for peaceful purposes [6].

The other point is that the provisions require the safeguards to be applied on 'all source or special fissionable material in all peaceful nuclear activities' (NPT Article 3, INFCIRC/153 Paragraph 2), whereas in practice the safeguards are applied only on nuclear materials 'declared' voluntarily by each State.

The above mentioned points have been pointed out with regard to INFCIRC/153. However, it was only after issues in Iraq and the DPRK occurred in the 1990s when its revisions were accelerated. Details of these cases are given below.

Practice of special inspection

A special inspection (INFCIRC/153 Paragraph 73 and 77) is an inspection designed to examine reports from a concerned State or to fulfill responsibilities of the IAEA in the event or suspicion of abnormal situations, apart from routine inspections [7]. There have been indications for some time that utilising special inspections is necessary. However, these indications have been unsuccessful because none has ever been done. It was not until after it was revealed that Iraq had pursued nuclear weapons in 1991 that the IAEA started a full-scale review of the special inspection provision.

Later, in November 1991, the IAEA Secretariat prepared a paper on strengthening the IAEA safeguards GOV/2554) to be reviewed at the BOG in February 1992. The BOG 'reaffirmed the IAEA's right to undertake special inspection in Member States with comprehensive safeguards agreements, when necessary and appropriate, and to ensure that all nuclear materials in peaceful nuclear activities are under safeguards'. It further 'reaffirmed the IAEA's right to obtain and to have access to additional information and locations in accordance with its Statute and all comprehensive safeguards agreements' [8].

Here, provisional terms 'in agreement with the State' (Paragraph 77) raise a controversy about whether the State Party which concludes a INFCIRC/153-type safeguard agreement has an obligation to accept the special inspection, or whether it allows the State to refuse the special inspection.

This point is not clarified in the paper on strengthening the IAEA safeguards (GOV/2554), and there is an argument to be made for the obligation of accepting special inspections [9]. However, Article 12 C of the Statute provides that the BOG 'shall' report the non-compliance to all members, the UNSC, and the UNGA [10], while Paragraph 19 of INFCIRC/153 provides that the BOG 'may' make the reports. From these terms, it follows that it is possible for the BOG not to report non-compliance even when a State Party refuses to accept the special inspection, meaning that refusing special inspections does not always equal non-compliance. Therefore, it can be said that there is no obligation to accept special inspections.

Taking account of the fact that the BOG is entitled to decide whether or not to report each individual case, it was not unreasonable for the BOG to reaffirm its rights to implement special inspections in February 1992.

Improving the reporting system

Although the right to implement special inspections was reaffirmed as above, questions still remain about the effectiveness of IAEA safeguards if the IAEA is given insufficient information on undeclared nuclear activities. To secure information that can help finding undeclared nuclear activities, the IAEA has also improved the reporting system related to its safeguards.

Firstly, early submission by states of design information with respect to nuclear facilities was debated. INFCIRC/153 stipulates that design information of nuclear facilities shall be provided 'as early as possible before nuclear material is introduced into a new facility' (Paragraph 42), but does not give specific time limits. Thus, the BOG on February 1992, which reaffirmed the right of special inspection, stated that design information on new facilities and on changes to existing facilities shall be provided to the IAEA as soon as possible.

Secondly, the BOG of February 1993 adopted a Universal Reporting System. Under this system, each member state provides voluntary information on the import/export of nuclear materials, specified nuclear related equipment, and non-nuclear materials to the IAEA. It covers a wider scope than INFCIRC/153 as it encourages member states to provide relevant information on specified 'equipment and non-nuclear materials', not just specific nuclear materials.

As the system equally encourages NNWSs, which concluded INFCIRC/153-type safeguard agreements, and NWSs, which concluded the VOA, to voluntarily provide information it enabled the IAEA to have a much clearer view of the global flow of nuclear-related equipment and thus enlarged the possibility of detecting undeclared nuclear activities, by providing a chance for the comparison and analysis of the flow.

Programme 93+2

The IAEA Secretariat recognised the need for a comprehensive and systematic approach to strengthen its safeguards in the course of discussions triggered by the issues in Iraq and the DPRK in the early 1990s and proposed 'Programme 93+2' to the BOG in December 1993. For the next two years, it worked to assemble a proposal on 'Strengthened Safeguards System (SSS)' [11].

This system was worked out in two separate parts: part one examines various available actions under the authorisation of the current INFCIRC/153-type safeguard agreements; and part two examines other actions that would be available only if additional legal authority was given to the IAEA. Part one was approved by the BOG in June 1995 to be implemented in 1996 [12].

Features of part one include obtaining further information, enhancing on-site inspection and adapting existing systems to improve efficiency. To obtain further information, part one proposes the early submission of design information on nuclear facilities, as mentioned above, while stretching its objective to encompass information on nuclear activities prior to the entry into force of safeguard agreements, the status of nuclear fuel cycles, and the operational conditions of nuclear facilities. In regard to on-site inspections, part one enabled inspections on uranium processing plants, nuclear power stations, and other related facilities without advance notice other than sites which indicated that nuclear material was present as provided for by INFCIRC/153. Part one also proposed procedural improvements including simplifying the procedures of appointing inspectors and permitting multi-visas for more flexible and efficient inspections.

Additional protocol INFCIRC/540

Part two of the SSS was transformed into a different proposal by the Secretariat, after part one was implemented. After careful discussions within the BOG's drafting committee, a special BOG session adopted the 'Model Protocol Additional to the Agreement(s) between State(s) and the IAEA for the Application of Safeguards' (INFCIRC/540) by consensus on 15 May 1997 [12].

The new measures contemplated by INFCIRC/540 are of three general types: information related, access related, and those related to administrative arrangements. For all of these measures, INFCIRC/540 dared to stretch their range or enhance their implementation. It is especially noticeable that access to related sites including places where nuclear material is not present was permitted, as it allowed complementary access to undeclared nuclear activities (Article 5) [14].

INFCIRC/540 is distinct from both the NPT and INFCIRC/153 as it requires both NNWSs and NWSs which have NPT membership to apply, whereas the NPT places only NNWSs under an obligation to conclude safeguard agreements [15]. As of August 2003, it was signed by 74 states and entered into force in 35 states and EURATOM. It is expected that INFCIRC/540 will bring improved transparency of each state's nuclear activities, increasing the accuracy and completeness of IAEA safeguards in future.

Integrated safeguards

Integrated Safeguards are defined as the optimum combination of all safeguard measures available to the IAEA under INFCIRC/153-type safeguard agreements and additional protocols to it (INFCIRC/540). These safeguards achieve the maximum effectiveness and efficiency within available resources in fulfilling the IAEA's right and obligation in paragraph 2 of INFCIRC/153 [16].

Integrated safeguards shall be implemented in a State only when the IAEA has drawn the conclusion that there is an absence of undeclared nuclear materials and activities in that State, and only after taking IAEA safeguards under an INFCIRC/153-type safeguard agreement and its

additional protocols. Furthermore, under integrated safeguards, safeguarding measures may be applied at reduced levels at certain facilities, compared with the measures that would have been applied without this conclusion.

Traditional INFCIRC/153-type safeguard agreements in practice focused solely on the quantity of nuclear materials possessed by each State and left little room for independent decisions by the IAEA. On the contrary, under the integrated safeguards system, the IAEA can make independent decisions based solely on its past experience. Research and developments are being made towards the speedy realisation of integrated safeguards. The IAEA General Conference (GC) has supported the Secretariat's challenge to strengthen the effectiveness and improve the efficiency of safeguards ever since it commenced. It had also urged the Secretariat to continue studying integrated safeguards in the context of implementation since 2000 [17].

If applied with integrated safeguards, states could enjoy more international credibility and benefits from nuclear activities as a result of decreased costs for conventional safeguards. This means the NPT and IAEA safeguards could step forward into a new era.

Case studies

South Africa

Discovery of a uranium mine in the suburb of Johannesburg in 1944 led the South African government to enact the Atomic Energy Act and establish the Atomic Energy Board (AEB) [18] in 1948. Since then, South Africa has become a forerunner in the field of nuclear studies backed by its abundant uranium resources. With the establishment of the IAEA in 1957, it was listed as one of the original member states, and had also concluded INFCIRC/66-type safeguard agreements with the IAEA in which it had transferred bilateral safeguard systems to the IAEA.

In the mid 1970s, South Africa started nuclear development from political necessity. In 1975, Angola, which is adjacent to Namibia, and Mozambique, border countries to South Africa, gained independence from Portugal. In both Angola and Mozambique, civil war broke out between pro-USSR governments and anti-government guerrilla groups, and South Africa interfered in these civil wars by supporting guerrilla groups from fears that communism would raise its head in Southern African countries. Suffering from the influences of the cold war and domestic power struggles in South Africa, Angola turned into a fierce battlefield in the end and the Cuban army was deployed to help its government. Such a situation was said to be a direct factor in South Africa rushing to develop nuclear weapons.

After the USSR pointed out South Africa's nuclear development in 1977, followed by similar indications from the US in 1979, the UNGA of December 1982 requested that South Africa stop nuclear development and place all of its nuclear activities under the control of the IAEA safeguards. At the same time, the UNGA requested that the IAEA suspend all assistance to South Africa on nuclear activities [19]. In June 1987, pursuant to Article 19 B of the Statute, the BOG submitted a recommendation to suspend South African privileges and rights of membership as a member state of the IAEA to the General Conference (GC). However, the GC of September 1987 postponed this subject for one year as South Africa was considering changing its policy on nuclear activities and joining the NPT in the near future. The issue was revisited many times by the GC in an effort to see the Cold War end [20], and on 10 July 1991 South Africa acceded to the NPT as a NNWS and concluded an INFCIRC/153-type safeguards agreement with the IAEA on the 16th of September. For verification of the initial report South

Africa submitted to the IAEA pursuant to the agreement, South Africa was keen to co-operate with the IAEA in accepting access to 'any place, any time', including enrichment facilities, which had been missing from prior safeguards [21].

On 24 March 1993, then South African president Frederik Willem de Klerk announced that his government had developed six nuclear weapons in the past but had destroyed all of them. The information was later verified by IAEA inspectors who had been invited by the South African government [22].

It may be reasonable to conclude that South Africa abandoned nuclear development because security concerns vanished at the end of the Cold War. In any event, what transpired was that a strong political leadership took the initiative to rejoin the international community and achieve economic development by restoring its international credibility through membership with the NPT. It symbolises the raison d'être of the NPT system in the international community.

Consequently, South Africa became the one and only state to abandon nuclear weapons voluntarily and played a key role in supporting the indefinite extension of the NPT at the NPT Review and Extension Conference in 1995.

Iraq

UNSCOM

Following the Iraqi invasion of its neighbouring country Kuwait in August 1990, the UNSC adopted Resolution 660 which demanded immediate and unconditional withdrawal. When Iraq failed to comply with this resolution, the Multinational Coalition Force attacked Iraq in January 1991, otherwise known as the Gulf War. The end of the Gulf War was declared by UNSC Resolution 687 on 3 April, which demanded that Iraq reaffirm its obligations under the NPT, place its fissionable materials under the exclusive control of the IAEA, accept IAEA inspections to verify the destruction of the materials stated above, and permit inspections and monitoring for extended periods, all of which Iraq accepted officially. Following this resolution, the UNSC established the United Nations Special Commission for overseeing the elimination of weapons of mass destruction and ballistic missiles in Iraq (the UNSCOM) on 1 May 1991 to inspect and eliminate weapons of mass destruction in Iraq. The resolution also called upon the IAEA to carry out inspections of Iraqi nuclear weapons under the assistance and co-operation of UNSCOM. Places to be inspected by the IAEA were identified based on sites that Iraq indicated in the report submitted in accordance with Resolution 687 and sites which UNSCOM chose based on other information. The IAEA inspectors were guaranteed to have unconditional and unlimited access to any region, facility, equipment, record and means of transportation [23].

UNSCOM's extensive and intensive inspections discovered Iraq's nuclear development programme later on. The fact that nuclear development projects had been carried out in an undeclared facility in the same premises where the IAEA had made routine inspections according to an INFCIRC/153-type safeguards agreement in connection with the NPT between Iraq and the IAEA (INFCIRC/172; entered into force on 29 February 1972) without there having been official non-compliance records prior to that time, had a great impact on the IAEA. This case unearthed questions over the effectiveness of IAEA safeguards, which depend on declarations from a State.

On this point, then IAEA Director General Hans Blix proposed that this arrangement raises concerns about the scope and effectiveness of current non-proliferation control [24].

Meanwhile, UNSCOM Chief Rolf Ekeus called for more efforts by the IAEA to make special inspection of undeclared facilities, to gather more information from governments, and to work more closely with the UNSC. Mr. Ekeus also expected that the UNSC could play a vital role in comprehensive non-proliferation [25].

UNMOVIC

While the IAEA began to strengthen its safeguard system after this incident as mentioned above, Iraq announced in October 1997 that it would no longer co-operate with UNSCOM and in October 1998 decided to suspend all assistance to UNSCOM. Following this move, the UNSC (with full assent) adopted Resolution 1205 on 5 November 1998 which held Iraq non-co-operative and called for resumed co-operation on inspections. Although Iraq temporarily declared the unconditioned acceptance of inspections, it remained unco-operative. Thus, in December 1997, the US and UK bombed Iraq on a scale not seen since the Gulf War because Iraq's co-operation with inspections was insufficient. This forced UNSCOM to suspend its monitoring and verification operations and close down its office in Iraq.

To break the standstill, the UNSC adopted Resolution 1284 on 17 December 1997 which established the United Nations Monitoring, Verification and Inspection Commission (UNMOVIC). UNMOVIC replaced UNSCOM and aimed to establish and implement a strengthened system of continuous monitoring and verification in Iraq. Although preparations for inspection were continuously pushed forward with former IAEA Director General Hans Blix taking office as Chief of UNMOVIC on 1 March 2000 and an organisational plan for UNMOVIC being adopted by the UNSC on 13 April, no inspections were made in Iraq because it had not agreed to accept inspections.

On 8 November 2002, the UNSC adopted Resolution 1441 giving Iraq a 'last chance' to implement its obligation to disarm. The resolution stated that UNMOVIC and IAEA should make inspections of chemical/biological weapons/missiles and nuclear development programmes respectively, giving them drastically improved authority for instant, unconditional and unlimited access to various sites including the president's facilities. As Iraq announced that it would accept the resolution on 13 November, IAEA and UNMOVIC inspectors resumed their activities on 27 November which eventually extended to include the whole country. However, as the US began bombing Iraq in March 2003, such inspections were suspended four months after resumption.

On 15 October 2003, the UNSC adopted Resolution 1511 on post-war reconstruction of Iraq by common assent, and IAEA Director General Mohamed ElBaradei urged the resumption of inspections the next day [26].

IAEA and the UNSC in Iraq's case

In this case, the IAEA worked closely with UNSCOM and UNMOVIC in the verification of nuclear weapons in Iraq under UNSC resolutions arising from Iraq's violations of international law by invading Kuwait. Since the verification was not based on a INFCIRC/153-type safeguards agreement but on related UNSC Resolutions, it had far greater authority than that under the agreement, and helped inspectors to detect previously undetected nuclear weapons programmes in Iraq.

Some have jumped to the conclusion that this case indicates the limits of IAEA safeguards and the entire NPT system, but we must take into consideration that most likely it was impossible to conclude a safeguards agreement between the IAEA and Iraq that would have allowed the same level of authority for the IAEA as was given by UNSC Resolutions. Therefore, it is not realistic to evaluate IAEA verification measures generally based on this case, in which verification was carried out under the authority of the UNSC.

What should be stressed here is the benefit gained from the close relationship between the IAEA and the UNSC. The NPT entrusts its verification to the IAEA, in part due to its close relationship with the UNSC, making it possible to improve its verification system with other IAEA activities under the UNSC (although as a result). As mentioned above, the IAEA made several attempts to strengthen its safeguard system hereafter these events with Iraq.

Democratic People's Republic of Korea

NPT withdrawal in 1993

On the 12th of December 1985 the DPRK became a party to the NPT. On the 30th of January 1992 it signed an INFCIRC/153-type safeguards agreement (INFCIRC/403), which entered into force on the 10th of April, with the end of the Cold War and the Declaration on the Denuclearisation of the Korean Peninsula as its backdrop [27]. The IAEA began inspections to verify the DPRK's initial report and found inconsistencies between its findings and the DPRK's declarations [28]. In parallel with the request for a special inspection in the DPRK on the 9th of February 1993, the special BOG adopted Resolution 2636 calling upon the DPRK for full cooperation with the IAEA [29]. However, the DPRK refused a special inspection to specified facilities claiming them to be non-nuclear military facilities, and on the 12th of March the DPRK announced its withdrawal from the NPT pursuant to Article 10 [30].

The BOG of the 18th of March adopted Resolution 2639 [31] which affirmed that the safeguards agreement between the IAEA and the DPRK remained in force and requested the Director General to continue efforts and talks. However, on the 1st of April, Resolution 2645 [32] was adopted which concluded that the DPRK was in non-compliance with the safeguards agreement. This resolution also directed that a report of the DPRK's non-compliance and its failure to verify the non-diversion of nuclear materials under IAEA safeguards would be made to all member states, the UNSC, and the UNGA, in accordance with the Statute 12 C and Article 19 of INFCIRC/403. In line with this decision, the IAEA submitted a Director General's detailed report on the DPRK's non-compliance to the United Nations [33].

Following the submission of this report, the UNSC adopted Resolution 825 on the 11th of May, calling upon the DPRK to reconsider its withdrawal from the NPT and to comply with the safeguard agreement. Shortly after this, the US began bilateral talks with the DPRK beginning in June 1993. Due to these attempts, the DPRK suspended its withdrawal from the NPT on the 11th of June, a day before the scheduled date of its entry into force, under the condition that it would determine the scope of IAEA inspections in the future through DRPK-US talks. This condition was based on the DPRK's claim that it stood in 'unique status' because of the suspension of its withdrawal from the NPT, and thus IAEA inspections in the DPRK are not completed according to the safeguards agreement [34].

The IAEA continued talks with the DPRK in order to carry out inspections, but to no satisfactory extent [35]. Then in May 1994, concerns once again arose as the DPRK started to

draw fuels out of its nuclear reactor. Soon after this on the 10th of June 1994, the BOG concluded that the DPRK continued to widen its non-compliance with the safeguards agreement and called upon the DPRK to co-operate with the IAEA urgently and fully. It also adopted a Resolution to suspend all non-medical technical assistance to the DPRK in accordance with the Statute Article 12 C [36]. This was the first time the IAEA applied sanctions [37]. On the 13th of June 1994 the DPRK announced its immediate withdrawal from the IAEA (Statute Article 18) [38].

NPT withdrawal in 2003

In October 1994, negotiations between the US and the DPRK let to the 'Democratic People's Republic of Korea-United States of America: Agreed Framework to Negotiate Resolution of the Nuclear Issue on the Korean Peninsula' (21 October 1994). Under this framework the DPRK was set to freeze and dismantle its nuclear reactors and other related facilities under IAEA monitoring in exchange for light-water reactors and alternative energy resources available until the reactor was built. With regard to the NPT, the Agreed Framework stipulated that the DPRK retain its membership in the NPT and accepted the implementation of safeguards agreements with the IAEA. However, it also provided that instead of being required to immediately comply with the safeguards agreement, the DPRK were to be given time to come into full compliance with the agreement before the key nuclear components were delivered to the site, once the main section of the project had been completed.

On the 9th of March 1995 Japan, the US, the Republic of Korea (ROK) signed an agreement establishing the Korean Peninsula Energy Development Organisation (KEDO) to support the project. A Supply Agreement was concluded on the 12th of December 1995 to kick off the KEDO project, allowing a resumption of IAEA safeguards in the DPRK's nuclear facilities which were not frozen or dismantled.

In reality, however, delays in compliance with the US-DPRK Agreed Framework prevented IAEA inspections. In January, when US President Bush took office, the US revised its DPRK policies and put an end to the bilateral relationship between the US and the DPRK. In President Bush's State of the Union address in January 2002 he referred to the DPRK, Iraq and Iran as 'the axis of evil', making the situation much worse.

Bilateral talks were resumed in October 2002, during which the DPRK allegedly acknowledged that it had a programme to enrich uranium for nuclear weapons, instead of plutonium which had been frozen under the Agreed Framework [39]. Subsequently, on the 26th of October 2002, Japan, the US and the ROK announced a joint communiqué concluding the DPRK's programme infringed the NPT, the IAEA safeguards agreement and the US-DPRK Agreed Framework [40]. Then in November 2002 the BOG urged the DPRK to abandon all nuclear weapons programme [41]. At the same time the KEDO Board decided to suspend the supply of heavy oil beginning in December.

The DPRK asserted the US had unilaterally made the claim that the DPRK had acknowledged it had a nuclear programme. The DPRK then announced the freezes on its nuclear facilities were lifted pursuant to the US-DPRK Agreed Framework in light of KEDO's suspension of the heavy fuel oil supply [42]. This was followed by an order calling on IAEA inspectors, who were in charge of monitoring in the DPRK, to leave the country. At the end of December 2002, IAEA inspectors left the DPRK. After the BOG of January 2003 a resolution was adopted criticis-

ing the DPRK in the strongest of terms [43]. The DPRK again announced its withdrawal from the NPT on the 10th of January 2003 (NPT Article 10 I). With no outstanding progress in negotiations, the KEDO Board decided to temporarily suspend the KEDO project for one year's time on the 4th of November 2003.

IAEA and the UNSC on DPRK

The DPRK's non-compliance with the IAEA safeguards agreement triggered its withdrawal from the NPT, followed by bilateral negotiations between the US and the DPRK and then the establishment of KEDO. It was also the first time for the IAEA to request a special inspection, which was affirmed in February 1992 during its standstill in Iraq. However, this request was denied by the DPRK and actually drove the DPRK out of the NPT in the end. The IAEA started working closely with the UNSC after this event, but with the IAEA's first sanction the DPRK announced its withdrawal from the IAEA as well. The DPRK's current legal status under the NPT is not clear and still invokes various arguments [44]. It also serves to raise new issues concerning the effectiveness of the NPT.

Although the IAEA sanctions were insufficient in this case, it is fair to conclude that the IAEA fulfilled its responsibilities by reporting the DPRK's non-compliance to the UNSC and by dealing with the issue in close co-operation with the UNSC. Issues beyond this point should be recognised as belonging to the UNSC.

The DPRK's decision to withdraw from the NPT has nothing to do with the effectiveness of the NPT, since any state is entitled to withdraw from any treaty. Any treaty that has the membership of almost all states in the world can be recognised as customary international law, thus binding even non-member states. However, treaties to which some states are persistently and continuously opposed do not receive this same type of recognition. It is especially so when a state with important interests in the subject matter of the treaty is opposed. Based on the fact that international peace and security has been recognised as the core of customary international law, one might say that nuclear proliferation violates customary law. However, considering the peculiarity of the NPT, which provides different obligations on NWSs and NNWSs respectively, the criticism that the NPT is an unequal treaty due to this peculiarity, and opposition from India and Pakistan, it is still too early to conclude that the provisions of the NPT form a part of customary international law.

The situation with the DPRK highlighted the importance of co-operation between the IAEA as a verification organisation of the NPT and the UNSC in terms of resolving conflicts. However, it should also be seen as a challenge to the nuclear non-proliferation system, which is centred around the NPT and not as a challenge to the effectiveness of the NPT.

Iran

Iran gained membership in the IAEA in 1958, signed the NPT on the 1st of July 1968, and ratified it on the 2nd of February 1970. Iran's safeguards agreement with the IAEA, in connection with the NPT, entered into force on the 17th of May 1974 [45].

In August 2002, an Iranian anti-governmental organisation announced that the Iranian regime had a nuclear weapons programme [46]. This sparked much controversy that continues to this day. At the IAEA GC held in September 2002, Iran announced that it was planning on constructing nuclear facilities twenty years hence, emphasising they would be used for peaceful

purposes and denying any existence of nuclear weapons programmes. However, undeclared imports of related materials and construction plans for previously unknown nuclear facilities [47] were revealed leading the BOG of June 2003 to urge Iran to submit accurate information under the safeguards agreement [48]. The IAEA has issued the same requests calling for the implementation of the safeguards agreement.

After concluding that Iran's report was unsatisfactory, the GC of September 2003 called upon Iran to take all necessary steps to show its compliance with the safeguards agreement by the end of October 2003. The GC also requested that Iran suspend the enrichment of uranium and sign an additional protocol to secure transparency in regards to its nuclear programme [49]. Although Iran stressed that it did not renounce the right to enrich uranium, it announced that uranium enrichment would be suspended, signed an additional protocol, and stated it would act in full co-operation with the IAEA in implementing the safeguards agreement on the 21st of October 2003. On the 23rd of October 2003 Iran submitted a report on its nuclear programmes and on the 10th of November 2003 it officially announced the suspension of uranium enrichment and the acceptance of the additional protocol, emphasising again that it had no intention of developing nuclear weapons. It is stated that the report clearly indicated Iran's non-compliance with the safeguard agreement, but this remains unclear.

Issues in Iran are centred on its non-compliance with IAEA safeguards agreement in connection with the NPT, as in the case of the DPRK. While IAEA inspection under the safeguards agreement revealed unknown nuclear activities in the DPRK, in Iran the IAEA took actions after the suspicion was aroused by a third party and spread through the media.

As stated above, IAEA safeguards are, in principle, based on information declared by the state party. Complementary inspection authority in regards to undeclared activities is granted to the IAEA only under the Additional Protocol. Therefore, if a state party in which the Additional Protocol is not entered into force submits unsatisfactory reports, as in Iran's case, the IAEA has no option but to persistently negotiate with the state while following normal procedures, such as calling for the BOG and the GC to adopt requests or report to the UNSC. The future of this case is still unknown, but it is time to discuss an international framework for the IAEA which would allow it to collect more objective information if the aim is to improve the effectiveness of the NPT [50].

Conclusion

As discussed above, the end of the Cold War in the early 1990s led to a situation in which the non-proliferation of nuclear weapons came to affect more than a limited number of industrialised nations. Since then, the NPT has been frequently questioned in terms of its effectiveness.

The South African case indicates that the mere existence of the NPT has some significance. South Africa launched a nuclear weapons programme under the influence of the Cold War, subsequently abandoned its programme voluntarily, and sought membership of the NPT in order to build confidence in the international community. Also, through the cases in Iraq and the DPRK, IAEA safeguards have been improved by strengthening connections between the UNSC and the IAEA, the verification organisation of the NPT. Along with the IAEA, which is looking to strengthen its safeguard measures through Additional Protocols being adopted in more countries while searching for more effective and efficient safeguards through integrated

safeguards, the NPT remains effective with possibilities of becoming even more effective in the future.

One of the pressing questions for the NPT is not its verification measures but the means of withdrawal as chosen by the DPRK. It is not the NPT's failure but rather the failure of the whole nuclear non-proliferation system that India, Pakistan and Israel – which is claimed to have nuclear weapons – do not have NPT membership. However, withdrawal from the NPT by any member state must be avoided since such a move virtually deprives the NPT of its material effectiveness irregardless of how effective it might formally be.

The indefinite extension of the NPT decided in the NPT Revision Conference held in 1995 in accordance with the NPT Article 10 II symbolises its huge membership and the expectations about the NPT, although the decision did not accept the current situation. Most of the discussion fell upon the negotiations for nuclear disarmament centred on Article 6, which provides that each of the Parties undertakes to pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control [51]. It is essential for NWSs to pursue negotiations both in good faith and to maintain voluntarily practical effectiveness of the NPT in the future, encompassing the criticism that it is substantially an unequal treaty by dividing between NWSs and NNWSs.

Notes

1. Carlton Stoiber, Nuclear Non-Proliferation: Historical & Policy Dimensions, Montpellier, 2003, p. 2.
2. Ibid., p. 13.
3. Israel, India and Pakistan, all of which are suspected of possessing nuclear weapons, have not acceded to the NPT but respectively concluded INFCIRC/66-type safeguard agreement with IAEA.
4. Japan showed its positive attitude to the IAEA, for example it got some fuels through the IAEA in 1959. Ryukichi Imai, IAEA inspection and Nuclear Proliferation (IAEA sasatsu to kaku kakusan), Tokyo, 1994, p.35.
5. Ibid., pp. 44 and 56-58.
6. Article 14 is relevant here; however this article has not been applied so far.
7. Paragraph 73a also provides another special inspection in order to verify the information contained in special reports; however, I use the term 'special inspection' of paragraph 73b in this article, which is most relevant here.
8. IAEA Press Release, PR92/12, 26 February 1992; and IAEA Bulletin 34 (1) (1992) 47.
9. Hans Blix, IAEA Safeguards: New Challenges, Disarmament 15 (2) (1992) 42.
10. The same provision is provided in Article 3II of the UN-IAEA agreement.
11. GC(37)/RES/619 (1993), GC(38)/RES/10 (1994) and GC(39)/RES/17 (1995).
12. GOV(39)/17; GOV/2807; and Bruno Pellaud, Safeguards: the evolving picture, IAEA Bulletin 38 (4) (1996).
13. GOV/OR/914, 15 May 1997; GC(41)/22, 17 September 1997; and Laura Rockwood, Strengthening the Effectiveness and Improving the Efficiency of the IAEA Safeguards System, Nuclear Law Bulletin No. 60, OECD Nuclear Energy Agency, 1997.
14. Laura Rockwood, Systems of Security Control, Montpellier, 2003, pp. 8-9.
15. Five NNWs declared respectively in the BOG to adopt the Additional Protocol that it would take some steps required in NFCIRC/540. GOV/OR.913, 15 May 1997.

16. Laura Rockwood, The IAEA Safeguards System, Montpellier, 2003, p. 29.
17. GOV(44)/RES/19; GOV(45)/RES/13: GOV(46)/RES/12; and GOV(47)/RES/11.
18. It was reorganised to establish Atomic Energy Corporation (AEC) in 1983.
19. IAEA, Annual Report for 1982, Vienna, 1983, p.16, para. 63.
20. IAEA, Annual Reports for 1987, p. 15 para. 41; for 1988, p. 10, para. 39; and for 1989, p. 7, Vienna.
21. IAEA, Annual Report for 1992, Vienna, 1993, pp.4-5; David Fisher, History of the IAEA: The First Forty Years, IAEA, 1997, pp. 109-110.
22. IAEA, Annual Report for 1993, Vienna, 1994, p. 157; David Fisher, History of the IAEA: The First Forty Years, IAEA, 1997, p.111.
23. Mitsuru Kurosawa, Disarmament International law (Gunsyuku kokusai hou), Tokyo, 2003, p.149.
24. Hans Blix, Verification of Nuclear Non-proliferation: The Lesson of Iraq, Washington Quarterly 15 (4) (1992) 58.
25. Rolf Ekeus, Minimising the Risk of Proliferation, United Nations, Non-Proliferation and Confidence-Building Measures in Asia and the Pacific, Disarmament Topical Papers 10, 1992, pp. 47-48; Rolf Ekeus, The Iraqi Experience and the Future of Nuclear Non-proliferation, Washington Quarterly 15 (4) (1992), p. 73; and see [23; pp. 149-150].
26. See http://www.iaea.org/worldatom/Press/Focus/IaeaIraq.
27. See [23; p. 154].
28. UN doc. A/48/133(S/25556), 16 April 1993. pp. 4-6.
29. IAEA doc. GOV/2636, 26 February 1993.
30. SIPRI Yearbook, 1994, p. 630.
31. IAEA doc. GOV/2639, 18 March 1993.
32. IAEA doc. GOV/2645, 1 April 1993.
33. See [23; p. 155].
34. Masahiko Asada, Controversial Points in International Law with respect to the DPRK case concerning Nuclear Weapons (Kitachosen wo meguru kokusaihou jyou no mondaiten-kakuheiki mondai wo cyushin ni), Hogaku Kyoshitsu, No. 274 (2003), p. 51.
35. See [23, pp. 155-156].
36. IAEA Press Release, PR/94/25, 13 June 1994.
37. Regarding discussions on UN sanctions to be applied to the DPRK, see [23; pp. 156-157.
38. INFCIRC/447, 21 June 1994. DPRK was a member of IAEA since 1974. Withdrawal by a member from the IAEA shall be done by a notice in writing to that effect given by the depositary Government, but shall not affect its contractual obligations entered into force pursuant to Article 11 or its budgetary obligations for the year in which it withdraws (Article 18 of the Statute).
39. See [34; p. 51].
40. Joint US-Japan-ROK Trilateral Statement, Los Cabos, Mexico, October 26, 2002.
41. GOV/2002/60, 29 November 2002.
42. Its re-operation was confirmed in February 2003.
43. IAEA, Media Advisory 2003/04, 6 January 2003.
44. The Preparatory Meeting in April-May 2003 decided not to make a discussion on the status of this DPRK for a moment.
45. INFCIRC/214. Iran also concluded INFCIRC/66-type safeguard agreement.
46. See http://www.iaea.org/worldatom/Press/Focus/IaeaIran/index.shtml.
47. IAEA doc. GOV/2003/40, 6 June 2003.
48. IAEA Media Advisory, 2003/72, 19 June 2003.

49. IAEA doc. GOV/2003/69, 12 September 2003.
50. In the DPRK case, the US provided some information to the IAEA, which constitutes most part of the information the IAEA relies on. The IAEA should be careful with the information not provided by itself nor by the country concerned. See [23; p. 159].
51. International Court of Justice, Legality of Threat or Use of Nuclear Weapons, ICJ Reports, 1996, pp. 224-267.

Dispositioning military plutonium to promote nuclear non-proliferation

Robert Sancton

Security and Armed Conflict, Pax Christi International, Rue du Vieux Marché aux Grains, 21, B1000 Brussels, Belgium; rsancton@hotmail.com

Given that all chemical varieties of plutonium can be used in nuclear weapons, sophisticated measures are required to disposition it so that its potential to contribute to horizontal and vertical nuclear proliferation is minimised. This article argues that the present options for dispositioning military plutonium are not acceptable, and, as a result, this plutonium should be placed in international storage until an acceptable method is found. First, a brief description of plutonium and its use is given. A discussion follows on non-proliferation and feasibility criteria by which the policy options to disposition military plutonium should be assessed. Then several policy options are outlined and assessed against the specified criteria. Finally, the concept of international plutonium storage is described.

Nuclear proliferation includes both horizontal and vertical proliferation activities. Horizontal proliferation occurs when states and non-state actors acquire or develop nuclear weapons for the first time, and vertical proliferation occurs when nuclear weapon states [34] quantitatively expand or qualitatively improve their nuclear arsenals [3].

Nuclear proliferation is a threat to global security because as the number of nuclear weapons in existence grows so does the likelihood that they will be intentionally or accidentally used to seriously imperil human existence. This effect is magnified because instances of proliferation increase the likelihood of further proliferation. The appearance of a new nuclear weapon state can motivate a regional adversary to undertake further proliferation in response, as in the case of Pakistan following India's lead in the late 1960s [19]. Vertical proliferation also increases the likelihood of further proliferation if it is interpreted by state and non-state observers as evidence that existing nuclear-weapon states are not sincerely committed to fulfilling their legally-mandated disarmament commitments [6].

Military plutonium [35] is central to the problem of nuclear proliferation because the theft of such material is a possible pathway for horizontal proliferation. Furthermore, plutonium

ISYP Journal on Science and World Affairs, Vol. 1, No. 2, 2005 103-112

would likely be used in vertical proliferation because it is an essential component in most contemporary nuclear weapon designs.

Arms control initiatives since the end of the Cold War, such as the Strategic Arms Reduction Treaty, have led to reductions in nuclear arsenals but have failed to address the proliferation risks related to military plutonium. Nuclear bombers were dismantled and missile components were crushed [36]; however, the plutonium from nuclear warheads was left intact [11].

Initiatives to restrict exports do not address these aforementioned proliferation risks. Ad hoc groups of states rather than the United Nations have implemented export controls, though these initiatives have not been effective [15]. In any case, because export controls are focused on stopping actors from acquiring either nuclear weapons or the capability to develop them, this approach does not address vertical proliferation.

Even the Nuclear Non-proliferation Treaty (NPT), the key component of the international nuclear non-proliferation regime, does not fully address these proliferation risks. The NPT attempts to ensure that declared non-nuclear-weapon states are not developing nuclear weapons; however, it does not require the protection of military plutonium from unwanted access [9]. While there is a requirement for declared nuclear-weapon states to pursue disarmament [37], and thus curb their vertical proliferation ambitions, it has not been fully honoured.

Unlike uranium, plutonium cannot be 'blended down' into a form that is not suitable for nuclear weapons [6,38]. This technical fact necessitates the development of sophisticated measures to disposition the plutonium or change it in some way to minimise its capacity to be used in proliferation. One method immobilises plutonium and radioactive waste in large containers that are buried in underground repositories. Another method burns a mixture of uranium and plutonium in contemporary nuclear power plants. Other proposed methods transform plutonium in accelerators, launch it into the sun, or subject it to underground nuclear explosions.

This article argues that the present options to disposition military plutonium do not satisfy necessary non-proliferation and feasibility criteria, and, as a result, the international storage of this plutonium should be implemented until an acceptable method is found.

This argument is developed in the following sections. The first section presents a brief description of plutonium and its use, the second section discusses the criteria by which disposition options must be assessed, the third section outlines several approaches and assesses them against the specified criteria and the fourth section describes the concept of international plutonium storage.

Much of the discussion about plutonium disposition in academic, government and scientific circles is framed by the activities of Russia and the United States, such as their September 2000 commitment to dispose of 34 metric tons of weapons-origin plutonium [39]; however, since nuclear proliferation is a matter of concern for the entire international community, this article addresses the dispositioning of military plutonium in general without restricting its focus to the policies of any specific country or countries.

Background information on plutonium

Since the technical aspects of plutonium and its use in nuclear weapons have been adequately introduced elsewhere [40], the present discussion focuses on a few key points that are directly relevant to the following sections. Weapons-grade plutonium refers to a sample of plutonium

that is ideally suited for nuclear weapons. As previously mentioned, all forms of plutonium can be used in nuclear weapons; however, the development of weapons with non-weapons-grade plutonium requires greater ingenuity to overcome losses in efficiency [3].

In a nuclear weapon, a massive amount of energy is produced in an extremely short period of time from the fission of either uranium or plutonium nuclei in an uncontrolled and rapidly multiplying chain reaction. The energy produced in a nuclear power reactor is the result of a fission chain reaction under precisely controlled conditions that prevent rapid multiplication. In a nuclear reactor that uses uranium fuel, plutonium is an expected by-product and is therefore present in its spent fuel [3]. Other by-products of nuclear reactions are highly radioactive fission products that are extremely harmful to human health and are believed to protect spent fuel from unwanted access [6].

In 1999, the Institute for Science and International Security estimated the total amount of plutonium in military stockpiles around the world to be 250 metric tons [1]. Approximately eight kilograms of plutonium is all the plutonium that is required to build a 'Nagasaki-type bomb' [23].

Criteria for the assessment of plutonium disposition policy options

The plutonium disposition methods will be assessed against the non-proliferation and feasibility criteria discussed in this section. These criteria are based on the fundamental assumptions that military plutonium is a threat to global security, as discussed in the introduction, and dispositioning military plutonium 'is a long-term issue on which urgent action is needed' [11].

For obvious reasons, a disposition method that physically destroys the plutonium at hand is considered to be optimal. Failing complete physical destruction of the plutonium, the disposition method must create non-proliferation barriers by preventing the reuse of the plutonium for weapons purposes by its owner and preventing its theft by terrorists and other actors. These barriers should be political and technical [8]. Technical barriers include 'physical, chemical, and radiological barriers to recovery of the plutonium' [6]. That is, the effort needed to obtain the plutonium after it has been dispositioned must be prohibitive. The non-proliferation measures must remain intact for at least several centuries. The implementation of the disposition method, including processing and transportation, must not introduce significant proliferation risks [11]. Some countries, particularly the United States, have proposed the spent fuel standard as a guide by which the security of dispositioned plutonium should be assessed. This standard specifies that dispositioned plutonium should be as difficult to access as the plutonium in spent fuel from nuclear power reactors [16; p. 8, cited in 6]. In this article, the spent fuel standard will be used to establish a minimum threshold, but it will not be narrowly applied to reject disposition methods that make military plutonium more difficult to access than the plutonium in spent reactor fuel [6].

The feasibility criteria for plutonium disposition involve timing, and technical and political requirements. The disposition method must be able to be implemented with reasonable start and completion times [33]. The process must not be excessively delayed by infrastructure or technology needs. For example, the approach must not rely on 'the development, licensing, and construction of new types of reactors' [11]. In addition, the implementation of the disposition method must not contravene any international treaties.

Do nothing option – national storage

Before assessing the plutonium disposition options, it is necessary to examine the path of not taking any action to demonstrate that an active approach is required. In the do nothing option, military plutonium is simply left in assembled nuclear weapons or in stockpiles under its owners' control. This approach obviously meets feasibility criteria; however, it raises horizontal and vertical proliferation concerns.

While it is true that military plutonium inside assembled nuclear weapons is often protected by physical access barriers such as sophisticated locking mechanisms and military personnel, the risk of horizontal proliferation due to weaknesses in physical protection of military facilities has been identified in some states. While the problems in Russia and the states of the former Soviet Union have been well publicised [41], security concerns have also been raised about other countries with nuclear weapons including the United States [7].

The risk of horizontal proliferation also arises from present or potential political instability in some nuclear-weapon states, including states with weak civilian control over military plutonium and related decision-making [42]. Similarly, the facilities that contain military plutonium in states that are involved in regional and internal conflicts, including India, Israel and Pakistan, are potentially at risk of accidental or intentional attack.

Considering that in the do nothing option the military plutonium remains under national control and presently most military plutonium is not under the supervision of the International Atomic Energy Agency (IAEA) [4], the risk of vertical proliferation is also present. Furthermore, the absence of vertical proliferation activities does not guarantee that they will not be undertaken in the future, especially in cases in which nuclear weapons have a central position in national security doctrines.

Plutonium disposition – immobilisation

The immobilisation method involves creating radiological and physical barriers to protect the plutonium from unwanted access. In one approach, known as the 'can-in-canister', an inner container of vitrified plutonium is placed within an outer container of highly radioactive waste. Another approach is to combine the plutonium and waste and then vitrify the mix [5]. The former approach is 'technically simple and quicker to implement' than the latter [6]. After the plutonium is immobilised, the end product is buried in an underground geological repository [8].

The barriers against proliferation provided by plutonium immobilisation include the high radioactivity of the material and the difficulty of accessing the underground repository [6]. Limiting the amount of plutonium in each container to ensure that it is less than in spent nuclear fuel is ostensibly a disincentive to theft [8].

Recognising that the plutonium is not actually destroyed in the vitrification process [6] and the radioactivity would decrease significantly in less than two centuries, the plutonium dispositioned in this way 'would be a mineable source for nuclear weapons for future generations' [26]. While presently there are no industrial techniques to reprocess vitrified plutonium [12], the non-proliferation criteria remain unsatisfied, however, if it is assumed that such techniques will eventually be invented.

The immobilisation approach also fails to satisfy feasibility criteria. No single uncontroversial burial site has been identified anywhere in the world [24]. In addition to the time required

to identify an appropriate geological repository, time is also required to research the vitrification process. Although vitrification is a well-known industrial technology, the vitrification of plutonium requires further research [8]. Furthermore, those states, including Russia, that consider plutonium to be a desirable commercial energy source will likely reject immobilisation [12].

Plutonium disposition – MOX fuel

This option involves fabricating a nuclear fuel made from a mixture of plutonium and uranium oxides known as MOX, and irradiating it in nuclear power reactors. The end product of this activity is similar to that of the irradiation of normal uranium fuel. The radioactivity of both kinds of spent fuel is generated by the highly radioactive fission products [6]. The reprocessing of spent MOX fuel is presently not being considered, so it will most likely become radioactive waste [5].

The non-governmental organisation Greenpeace has criticised the MOX fuel approach for creating 'more plutonium than existed in the original MOX fuel' [18]. While the overall process does create plutonium as a by-product of the irradiation of the uranium component in the MOX fuel and the standard uranium fuel that would accompany the MOX fuel, it is not clear that there would necessarily be a net gain in plutonium because a portion of the initial plutonium is destroyed during irradiation [20]. It is a fair criticism, however, that a process designed to treat plutonium in one form actually creates new plutonium in another form.

The MOX fuel disposition approach creates non-proliferation barriers to protect the end product of the dispositioning process. The remaining plutonium is protected by the radiation emitted by the fission products. Since MOX spent fuel will likely be disposed of in underground repositories, given that this is the expected disposal method for non-MOX spent fuel [8], the handling and recovery difficulties associated with these locations offer some protection against theft. However, as with immobilised plutonium, the underground repositories of MOX spent fuel represent a source of plutonium that could be mined in the future [26].

The fabrication and transportation steps required by the implementation of the MOX fuel disposition approach might make the plutonium vulnerable to theft. The radiological barrier to deter unwanted access only exists after the irradiation process, and would therefore not be present during the fabrication and transportation steps. In addition, only a basic level of scientific knowledge is required to extract the plutonium from un-irradiated MOX fuel. According to Frank Barnaby, the scientific knowledge needed is more basic 'than that required for the illegal manufacture of designer drugs, or that employed by the Aum Shinrikyo cult in 1995 to prepare sarin nerve gas for release into the Tokyo subway' [cited in 27]. Some states may not have MOX fuel fabrication facilities or enough nuclear power reactors to process weapons plutonium in a reasonable period of time. Because it does not have enough suitable nuclear reactors, Russia may need to ship plutonium to other states to be irradiated [11]. To address the shortfall in nuclear reactors, one possibility is to burn MOX fuel made from Russian military plutonium in nuclear power stations in Canada. While this proposal would not violate the NPT if the material that is transferred to Canada is placed under IAEA safeguards [44], the transportation of MOX fuel between states introduces proliferation risks [2].

Although MOX fuel fabrication plants already exists in Belgium, France and the United Kingdom [23], the dispositioning of plutonium as MOX fuel does not satisfy the feasibility

criteria. With regard to infrastructure requirements, 'neither Russia nor the United States has industrial-scale MOX fuel production facilities' [32], and, as mentioned previously, Russia does not have enough reactors available. In any case, the MOX fuel option cannot disposition all forms of military plutonium, so it is not a complete solution. For example, the United States estimates 'that as much as one third of its own plutonium surplus stockpile will be too impure to fabricate into MOX fuel' [6].

Plutonium disposition – other options

Another approach is plutonium disposition by accelerator transmutation. In accelerator transmutation, plutonium atoms are destroyed by nuclear fission [8]. Unlike in a nuclear weapon, the fission reactions in an accelerator are precisely controlled to prevent 'the possibility for a runaway chain reaction' [26].

It is not clear how much of the original plutonium would be destroyed in the transmutation process. James M. McCormick and Daniel B. Bullen posit that a large amount would be destroyed [26]; however, others suggest that 'significant residues of…[the initial plutonium] would remain' [8]. In any case, not all of the original plutonium is destroyed in the transmutation process.

Plutonium disposition by accelerator transmutation does not mitigate against proliferation risks. The required processing of the plutonium introduces the opportunity for theft [8]. It is also not practical. The time needed for the research effort associated with accelerator transmutation is prohibitive [26].

Another disposition approach involves launching plutonium into the sun. The suitably packaged plutonium is launched 'into earth's orbit. Then, by decelerating the payload to counter the spacecraft's orbital velocity around the sun, the waste eventually would drop into the sun' [26].

Solar disposal reduces proliferation risks to nil because all of the plutonium would be removed from earth and ostensibly destroyed in the sun. However, if the delivery vehicle accidentally returned to earth, there may be opportunities for theft if would-be proliferators could find and access the point of impact. Currently, dispositioning of plutonium by solar disposal is highly infeasible because it 'would require many decades of development' [29,26].

Another disposition approach is underground nuclear detonation. This involves subjecting buried plutonium to a nuclear explosion. Plutonium dispositioned in this way introduces proliferation risks because the plutonium may be vulnerable to theft if there is a delay between burial and detonation and the explosions could be used as an excuse to research new weapons technology. This proposal is impractical because a large number of detonations would be required [8]. Also, the Comprehensive Nuclear-Test-Ban Treaty prohibits even peaceful nuclear explosions [45].

International plutonium storage

The previous section showed that the currently proposed options for dispositioning plutonium have shortcomings when assessed against necessary non-proliferation and feasibility criteria. Therefore, international storage of military plutonium should be pursued until an acceptable plutonium disposition approach can be implemented.

There are numerous models for international plutonium storage. They differ in their conceptualisations of where the plutonium is stored and how easily it can be accessed. The international custody model and the plutonium prison model are discussed below.

In the international custody model, plutonium is placed in the custody of the IAEA which already has the mandate in its statute 'to require deposit with the Agency of any excess of any fissionable materials recovered or produced as a byproduct over what is needed' and return deposited plutonium to the owner 'provided that the material is used for peaceful purposes under continuing IAEA safeguards' [46]. Deposited plutonium would continue to be legally owned by the state and would not be moved outside of its territory. By assuming custody of the plutonium, the IAEA would verify that domestic security meets international standards and block access to the plutonium except by legitimate requests for withdrawals [4]. The withdrawal of plutonium is envisaged to be 'a routine matter based on the provision of a certificate of use' in the spirit of the widely adopted International Plutonium Guidelines [4].

In the plutonium prison model, military plutonium is moved to a single global repository and, unlike the international custody model, withdrawal of plutonium would be infrequent and difficult [13]. The repository would be protected by an international military presence and 'engineered features that would make it easy to move the material in quickly but hard to take out (collapsing tunnels, dismantled railroad tracks, etc.)' [25].

Both models include political barriers to unwanted access. The centralised storage provided by the plutonium prison model represents a greater barrier to vertical proliferation. The author of this article believes that the military presence and physical protection afforded by the plutonium prison model give greater protection against external theft than the security measures in the international custody model. However, the transportation of plutonium to the global repository, although presumably under heavy guard, represents a proliferation risk.

Noting that 'national sovereignty has remained a basic principle in the management of plutonium' [5], local storage in owner states is probably more politically acceptable than centralised international storage; however, the Japanese policy of not keeping any excess plutonium in Japan demonstrates that the international storage of plutonium, albeit when national ownership is maintained, is possible [4]. One practical problem with finding a location for the plutonium prison is that treaties defining nuclear free zones may prohibit the selection of certain locations. The Antarctic Treaty, for example, specifically forbids the 'disposal there of radioactive waste material' [47].

Based on this discussion, the optimal design of an international plutonium storage programme appears to be a hybrid of the best features of the two models. The hybrid model would store plutonium in each owner state under the international custody of the IAEA supported by an international military presence. The plutonium would remain in custody until the termination of the programme.

Conclusion

Dispositioning military plutonium is necessary to address the proliferation risks associated with its existence. Various methods have been proposed. One approach involves immobilising it in glass and burying it in underground repositories. Another approach involves making it into a nuclear fuel and burning it in nuclear power reactors. Other approaches include: altering its physical properties in an accelerator, launching it into the sun, and subjecting it to underground nuclear explosions. All of these approaches fail to satisfy necessary non-proliferation and feasibility criteria. This article recommends that international plutonium storage should be implemented until such time as a satisfactory disposition method is found.

Notes

1. David Albright and Lauren Barbour, Plutonium watch: separated inventories of civil plutonium continue to grow, 1999. (http://www.isis-online.org/publications/puwatch/putext.html).
2. Dave Andrews, The problem of civil plutonium stockpiles, in: Basic Reports: Newsletter on International Security Policy, 2003, pp. 4-5.
3. Frank Barnaby, The FMCT handbook: a guide to a fissile material cut-off treaty. Oxford Research Group (2003). (http://www.oxfordresearchgroup.org.uk/publications/books/fmcthandbook.htm).
4. Harold D. Bengelsdorf and Fred McGoldrick, International custody of excess plutonium, Bulletin of the Atomic Scientists 58 (2002) 31-35.
5. Frans Berkhout, Commercial prospects for plutonium, in: Oxford Research Group, Managing plutonium in Britain: current options, Current Decisions Report Number 21, Oxford Research Group, 1998, pp. 21-31.
6. Adam Bernstein, Russia: introduction to plutonium disposition, 1997. (http://nti.org/db/nisprofs/russia/fissmat/plutdisp/dispovr.htm).
7. Danielle Brian, Lynn Eisenman and Peter D. H. Stockton, The weapons complex: who's guarding the store?, Bulletin of the Atomic Scientists 58 (2002) 48-55. (http://www.thebulletin.org/article.php?art_ofn=jf02brian).
8. Alexandra Brooks, Bernd Franke and Milton Hoenig, Plutonium: deadly gold of the nuclear age, International Physicians Press, 1992.
9. Matthew Bunn, Securing nuclear warheads and materials: global nuclear security standards, 2003. (http://www.nti.org/e_research/cnwm/securing/standards.asp?print=true).
10. Matthew Bunn and George Bunn, Reducing the threat of nuclear theft and sabotage, IAEA-SM-367/4/08, International Atomic Energy Agency, 2001. (http://www.iaea.org/NewsCenter/Features/Nuclear_Terrorism/bunn02.pdf).
11. Matthew Bunn, Anthony Wier and John P. Holdren, Controlling nuclear warheads and materials: a report card and action plan, Harvard University, 2003. (http://www.nti.org/e_research/cnwm/cnwm.pdf).
12. William J. L. Buyers, John Harvey and Alan J. Salvin, The disposition of weapons-grade Plutonium as MOX fuel in Canadian reactors, Canadian Association of Physicists, 2000.
13. Brian G. Chow, Richard H. Speier and Gregory S. Jones, A concept for strategic material accelerated removal talks (SMART). RAND (1996).
14. Department of Foreign Affairs and International Trade, Australia. The report of the Canberra Commission on the Elimination of Nuclear Weapons, 1996. http://www.dfat.gov.au/cc/CCREPORT.PDF.

15. Mohamed ElBaradei, Nuclear weapons and the search for security, 54th Pugwash Conference on Science and World Affairs, 2004. (http://www.iaea.org/NewsCenter/Statements/2004/ebsp2004n010.html).
16. G7 Moscow Summit on Nuclear Security, Background document on nuclear safety and security, 1996.
17. Global Security, 'A. Q. Khan', 2003. (http://www.globalsecurity.org/wmd/world/pakistan/khan.htm).
18. Greenpeace, Greenpeace briefing: the disarmament myth of plutonium fuel production, 2001. (http://archive.greenpeace.org/~nuclear/ waste/plutodisposition.pdf).
19. Peter Grier,. A big test of nuclear deterrence, 2002. (http://www.csmonitor.com/2002/0104/p1s2-wosc.html).
20. John P. Holdren, John F. Ahearne, Robert J. Budnitz, Richard L. Garwin, Michael M. May, Thomas H. Pigford and John J. Taylor, Management and disposition of excess weapons plutonium, National Academy Press, 1994.
21. Pervez Hoodbhoy, Pakistan: inside the nuclear closet, 3 March 2004. (http://www.opendemocracy.net/debates/article-2-95-1767.jsp).
22. Edwin S. Lyman, A perspective on the proliferation risks of plutonium mines, 14 December 1994. (http://www.nci.org/s/sp121495.htm).
23. Allison Macfarlane, Frank von Hippel, Jungmin Kang and Robert Nelson, Plutonium disposal, the third way, Bulletin of the Atomic Scientists 57 (2001) 53-57. (http://www.thebulletin.org/article.php?art_ofn=mj01macfarlane).
24. Arjun Makhijani and Annie Makhijani, Fissile materials in a glass, darkly: technical and policy aspects of the disposition of plutonium and highly enriched uranium, Institute for Energy and Environmental Research, 1995. (http://www.ieer.org/pubs/fissmats.html).
25. Jessica Mathews, Putting plutonium in prison, The Washington Post, 4 February 1997, p. A15. (http://www.fas.org/news/usa/1997/02/msg00043e.htm).
26. James M. McCormick and Daniel B. Bullen, Disposing of the world's excess plutonium, Policy Studies Journal 26 (1998) 682-702.
27. Stuart Millar, Scientist says BNFL plant is terrorist risk, The Guardian, 31 May 2001. (http://www.guardian.co.uk/uk_news/story/0,3604,499014,00.html).
28. New Scientist, Plutonium for sale: with nuclear smuggling on the increase, how long before a terrorist builds a bomb?, 26 May 2001. (http://www.newscientist.com/article.ns?id=mg17022921.100).
29. D. W. North, Unresolved problems of radioactive waste: motivation for a new paradigm, Physics Today 50 (1997) 48-54.
30. John Russell and Helen Hughes, A guide to verification: for arms control and disarmament, Verification Research, Training and Information Centre and United Nations Association of Great Britain and Northern Ireland, 2002. (http://www.vertic.org/assets/verification_pamphlet.pdf).
31. Henry Sokolski, Breeding nukes: why is the US government risking the spread of plutonium around the world?, The Weekly Standard 8 (2002).
32. Elena Sokova, Plutonium disposition, 2002. (http://nti.org/e_research/e3_11a.html).
33. US-Russian Independent Scientific Commission on Disposition of Excess Weapons Plutonium. Interim report, 1996.
34. Vertical proliferation is only used here to describe the actions of states because vertical proliferation by non-state actors, although logically possible if non-state actors undertake horizontal proliferation,

is not considered to be a serious possibility at this time. In this article, nuclear-weapon states include both declared and de facto nuclear powers.

35. Military plutonium is defined as the plutonium that exists in the military complex of a declared or de facto nuclear-weapon state. Military plutonium includes weapons-grade and non-weapons-grade material in assembled nuclear weapons and stockpiles. In this article, plutonium refers to military plutonium except in general scientific discussions or where otherwise noted.
36. See the Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms, 1991, Protocol on Procedures Governing Conversion or Elimination.
37. See the Treaty on the Non-Proliferation of Nuclear Weapons, 1968, Article VI.
38. Technical constraints would likely limit the efficiency of nuclear weapons made from some forms of plutonium. See the section entitled 'Background Information about Plutonium'.
39. See the Agreement Between the Government of the United States of America and the Government of the Russian Federation Concerning the Management and Disposition of Plutonium Designated As No Longer Required for Defense Purposes and Related Co-operation, 2000.
40. See, for example, [3; pp. 19-21, 44-45].
41. See, for example, [10; p. 3].
42. It is likely that the Pakistani nuclear scientist Abdul Qadeer Khan operated his proliferation network with the support of actors within his country's security sector [21,17].
43. Proliferators with adequate resources would likely find it easier to produce new plutonium than retrieve immobilised plutonium from a geological repository [22; p. 9].
44. See the Treaty on the Non-Proliferation of Nuclear Weapons, 1968, Article III.
45. See the Comprehensive Nuclear-Test-Ban Treaty, 1996, Article I. As of February 2005, this treaty has been signed and ratified by several states but it has not entered into force.
46. See the Statute of the International Atomic Energy Agency, 1956, Article XII, A.5. [cited in 4; p. 32].
47. See the Antarctic Treaty, 1959, Article V.

The Middle East and the 'new terrorism'

Kayhan Barzegar

Assistant Professor of international relations in the Islamic Azad University (IAU), Science and Research Campus, Tehran, Iran & Center for Scientific Research and Middle East Strategic Studies, No. 20, Naderi St., Keshavarz Blvd., 14166 Tehran, Iran; kbarzegar@ihcs.ac.ir

Over the past 50 years, the Middle East has been a hub of tension and insecurity. Traditionally, threats to global peace and security ensued from wars and crises among regional states which thereby engaged the international system. Presently, threats to global security are considered in the context of global terrorism. September 11, 2001 has introduced a new approach to dealing with terrorism. In this approach, the West is determined to eradicate the root causes of new terrorism outside of its boundaries. Since global terrorism stems from the Middle East, exploring the correlation between regional issues and new terrorism is of great importance. As a whole, the roots of new terrorism have undoubtedly been associated with problems of the Middle East. If new terrorism was conceived in the region, one needs to consider the unique political, economic, cultural and religious characteristics which frame it on the one hand and the approach of the global system to dealing with these issues on the other.

This article focuses on the global community's policies as the main contributing factor to the development of new terrorism. The following main questions are addressed:

1. Why has new terrorism appeared in the Middle East?
2. Have the current policies of the global system, as led by the US, ignored the threat posed by new terrorism? Has this approach itself been a threat to, or an opportunity for, global security?

To answer these questions, two hypotheses are developed in this article:

1. The roots of new terrorism are found in the political, cultural, and economic problems of the Middle East, which have been considerably affected by the conduct of the international community. Tackling such problems with military operations is rather pointless and

ISYP Journal on Science and World Affairs, Vol. 1, No. 2, 2005 113-121

leads to the development of more hostility in the region. Effectively, the current conduct of global governance in the region has itself been a source of tension and insecurity.
2. As a result of the policies of the global system, the concepts of 'stabilisation' and 'democratisation' that are essential to any political and economic transformation – and thus to the eradication of terrorism – have diverged in the region to the extent that accommodating them in one context is largely inconceivable.

This article is organised into three sections. The first section compares the characteristics of old and new terrorism. The role of the global system's past policies in the region in relation to new terrorism is the subject of section two. The final section focuses on the current regional policies of the global system and their effects on global peace and security.

New terrorism

Terrorism has always existed throughout the world. What is new is that terrorism has acquired an international dimension with its own specific definition, which increases its importance within the global community. Introducing a new nature and definition, September 11 undoubtedly marked a turning point in terrorist activities. Old terrorism had internal or regional dimensions, functioning in specific spatial and time domains, and had less negative impact on the international community. In contrast, new terrorism acts beyond national and regional boundaries, has global impact and constitutes a direct threat to global peace and security.

International security, long threatened by wars and tensions among nations, is presently endangered by an unknown, complex, and unconventional force. This by no means suggests an easy resolution. In contrast with old terrorism, the new kind of terrorism has no individual, nationalistic, or state-sponsored characteristics. It occurs in many countries and is supported by a global network. The hub of new terrorism is the Middle East, its driving force is Sunni Islamic radicalism, and its representative is Al-Queda. Its main aims are as follows:

1. To destabilise international security;
2. To de-legitimise Western culture and values; and thereby,
3. To create a new balance of power between the West and the Islamic World.

As a result of these aims and characteristics, new terrorism is more ferocious and less tolerant. It stems from a radicalism which originates in the political, cultural and economic dissatisfaction with the policies of the global community within the nations of the Middle East. The type of terrorism recurred to by Al-Queda appeals to the hearts and minds of individuals to act for an idealistic end. 'As we are not safe, no one would have the right to be safe in the world', they argue. Accordingly, current suicide attackers fight for their faith and most importantly 'Allah's satisfaction', as they are certain that they will be blessed by God [1].

Finally, new terrorism is a tactic that is supported by a worldwide network. Considered in this way, no eradication of today's terrorism will succeed unless the root causes of its emergence on the one hand, and the motives of its adherents on the other, are identified and addressed. In the context of the Middle East, new terrorism no doubt stems from a collective sense of historical injustice, political subservience, and a pervasive sense of social humiliation inflicted by the global powers and their allies [2]. These political, cultural and psychological

complexities operate cumulatively to trigger the axis of global terrorism. Hence, without solving the existing problems in the region, no abolition of new terrorism is feasible.

The Middle East and new terrorism

With the advent of the September 11 events, the two subjects of new terrorism and Middle Eastern studies have emerged as two substantial components of international security studies. In other words, the subject of terrorism as the crucial threatening factor to international peace and security and as the major challenge facing the global community has acquired great importance.

The question that arises here is why new terrorism has emerged in the Middle East. To find a sensible answer, one should consider multiple contributing factors. Although the unique political, cultural and economic characteristics of Middle Eastern societies (i.e. their cultural-ethnic fragmentation, religious confrontations, traditional communities, the occurrence of the wars, etc.) provided a platform, the author maintains that, in dealing with the regional issues, the policies of the global community have played the major role for the development of new terrorism.

In the contemporary history of the Middle East, Britain and the United States have respectively shaped the policies of the global system. As for the British colonialist policies, it is imperative to understand that the political map and ethnic boundaries of the region were drawn in accordance with the demands of British foreign policy in the first half of the 20th century. The devastating British policies [3] based on securing British national interests have more than anything resulted in unrealistic territorial divisions and the consequent establishment of artificial states. As a result, no distinctly Arab or non-Arab state can be found today in the region without serious difficulty. Given these policies, the second half of the century witnessed numerous wars and crises and thus more ethnic and religious fragmentation in the region. The outcome was the enduring existence of authoritarian regimes which by enjoying the support of the global community have been able to suppress their national demands for political openness, fair distribution of power, and a competitive position in the globalised economy as the prerequisites for any democratisation process [4].

As for the role of the United States following the British withdrawal from the region in 1971, more complexity and tension has undoubtedly been brought into the region. In order to secure US national interests – as US leaders have recently confessed – the requests of the people from the Middle East for democratisation have long been sacrificed in order to achieve stability in the region [5]. Over the past three decades, US policies aimed at preserving stability have contributed to the halting of any democratisation efforts. These stability-seeking policies have been based on two strategic pillars: the control of energy sources and the termination of the Arab-Israeli peace process.

Achieving the first goal, US foreign policy has manifested itself in two primary ways: support of autocratic regimes and military presence. After the first Persian Gulf War, arms transfers and diplomatic and economic support systems continue to play a substantial role in keeping autocratic regimes in power thereby strengthening regional stability. By virtue of their empowerment, these regimes have been able to carry out internal repression [6]. Opposition groups have not been allowed to compete in an open political process and there has been no democratic distribution of power. As a result of this policy, many Arabs today regard the US as guilty of delaying the creation of political openness [7]. Over the past years, demands to

establish real parliamentary systems have been foiled. The result is the emergence of extremism on the one hand, and the creation of a specific 'power-base' on the other hand, which in turn has encouraged new levels of extremism.

US policy in the region in the early 1980s also played a part in creating the initial conditions for radicalism to develop. For example, Washington backed Sunni radical groups against the Soviet army in Afghanistan as a means of limiting the influence of the Islamic revolution in Iran. The result of that policy today is Al-Queda and new terrorism. Supportive US policy towards the Taliban in Afghanistan in the mid 1990s provided Al-Queda with the opportunity to organise, recruit, and train operatives in preparation for terrorist activities around the world.

US support for regional regimes has moreover created a kind of 'power-base' which by its nature undermines work towards democratisation. As a result of these supportive policies we witness the existence of unusual authoritarian regimes along with distinctive closed power circuits in the region which are monopolised, unbalanced, unlimited, and offer advantages to those who are loyal to the core of the system. With the existence of these kinds of power bases, there is less chance for any democratisation process. Such a process could only occur at the determination of those in power, not by the will of the people.

As for US military presence, the first Persian Gulf War enabled the establishment of several permanent US military bases. This presence has continued and has become an important component in the forging of political alliances between the US and various Middle Eastern regimes. Although these regimes were grateful for this strong US presence during the 1990s, it is now felt that the American intervention was not in accordance with international law, nor did it facilitate self-determination or the development of human rights. Rather, it protected US access to, and control of, energy resources and was in essence purely self-interested in order to preserve stability in the region. US policy caused the new wave of religious extremism by creating dissatisfaction, distrust and a popular negative reaction against US military presence and its intervention in the internal affairs of the nations of the region. Ironically, this increase in tension and violence has itself become the main obstacle to further democratisation.

As regards termination of the Arab-Israeli Peace Process, in order to preserve stability US policies have always favoured Israel as the counter-weight to the regional powers. Over the past decade the United States has not been a fair mediator in the Arab-Israeli conflict: biased US policy has created enormous resentment as diplomatic, financial, and military support for the Israeli regime and its humiliating attitude to the Palestinians has continued. The failure of the US to be a fair mediator means that Arab feelings towards it are rapidly worsening.

This growing Arab frustration is thought of as the primary catalyst of the move towards extremism and of attempts to obtain rights through armed struggle or even sometimes through terrorist activity. As the Iraq case displays, some segments of more politicised and radicalised Sunni Muslims are feeling the need to wage Jihad in support of their suffering brethren and to restore the lost credit of Muslims. At present, Muslim public opinion is daily expressing its concern about the US led war on terror and its threat to Islam [8]. A negative view of US policy among Muslims had previously been largely confined to countries in the Middle East but has now increasingly spread to other parts of the Islamic world.

Another sign of the sacrifice of the democratisation effort is provided by US interference in overthrowing Mosadeq's national government in the 1953 coup in Iran, ultimately resulting in the extension of Shiite radicalism in the wake of the 1979 Islamic Revolution. Although

Shiite radicalism introduced fewer threats to the global community, when combined with the flexible Persian culture it became the example of Sunni radicalism in the 1980s and 1990s. Presently, the main legitimacy of Al-Queda in the eyes of its proponents is the organisation's precious effort to delegitimise the regional regimes and thereby liberate Islamic nations from dependence on the West.

Viewed in this light, no place could have been more appropriate for the emergence of terrorist activities than the Middle East. In other words, new terrorism could in fact just have been a response to the ruin and misery prevalent in the Middle East. As an underlying reality, it is hard to find even one nation without territorial, political, and ethnic problems. Even within the nation-states we witness countless ethnic and religious fragmentations, which have now been fuelled by the new round of global interference such as the conduct of wars in Afghanistan and Iraq.

The global community and the war on terrorism: threat or opportunity?

Irrespective of what component(s) contributed the evolution of new terrorism, the main challenge now is whether the current confrontation of terrorist activities has resulted in the eradication of, or at least a reduction in, the terrorist threat to international security. Are the current policies the continuation of the previous ones, or has some fundamental change occurred?

With the events of September 11, a worldwide consensus has emerged among as to how the terrorist threat should be tackled, namely, as the priority of international peace and security. Accordingly, confronting new terrorism has become a cornerstone the foreign policies national governments. On the other hand it has become a source of pressure when applied to so-called rebel states, who regard the existing order as a threat to their systems and thus are unsympathetically questioning the current international system. The war on terrorism has generally gained legitimacy and justification among the international community, nation-states today considering it to be their obligation to support the movement for security. Consequently, as the representative of the global system (or even as claimed, its head) and as the major victim and target of new terrorism, the United States has come to dominate the scene with the new rhetoric of abolishing terrorist activities by prioritising democratisation processes.

From the perspective of the US administration, future September 11 type scenarios can only be prevented through liberalisation and democratisation of the Middle Eastern countries [9]. This was a key rationale used by the Bush administration to mobilise public support for conducting wars in Afghanistan and Iraq. The justification of starting war on terrorism was based on eradicating Al-Queda type terrorist activities in Afghanistan and the subsequent war in Iraq was justified by the excuse of denying terrorist access to Weapon of Mass Destruction (WMD). From this perspective, removing the Taliban and Saddam Hussein as the two components of the expanding new terrorism constitute the great effort made by the US to establish stability and security in the Middle East and, thus, in the world.

Irrespective of the purposes behind the present talk of the US administration on the necessity to democratise the Middle East [10], one should ask whether this type of democratisation would effectively work in the region. The fundamental question is now what the global community has accomplished by conducting almost three long occupation wars. Has the approach of the global system to dealing with new terrorism led to any proper outcome, and is the world is a safer place now? Has the region shifted to a secured place, as a prerequisite of

the democratisation process? And has the operational and organisational power of terrorists declined?

New terrorism, as argued, operates through persuading the thoughts and hearts of its believers and utilises 'life as a weapon'. It talks about the mistreatment by the global community of the Muslim world. Viewed in this context, the foreign presence in the region and conducting the current type of wars against terrorist activities will undoubtedly have counter-productive consequences. How would it be possible to find a military solution to a political-cultural problem? As the current problems in the Middle East have cumulative effect, rooting out new terrorism requires first identifying, and then solving, regional difficulties.

In order for the global community to remain safe, the Middle East must become stable and prosperous. This is a massive undertaking with at least two very complex components for global governance:

1. Committing to remove the authoritarian regimes in the region, which will destabilise the closed power circuits in the regional states, inevitably leading to further extremism and ultimately to terrorist activities. The result is again instability and the undermining of democratisation.
2. Solving the Palestinian problem, which appears to be the most pivotal fuel of new terrorism.

The consequences of conducting wars on new terrorism are as threefold: insecurity is spread across the world, religious-ethnic fragmentation is escalated, and the dissatisfaction in the region's countries is accelerated.

Spreading insecurity across the world

Assuming that the existence of insecurity and disorder will provide the best conditions for terrorists operations, US strategies have intensified insecurity in the region. War followed by overwhelming military presence in Iraq not only resulted in a secured Iraq, in increased instability and violence in the region. The underlying fact is that the first priority of Middle Eastern citizens today is security, not democratisation. In other words, the people of the region are now prioritising daily matters such as safety, a certain future, and better economic conditions, rather than the growing rhetoric about promoting freedom and democratisation. As a result of the paradoxical conduct of the global system, there is effectively no place more hostile to democracy and the globalisation process than the greater Middle East.

Today, the Arab nations of the region are wary of the current US policies. As history shows, Arab Muslims have always resisted domination by foreigners, particularly non-Muslims. No doubt, the more extensive presence of the West will bring more violence and dissatisfaction in the Arab public opinion. As a result, no place in the world is safe for Western citizens.

Escalating religious-ethnic fragmentation

The war on terrorism has undoubtedly accelerated religious, ethnic, and identity related fragmentation at the worldwide and/or at the regional and national levels. At the global level, while the terrorist threat expands from the Middle East and the Arab world, the division between Islam and Christianity is widening and becoming more complicated. Since the West is the place of diverse religious Muslim minorities, these reciprocal unsympathetic conditions will breed

more anxiety and tension between the two worlds. In this context, Muslims today feel unsafe and humiliated in the West. Engulfing the two worlds, new terrorism is increasingly seeking more divergence between Muslims and Christians.

At the regional and national levels, the almost three-year war on terrorism neither resulted in a safer region, nor led to more convergence. On the contrary, waging wars in multi-ethnic countries such as Afghanistan and Iraq has intensified ethnic and religious factionalism and, hence, provided breeding grounds for terrorist activities. In Afghanistan, for instance, the US has begun working separately with the central government and the influential regional commanders called Warlords or Mojaheddins in order to hunt Al-Queda and Taliban remnants. While paradoxical US policies have stepped up insecurity and disorder, Afghans have become frustrated and disappointed of the efforts of the international community to fill the power vacuum in the country. Although the uncivilized Taliban regime no longer has a physical existence, their thoughts still dominate the country. In illegitimate and malignant unity with terrorist organisations, international drug smugglers are taking advantage of ethnic and religious fragmentation and disorder inside the country, thereby fuelling new terrorism. Absolute US support of Karzi as the representative of the ethnic Pashtuns has broken up the natural power equations, thus disappointing the other political and ethnic factions and leading to their loss of confidence in the power division. This would work as a driving force for more skirmishes. As a result, a new wave of severance is on the way, notably between the Pashtuns and the ethnic Tajik and Uzbak, and among Shias and Sunnis, as evident in the upcoming presidential election.

Unlike Afghanistan, the political scene in Iraq presents a more complex challenge to global peace and security. As a result of the manipulation of the power division, rivalry within the diverse ethnic Sunni, Shia and Kurdish factions has intensified to the extent that the extremist Sunnis (the group led by Zarghavi) today regard the Shias as their number one enemy. The enmity not only accelerated among the ethnic groups, also within the groups themselves there are different adversary segments with competing approaches toward the occupation forces, the role of neighbouring countries, the future of the government, etc. The current division between the various Shiite factions is a substantial testament. Significantly, the uprising of the Shiite group of Moghtada Al-Sadar against the occupation forces is the result of current US efforts to marginalise the Shias from the real power division. No Shiite group has forgotten the unsupportive American policy in the 1991 uprising, which left thousands of Shias massacred by the Saddam regime. Understandably, no trust today exists among the Shias as regards US policies.

Accelerating the regional countries' dissatisfaction

Since the US established its new and direct presence in the region, the regional states have started to obstruct the policies of the global community. As an immediate result of the war in Afghanistan and subsequently in Iraq, the current US administration never denied its purpose to change the regimes in Iran or Syria. Unrealistic US conduct in dealing with the two solid opponents have caused these countries to be considered as threats rather than as opportunities in war against terrorism.

As an underlying reality, the most sacred principle for Middle Eastern establishments is safeguarding the system. While the US is determined to advance its grand strategy of regime change, it is understandable that the establishment in Tehran and Damascus will do their best

to keep the US and its allies busy and more engaged in Iraq. No more important justifications can be raised here for the opposition of these countries to global governance. As for the other Arab allies, it gets more complicated – unlike in the past, future US strategy leaves no place for authoritarian corrupt regimes. The divergence between stability and democratisation comprehensively demonstrates itself here. Ironically, in the current Middle East any effort toward democratisation equals instability, and instability equals increased terrorist activities. The paradox lies here: the democratisation of the region requires stability and security to be the first priorities. As the Iraqi political scene shows, any further attempts to advance the regime change policy will in the short term lead to more insecurity, the engagement of the global community and ultimately the spreading of new terrorism.

As regards Iran, the Islamic Republic is currently neither looking to export its revolution, nor using the ideological approach to set its regional policies as was intended shortly after the Revolution [11]. Similar to any other political system, the core of the system gives the first priority to protecting itself through empowering the means of influence and those faithful to the system. The system upheld, the Iraqi political scene indeed presents a new challenge for the establishment in Tehran. From the perspective of Iran as the next target of the US administration, the key role of Teheran in the war on terrorism becomes one of a threat instead of an opportunity. Many elements make Iran an influential country in the war against terrorism: the unique geopolitics of Iran (with 15 neighbouring countries, located between Afghanistan and Iraq, two centres of the spreading new terrorism) and its pro-western social and cultural orientation are two important facts in encountering terrorist activities. As Shiite radicalism declines and Sunni radicalism rises in the region, Iran could play a precious role in balancing extremism as the foremost fuel of new terrorism. Accordingly, as long as the US administration is determined to pursue the policy of regime change in Tehran, the role of the Islamic Republic in the war on terrorism could be understandably unco-operative.

Conclusion

It is unrealistic to solve a profound cultural-political problem by military means. The war on terrorism can not be won with traditional warfare, but must be won politically with long-term plans. The root causes of new terrorism originate in the problems of the region, notably created by the policies of global governance. The two principles of stability and democratisation essential for eradicating new terrorism have diverged. Ironically, in the current state of the Middle East any effort toward democratisation needs stability and security, and any stability in turn needs democratisation.

Global governance needs to help to create a calm regional environment in which democratic change can occur. In contrast, the almost three years long global presence in the region has intensified insecurity and fragmentation and hence fuelled terrorist activities. The current overwhelming military presence leaves no chance for such developments. It must be recognised that any change in the region must come from within the societies. No example of imposed democracy has been successful in the world, since it needs to be offered in compromise with the national characteristics. A stable, democratic and prosperous Middle East depends on fair and just global governance, working with all the regional societies, not by one power alone. Whereas conducting the current type of war on terrorism may in the short term

lead to some achievement in halting or reducing terrorist activities, it will cause more complexity in long term.

Notes

1. Riaz Hassan, Life as a weapon, ISIM Newsletter 14 (June 2004) 9. For further information in this regard see also Sabine Damir-Geilsdore, Martyrdom & resistance in the Middle East, ISIM Newsletter, ibid.
2. Riaz Hassan, op. cit., p. 8.
3. Up until 1971, Britain was for centuries the most influential state and the representative of the global community in shaping Middle East issues.
4. Ronald D. Asmus and Michael McFau, Let's get serious about democracy in the Greater Middle East, Progressive Policy Institute, 9 March 2004 (http://www.worldsecuritynetwork.com/showArticle3.cfm?Article_ID=9149).
5. See George W. Bush's Speech at the National Endowment for Democracy, 6 November 2003. (http://www.whitehouse.gov/news/releases/2003/11/20031106-2.html).
6. For further information, see Stephan Zunes, US policy toward political Islam, Foreign Policy in Focus, 12 September 2001. (http://www.alternet.org/story/11479).
7. Mahmood Sarioalghalam, Justice for all, The Washington Quarterly, Summer 2001, p. 115.
8. In opinion polls conducted and released by the Pew Research Centre, the Muslim public expressed their concern about the US-led war on terror and its threat to Islam. A negative view of US policy among Muslims had previously been largely confined to countries in the Middle East, but has now increasingly spread to other parts of the Islamic world. Crucially, solid majorities in the Palestinian Authority, Indonesia and nearly 50% of those questioned in Morocco and Pakistan said they had at least some confidence in Osama Bin Laden to do the right thing with regard to world affairs. 71% of Palestinians agreed with his actions. See the Pew Research Center, Views of a Changing World 2003, 3 June, 2003.
9. Riaz Hassan, op. cit., p. 9.
10. Democratisation in the Middle East as the sole solution for security and peace in the region is expressed in the US Greater Middle East Plan. For further information see Rabin Wright and Glenn Kessler, Bush aims for Greater Mideast plan", The Washington Post, 9 February 2004.
11. See Kayhan Barzegar, Détente in Khatami's foreign policy and its impact on the improvement of Iran-Saudi relations, Discourse: an Iranian English Language Quarterly 2 (2) (Fall 2000) 157.

From dissociated hegemony towards embedded hegemony

Multilateralism as a by-product of American security concerns

Nikhil Dhanrajgir & Bas de Gaay Fortman

N DHANRAJGIR: Prinsestraat 55, 2513 CB Den Haag, The Netherlands; dhanrajgir@hotmail.com.
B DE GAAY FORTMAN: Netherlands Institute of Human Rights, Utrecht University, Janskerkhof 3, 3512 BK Utrecht, The Netherlands; b.degaayfortman@law.uu.nl.

An earlier paper by the second author, entitled 'Bella Americana: Some Consequences for the International Community' [1], dealt with the background and consequences of the American dissociation from the international legal and political order created after World War II. The current article examines this divergence in the light of United States foreign policy in general, pointing out that hegemony, unilateralism and pre-emptive strike together represent a certain 'constant' in American foreign policy. The article then examines the so called 'war on terror', trying to understand its flaws within the context of American strategic culture. Arguably, however, what has changed after 9/11 is not just the nature of security threats as such but also the global environment in which these manifest themselves. Taking supremacy of the world's military, technological and financial-economic superpower as a basis for further analysis, the issue becomes how to get that hegemony embedded in a multilateral setting. Here the notion of 'policy by-products' appears to open new venues. Continuing unilateralism, the article argues, would constitute a serious threat to American security proper.

During the most recent US Presidential election campaign, Madeline Albright addressed a largely American gathering at The Hague aimed at shoring up support for John Kerry as President. She prefaced her remarks with an ominous warning: America, thanks to a spate of reckless foreign policy decisions post 9/11 set in motion by a misguided Republican administration, had found itself in the middle of a perfect storm – floundering in what she argues is the worst foreign policy crisis to afflict post-modern America. Nothing short of voting Bush out and Kerry in would salvage the situation and bring it back to an even keel.

ISYP Journal on Science and World Affairs, Vol. 1, No. 2, 2005 123-131

One year earlier, at the 2003 Pugwash Annual Conference, in Halifax, Nova Scotia, our founder and former president Joseph Rotblat in his widely applauded address made a fervent appeal to the International Community to influence American public opinion in turning the tide of US foreign policy. Alarmed by the Bush Administration's intransigence on nuclear disarmament and the imminent danger of such a stance, Rotblat's sentiments of 'regime change' in the US were in fact shared unofficially by many European Governments [2]. So unpopular are Bush and those around him overseas, that foreign leaders are reluctant to agree with anything the President says lest their own ratings take a dive. Quick to capitalise on the transatlantic divide, John Kerry suggested publicly that foreign leaders wanted to see him elected as President on November 2, 2004. He may not have been wrong. Foreign co-operation had come to a virtual standstill and governments in Europe and elsewhere were biding time and waiting it out till those November elections.

Now that we know that Kerry has lost, it can be questioned whether it was realistic to expect wholesale changes in US foreign policy with a new President at the helm of affairs. The US and Americans are often chastised for their ignorance of world affairs and general geographical ineptness, but one could also argue that there is a fundamental misperception in the international community of the traditional role of foreign policy in American electoral campaigns and an under-appreciation of bipartisanship on matters of national security. As important an issue as national security is in the US at present and as crucial Bush's misjudgement in the invasion of Iraq might become, the presidential election at the outset was already unlikely to become a referendum on the foreign policy of the Bush administration, as many European observers had assumed. There is a historical continuity in American foreign policy and one of the reasons for this is that it has never really been in the forefront of mainstream political debate. Moreover, there is little discussion on what constitutes a national security interest – global stability and championing the cause of political freedom and democracy in the world is generally seen as the linchpin of American foreign policy. Both candidates, as an international public is bound to notice every day, carry the stars and stripes on their lapel. The real differences arise around issues of strategy and how best to achieve these ends.

The constant in American foreign policy

American exceptionalism and its spill-over into foreign policy are based on a combination of three elements: hegemony (and with that the idea of expansion), unilateralism ('going it alone'), and pre-emptive strike [3]. While it may well be argued that George W. Bush has distorted the notion of pre-emption (responding with a military attack to an immediate threat that could in no other way be dealt with) into aggressive prevention (responding militarily to future threats before these have manifested themselves as imminent), unilateralism itself is, indeed, not exclusive to any one party but reflects rather a general mind-set in the American decision-making process. If there is a constant in American foreign policy, it can be found in affirmations of this form of exceptionalism especially in the aftermath of September 11th, 2001. The campaign rhetoric last year and the discourse on the 'war on terror' for example lend themselves not so much to differences in foreign policy perception but in strategy and how best to 'win' the war. Kerry's contention therefore was that he was better equipped than his opponent to fight that 'war'; the theme itself and its dissociation from international law remained undisputed.

Throughout the 19th century, the main 'foreign policy' issue in American politics was actually an economic matter, namely the rate of tariffs on imports. The fundamental question of protectionism and the role of foreign capital were major concerns dividing the Democratic and Republican parties. It is also important to recall that the US constitution, with its division of powers between the judicial, legislative and executive branches of the federal government, establishes that the focus of foreign policy rests with the executive branch. The President's main job is to provide for national security. While this may seem obvious, it plays a major role in how the Congress defers to the executive in matters of homeland security and the response to the terrorist threat following the attacks of September 11th, 2001. Americans expect their President to lead the country when it comes to issues of war and peace and the safety of the country. So the issue of 'strong leadership' is a very important qualification in the public mind when it comes to evaluating presidential candidates.

But the constitution also reserves an essential foreign policy role to the US Senate. When Europeans criticise President Bush for not signing the Kyoto Protocol, for example, they should be aware that during President Clinton's term, the Senate passed a resolution against the climate treaty by a vote of 95-0. Since the Senate must approve treaties by a two-thirds majority, it is clear that the impact of treaties on the domestic economy can outweigh foreign policy considerations.

Notably, the most dramatic example of the role of the Senate in American foreign policy came during the period after the First World War. President Wilson, who had campaigned in 1916 on the slogan 'He kept us out of war' failed to get Senate approval for the key element of the post-war settlement, the League of Nations treaty. In part, this was a result of the personal animosity between the Democrat, Wilson, and Senator Lodge, Republican of Massachusetts, the then majority leader in the Senate. Wilson elected not to take any senior Republican leaders to the Paris peace talks after the war, and the issue of America's post-war role in the world became a partisan political issue.

Partly as a result of this bitter experience, a bipartisan consensus emerged during and after World War II. Senator Vandenberg, also Republican and Chairman of the Senate Foreign Relations Committee during the Truman presidency, made the famous statement that 'politics stopped at the water's edge', i.e., that foreign policy was not to be a partisan issue. The risks to the nation's interests of having a coherent and reliable foreign policy – especially during the Cold War – outweighed the potential political gains.

To say that during the Cold War American foreign policy was bipartisan is, of course, not entirely accurate. While the anti-communism of the McCarthy period had more to do with domestic politics than foreign policy, clearly there was a partisan element to the debate about national security then. And, foreign policy played a major part in presidential elections, despite the broad agreement between the two parties on America's role in the world during the 1950s. Eisenhower campaigned on a peace platform during the Korean War. Kennedy argued the Republicans had paid insufficient attention to national defence, accusing his opponents of allowing a 'missile gap' to develop between the US and the Soviet Union. But it is safe to say that generally there was no fundamental difference between Democratic and Republican foreign policy. Indeed, arguably, under Kennedy, the US pursued a much more aggressive foreign policy which in fact led to the Vietnam engagement.

Our conclusion is that obviously there is a lot more continuity in American foreign policy than changes of direction. Even the popular division of American policy into 'multilateral'

periods or 'unilateral' periods is misleading. The real division in American foreign policy is between internationalists and isolationists and the internationalists have been dominant for a long time in both parties. The US has traditionally viewed its national interests as consistent with the pursuit of global stability, and taken a practical approach to this overriding goal. When the US can obtain international support to this end, all the better; when not, as long as there is support in Congress for a particular course of action as being consistent with national security, then the issue is likely not to be politically contentious. So against this backdrop, what role should the international community play in influencing the direction of US foreign policy towards a multilateral embedding?

In this respect, it is worth pointing out that the international community as such is an abstraction. There is no legal entity or person by that name. No doubt the United Nations, which consists of almost all the states in the world, reflects for certain purposes the views of or acts in the name of the states, and to that extent represents a formal international community. But whether it does so substantially is contingent. There have been notable cases where the United Nations has failed to act when confronted with situations, which on any view are of general concern, while in some instances these constitute an affront to 'the conscience of humankind' [4]. It is, indeed, difficult to accept that the states and peoples of the world are now in a position where their legitimate collective concerns as to particular conduct are to be channelled exclusively through the United Nations. In giving extensive powers and functions to the United Nations, and a limited monopoly in respect of control of the use of force, the states and the peoples invoked in the Charter did not give up entirely their individual capacity to act. World peace through world law [5] is, indeed, not yet a fully available option and most probably never will be. Formation and execution of power for the sake of security without a solid legal base remains inevitable, especially in a global context. Yet, the point is that whenever that takes place, its objectives and focus have to be questioned continuously – within and without the United Nations – while a genuine effort has to be made to incorporate not only political but military and economic power too, in an international legal setting. Insofar as global power formation cannot be based on principles of representative democracy, power sharing constitutes the next best. Essential in this respect is the incorporation in decision-making of not primarily 'the willing' but precisely those constituent parts of international opinion-making that hold different views. Military power may, indeed, provide security, but it can also attract danger and lead to new threats [6], as illustrated rather horrendously in post-war Iraq.

The 'War on Terror'

The initial post 9/11 reaction outside America was largely one of sympathy and concern but expressed in different forms. Many Arab and Muslim countries, as represented by important spiritual and religious leaders in the Middle East, were quick to condemn the attacks and made it clear that such acts were morally reprehensible and anathema to Islam. For some though, there was also a feeling that the chickens had come home to roost – America through its sometimes blundering, violent and insensitive policies brought this upon itself and perhaps the gravity of the attacks would now galvanise American opinion into deep introspection and effect positive change in American foreign policy. America might now finally take notice of the plight of other countries experiencing the same terrorism and unite nations in a genuine effort

to rid the world of this scourge. But nothing of the sort happened – the need for rational argument and nuanced analysis that could have (and should have) taken centre stage in mainstream American politics was largely ignored in the corridors of power. Those with political axes to sharpen won the day and helped pave the way towards a second tragedy of missed opportunities.

Notably, the whole idea of a 'war on terror' is a misnomer and a gross misstatement: there is no war that one could tangibly identify, let alone 'win'. Indeed, while convenient for public consumption, the dynamics are complex – this is not a zero-sum game in which the 'we win and you lose' scenario works. Moreover, the entity currently called Al Qaeda is less an organisation than an ideology. The Arabic word qaeda can be translated as 'base of operation' or 'foundation', or alternatively as a 'precept' or 'method'. Islamic militants always understood the term in the latter sense. In 1987, Abdullah Azzam, the leading ideologue for modern Sunni Muslim radical activists, called for 'al-qaeda al-sulbah' (a vanguard of the strong). He envisaged men who, acting independently, would set an example for the rest of the Islamic world and thus galvanise the umma (global community of believers) against its oppressors. It was the FBI – during its investigation of the 1998 US Embassy bombings in East Africa – which dubbed the loosely linked group of activists that Osama bin Laden and his aides had formed as 'al Qaeda'. This decision was partly due to institutional conservatism and partly because the FBI had to apply conventional antiterrorism laws to an adversary that was in no sense a traditional terrorist or criminal organisation.

Although bin Laden and his partners were able to create a structure in Afghanistan that attracted new recruits and forged links among pre-existing Islamic militant groups, they never created a coherent terrorist network in the way commonly conceived. Instead, al Qaeda functioned like a venture capital firm – providing funding, contacts, and expert advice to many different militant groups and individuals from all over the Islamic world.

Today, the structure that was built in Afghanistan has been destroyed, and Osama bin Laden and his associates have scattered or been arrested or killed. There seems to be no longer a central hub for Islamic militancy. But the al Qaeda worldview, or 'al Qaedaism', is growing stronger every day. This radical internationalist ideology – sustained by anti-Western, anti-Zionist, and anti-Semitic rhetoric – has adherents among many individuals and groups, few of whom are currently linked in any substantial way to bin Laden or those around him. They merely follow his precepts, models, and methods. They act in the style of al Qaeda, but they are only part of al Qaeda in the very loosest sense. That is why Israeli intelligence services now prefer the term 'jihadi international' instead of 'al Qaeda'.

Naturally, then, in their confrontation with these ideologically inspired terrorist networks, the United States is looking for allies and coalitions. What is questionable, however, is the distance taken from an emerging international legal order predicated on human rights principles. This reluctance to participate in the institutions of international law derives precisely from the home-grown contention that the rights of Americans are embodied in the US Constitution and are subject to local consent and national popular sovereignty. US non-ratification of international rights conventions and newly established institutions, however, run counter to US interests in the long run and puts a spoke in the wheel of international legitimacy and justice. This is, indeed, the main point we should like to make here: rather than confronting US security discourse with a normative human rights based discourse, we would advocate an imminent dialogue, based precisely on America's own security concerns.

Strategic culture

It is in politics that cultural conversations become most explicit: What ends should the nation pursue? What means should it use? Foreign policy is at a very high end on a spectrum of conversational explicitness because it concerns relations with outgroups; outgroups serve the dual purpose of acting as a source of national identity (we are not like them) and as a threat to national identity (we must resist becoming like them). Suffice it to say, it is only through definitions of the 'other' that we can carve out a distinctive niche for ourselves (us versus them).

The disturbing linkage between socio-political naiveté and socio-political power became the underpinning of American politics when the administration quickly opted for an over-simplistic 'us versus them' dualism ('whoever is not for us is against us!' [7]), immediately translated into the latest chapter of the story of 'good against evil'. Any attempt to analyze the causes through self-examination was seen as comforting to the 'enemy' and those who suggested such analysis were vilified and branded 'unpatriotic'. America has lost the moral ascendancy it inadvertently gained in the immediacy of the attacks and frittered away the opportunity to build a genuine domestic and foreign coalition that could have so easily emerged from the debris of 9/11. Instead, jingoistic, triumphalist rhetoric and a continuing tendency to see things in facile ways only served to feed the very Manichaeanism whose existence has already created so many problems.

Crucial in our attempts to understand this reaction is the location of an American strategic culture, where strategic culture can be defined as a people's distinctive style of thinking and dealing with the problems of national security. Strategic culture, more often than not, is couched in explanations of war and conflict. It is fuelled by the construction and maintenance of the boundaries of identity and invites a bi-partisan approach in the implementation of critical areas in foreign policy. The stars and stripes on the lapels of both President Bush and his opponent Kerry symbolise trust in 'that greatest nation on earth'. 'The President's job', Bush said in the context of his campaign for re-election, 'is not to take an international poll; the President's job is to defend America'.

It is possible in this context then, to argue that there is a uniquely American approach to strategy. But is this strategic culture predicated on deeply rooted cultural traits embedded in the American polity (read 'American exceptionalism'), on a more short-term, secular historical experience devoid of the cultural element, or on a fusion of both? Strategic culture in the American context, it seems, is none of these three: it is more the product of a 'micro-culture' at work and less amenable to explanation by any meaningful compartmentalisation of cultural thinking on foreign policy issues.

The American foreign policy establishment has traditionally underestimated and at times ignored the importance of cultural influence when dealing with the threats and opportunities of the world around them. American ethnocentricism at the foreign policy level is precisely the result of this failure to understand value systems and cultural proclivities that could predict tendencies. It was during the cold war that the need to conceptualise strategic culture as an instrument of analysis first arose. While it could be argued that the constraints of bipolar rivalry largely nullified the domestic idiosyncrasies of nations, the reality today is quite different: The end of the Cold War will logically allow more artificial strategic cultures to give way to more culturally rooted ones, and it may become increasingly difficult to predict patterns

of interaction in the international arena without examining national security and foreign policy in the framework of cultural influence. However – and this is the critical point – in the framework of international security, a culturally rooted strategic culture is predicated on national security imperatives and not civilizational ones. For instance, to speak of an 'Islamic bomb' is to deny the fact that the Islamic world is not a monolithic entity but a geographically and historically disparate group of states with very real differences. More accurately, it is extremely difficult to identify leaders of a civilization, and from a practical standpoint, it is virtually impossible to actualise threats made in the name of civilizations (like declarations of a holy war or jihad) precisely because the only underlying institutions that could put them into effect are nation states. Islamic 'fundamentalism' as we understand it is not a monolithic entity but rather a diverse ideology that manifests itself very differently in socio-political life – some positive, some negative: For instance, the Ikhwan (the Muslim Brotherhood) has aligned itself with the monarchy in Jordan and plays a moderate (even constructive) role in some Arab countries. They are more radical in Egypt, Algeria and The Occupied territories (Hamas). The point is – there is no conspiracy or 'group dynamic' within a divided Islamic world. Moreover, what counts is not fundamentalism but radical extremism. The American propensity to lump fundamentalists into the category of 'dangerous extremists or terrorists' is self-defeating. A more nuanced, better informed analysis is needed.

It is only from a monolithic non-nuanced perspective that the war in Iraq made much more sense to the American war cabinet than focusing on dismantling and destroying Osama bin Laden and his network, although the latter always constituted a greater threat to America and the world than Saddam Hussein and his weapons of mass destruction (that in the end were never found). Bill Clinton was probably correct in asserting that in times of crisis and insecurity the American people want a leader that is 'strong and wrong' rather than one who is 'weak and right'. And perhaps President Bush had to act quickly and decisively in order to restore confidence in the country and assuage the fears of the American people.

But the Iraq misadventure may yet turn out to be the biggest strategic and tactical blunder since the Bay of Pigs fiasco. The quagmire that the Bush Administration precipitated will in all likelihood have disastrous long-term consequences for American foreign policy and further alienate allies already disillusioned by an unabashed display of arrogant American certitude. The damage may already have been done. Once the machinery for the foreign policy implementation process is set in motion, it becomes difficult (and often politically risky) to dislodge. It is extremely unlikely, for instance, that a new democratic administration will be able to roll back the current Iraq policy despite fundamental differences on the very question of whether it was right to go in there in the first place. The foreign policy apparatus simply does not allow for such wide-scale changes. For instance, since Kerry had voted in the US Senate for the war in Iraq this put the Democrats in a quandary and made it that much more difficult for their candidate to articulate clear policy objectives on Iraq that markedly differed from the ones adopted by the Bush administration. This may help explain why John Kerry in his campaign rhetoric had been unconvincing on Iraq and on how he planned to restore the loss of American credibility and respect around the world.

Insofar, then, as election results matter in respect of American security choices in our world today, it was probably the Bush versus Gore ballot (and its interpretation by the Supreme Court in its 5:4 judgment) rather than the Bush versus Kerry vote that mattered a lot.

Elections, however, are like water under the bridge: the issue remains how to get US hegemony embedded in a multilateral setting.

Multilateralism as a by-product of American security concerns

Understandable as US unilateralism may be in the light of disappointments far from home, defending America today requires a substantial change in strategic culture. It will not have much effect, however, to confront unilateralist national security discourse with a Universal human rights-based communication. But it is precisely within the context of current concerns with international terrorism that the international legal order manifests its primary significance. To clarify what is meant here, we should like to present the notion of policy by-products.

The term 'by-product' means that production is not primarily aimed at, nor automatic; yet it may be regarded as essential. Let us take democracy as an illustration here. Notably, that system implies the constitution and acceptance of government by its citizens or, in other words, legitimacy. Indeed, for Fukuyama [8], the advocate of liberal democracy as 'the end of history', a regime is democratic when it is legitimised through the consent of the ruled. Here, democracy and legitimisation become synonyms. It is also possible to see legitimacy as an essential by-product of democracy [9]. The term 'by-product' means, indeed, that the 'production' of legitimacy is not automatic; nevertheless it is essential for without it democracy will lose its meaning. 'Without the citizens' support, who recognise the regime as being legitimate, a political democracy cannot survive' [10]. A problem with pure by-products is, generally, that they cannot be aimed at, even where their production is regarded as essential. Thus, paradoxically, politicians in power cannot just aim at legitimacy, through major efforts in public relations for example. Rather, they have to aim at the right policies and if these are successful they might produce 'people's subjective perceptions' [11] that constitute the regime's legitimacy.

In a similar vein, American strategic culture's pre-occupation with national security implies that a close relationship between the US and the international legal order cannot be aimed at directly. Indeed, in the final analysis, both the international community and the US must break the habit of making assumptions based on their own wish lists. As long as American primacy reigns supreme, the US is not going to be bogged down by international treaties or international law if it perceives its national security to be under threat. And no country in its present form is going to develop a defence capability that rivals that of the US so that it could engage in preemptive actions on the global stage. What is abundantly clear though is that global interdependence, especially in light of powerful destabilising forces at work such as 'al Qaeda', has never assumed greater significance than it has today. It is precisely the global chaos that international terrorism aims at, which requires a response that is based on the international rule of law. Moreover, going it alone all the time the US would make itself as a country and American citizens wherever they might find themselves, a primary target of Jihad ideology and consequently of its terrorist methods. And finally, the international community would be rendered impotent without US support [1]. The sooner each side accepts these realities, the sooner they can start building a viable common agenda that will bring them out of 'the perfect storm' (Madeline Albright) and into calmer waters.

Notes

1. Bas de Gaay Fortman, Bella Americana: the need for global reform, in: Paul van Seters, Bas de Gaay Fortman and Arie de Ruijter (Eds.), Globalization and Its New Divides: Malcontents, Recipes, and Reform, Dutch University, Amsterdam Press & Purdue University Press, West Lafayette, IN, 2003, pp. 225-233.
2. The term regime change implies a serious deviation from the gist of the United Nations Charter and hence is to be resisted rather than being uncritically assumed. Although, clearly, change of administration is a different matter, it remains questionable whether non-Americans would do wise to opt for an American party political strategy. In [1] it was argued that not even Americans themselves would do wise to base their opposition to the Bush Administration's position with regard to the international legal order on the need for 'regime change'. The United States enjoys one political regime since 1776 (with an insecure period during the Civil War), and despite its defaults and deficiencies the general feeling in that country is that it has served them well.
3. James Chace, Empire, anyone?, The New York Review of Books 51 (15) (7 October 2004) 15-18.
4. Rwanda 1994 and Srebrenica 1996 are cases that immediately come to mind here. Currently, it is the situation in Darfur (Sudan) that is subject to a moral-political debate, which is as yet unsettled.
5. See the magnum opus of Grenville Clark and Louis B. Sohn, World Peace through World Law, Harvard University Press, Cambridge, MA, 1958.
6. Cf. W. F. de Gaay Fortman, Recht en vrede, in: B. de Gaay Fortman (Ed.), Christendom en oorlog, Kok, Kampen, 1966, p. 151.
7. Notably, Jesus had formulated this aphorism the other way round and hence more modestly: 'Whoever is not against us, is for us!'
8. Francis Fukuyama, The End of History and the Last Man, The Free Press, New York, 1992.
9. Herman van Gunsteren and Rudy Andeweg, Het grote ongenoegen: over de kloof tussen burgers en politiek, Aramith, Haarlem, 1994.
10. Ibid., p. 100.
11. See [8, p. 15].

Water: cause for conflict or co-operation?

Irna van der Molen & Antoinette Hildering

P VAN DER MOLEN: Department of Technology and Sustainable Development, University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands; p.vandermolen@utwente.nl.
PA HILDERING: MeerKeuze/MultipleChoice, Velperweg 52, 6824 BM Arnhem, The Netherlands; a.hildering@meerkeuze.org

Several authors, politicians, leaders of international organisations and journalists have cautioned the world community that the increasing scarcity of freshwater resources might lead to national and international conflicts. When relating this to climate change forecasts – most of which indicate that climate change will have a significant impact on the availability of freshwater resources, on water quality, and on the demand for water – this is alarming news for humankind as it threatens human security [1]. Not only can one expect a significant impact of climate change on the availability and quality of freshwater resources, one can also expect an increase in conflicts which are water related. Fortunately, there are also voices which question the empirical evidence for this 'conflict scenario', pointing to the opportunities for, and experiences with, co-operative arrangements for sharing river resources [2,3, 4]. This article gives an outline of this debate and touches upon some relevant issues involved. The article is primarily based on secondary information from previous studies.

A comparison of freshwater withdrawal per country and per sector (domestic use, industrial use, agricultural use) shows a large variation between various countries. For example, in 1994 the withdrawal for domestic use in Malawi was 9 m^3 per person per year, whereas for Iceland this was 176 m^3 per person per year [5]. Such variation is not only present between countries: the inequality within countries is enormous as well. Water consumption in Israel and in the settlements is much higher than that of their Arab neighbours in occupied territories who are restricted from pumping water. It seems that – in some cases – controlling groups are able to capture resources at the cost of politically marginalised groups due to asymmetrical power relations.

Acreman [6] and Pearce [7] show that there is overexploitation of water in several regions, and have calculated water exploitation indexes as a percentage of renewable annual water resources. These are: 83 % for Tunisia; 92% for Egypt; 140% for Israel; 169% for Gaza; 644% for Libya (because 84% comes from non-renewable fossil water from beneath the Sahara); 50% for Syria; 25% for Lebanon; 20% for Algeria and 40% for Morocco (referred to in [8]).

ISYP *Journal on Science and World Affairs*, Vol. 1, No. 2, 2005 133-143

Figures on water supply and sanitation reflect the harsh reality of life for many people, most of whom are living in developing countries. More than one billion people do not to have access to clean drinking water, and approximately 2.4 billion people do not have access to adequate sanitation. Gleick [9] indicates that an estimated 80% of the diseases in developing countries are water related. Every day 14 to 30 thousand people, mainly children and elderly, die because of waterborne diseases [10], or due to floods and droughts.

Problems related to the supply of freshwater resources, and more in particular to safe drinking water, can not be addressed properly without recognising the interrelation between multiple functions and uses of water. Water resources are used for human consumption, for sanitation, washing, bathing and cultural or religious rituals, and for economic purposes, such as agriculture, livestock, industry, tourism, and transportation [11]. Water resources are also considered to be an integral part of the ecosystem, for wetlands, coastal areas, mangroves, and more in general for humid, arid and semi-arid areas. Over-extraction of water for industrial use may severely affect ground water levels, affecting not only the ecosystem, but also agriculture in the area and potentially the access to safe drinking water [12].

At UNCED in 1992, the international community emphasised this interrelation stating that 'the extent to which water resources development contributes to economic productivity and social well-being is not usually appreciated, although all social and economic activities rely heavily on the supply and quality of freshwater.' (Agenda 21, Chapter 18; Protection of the Quality and Supply of Freshwater Resources). Due to this interdependence, any change of sub-national, national or regional water regimes and property rights has inevitably an impact on the availability of water for different uses and competition over water among different user groups [13]. This complexity clearly requires a coherent approach which not only addresses the existing inequalities in access to water, but also foresees actual or potential competition over water between different user groups. But first and foremost, it requires an understanding of the factors which could contribute to water scarcity.

Therefore, for analytical purposes, first, a typology of resource scarcity and scarcity related conflicts is provided based on earlier work by Ohlsson [14] and Homer-Dixon and Blitt [15,16]. The next sections explore how climate change and privatisation may result in water scarcity using this typology. The final section focuses on the question whether water scarcity is indeed a source for conflict, or whether there are reasons to believe that such conflict is avoided by co-operation and joint management in potential conflictuous areas.

Different types of scarcity and conflicts

In order to explain why and under which conditions countries co-operate, it is useful to look at the theories and studies which have been conducted about conflicts and their relation to scarcity of natural resources. First of all, one can make a distinction between different types of conflicts. Ohlsson [14] makes a distinction between first-order conflicts, which are those resulting from natural resource scarcity itself; and second-order conflicts, which result from the adaptation strategies by which societies try to overcome natural resource scarcity, such as conflicts which emerge when large numbers of people are displaced by dam-building projects.

Ohlsson further indicates that water scarcity can be demand-driven, supply-driven or that it can be the result of structural inequalities between different groups of water users. Demand-induced scarcity results from the water needs of increasing populations with justified demands

for increased welfare; supply-induced scarcity results from rivers running dry, lowered water-tables, and polluted groundwater and surface water courses; and structural scarcity emerges 'when more powerful segments of water users confiscate a larger part of the scarce resource, resulting in the ecological and economic marginalisation of the less powerful' [17]. Homer-Dixon and Blitt indicate that these three types of environmental scarcity often interact in two patterns, to which they refer to as 'resource capture' and 'ecological marginalisation':

> *Resource capture* occurs when demand- and supply-induced scarcities interact to produce structural scarcity: powerful groups within society, anticipating future shortages due to increased population growth and a decrease in the quantity and quality of the resource, shift resource distribution in their favour, which subjects the remaining population to scarcity. *Ecological marginalization* occurs when demand-induced and structural scarcities interact to produce supply-induced scarcity: lack of access to resources caused by unequal distribution forces growing populations to migrate from regions where resources are scarce to regions that are ecologically fragile and extremely vulnerable to degradation [10, cited in 18]

Homer-Dixon distinguishes between five types of violent conflict related to environmental scarcity: (i) disputes arising directly from local environmental degradation, (ii) ethnic clashes arising from migration and social cleavages due to environmental scarcity, (iii) civil strife caused by environmental scarcity, (iv) scarcity-induced interstate war, (v) North-South conflicts over mitigation of, adaptation to, and compensation for global environmental problems. In his study, Homer-Dixon shows that the fourth type – interstate scarcity wars over, for example, water – is the least probable [19]. Nonetheless, water scarcity may be used strategically as a component of war strategies, as has been the case with food aid and food production in the past.

Both Ohlsson and Homer-Dixon focus on environmental scarcity as potential cause of conflict. Various studies of armed conflict (e.g. Knauft [20]) show that armed conflict is seldom mono-causal. However, the distinction between different types of environmental scarcity and conflict enables us to look at different measures and policies. Some measures enhance the potential for conflict while other measures reduce it. Examples of the former category are measures which aim at improving supply-side management by large-scale engineering efforts or which aim to maximise the economic return of water (allocation efficiency). If, for example, a government authority decides to redirect water to cities and industries and thus away from agriculture, this will directly affect peoples' livelihoods and food-security and can therefore be a source for future (domestic) conflict [14]. Paul Richards emphasises that the problem may not be 'scarcity' of resources as such, but the perceived injustice (scarcity of justice) in the allocation of resources [21]. This will be the case if asymmetry of power is reflected in the allocation of, and access to, resources [22].

Naturally, measures which could be characterised as resource capture by powerful groups within society are more likely to result in conflict than measures which do the opposite by trying to reduce demand-induced, supply induced and structural scarcity through a coherent and integrated approach.

In the following two sections, we will look at two significant changes or trends which are believed to affect the availability, quality and demand for, and access to, fresh water resources:

climate change and the global trend towards privatisation. While climate change is likely to result in *supply induced scarcity*, privatisation in the water sector and commoditisation of water resources is likely to result in *structural scarcity*. Following the argument by Ridgeway and Jacques [18], the discussion on the contribution of population growth to environmental stress and violence is left aside in this article since this tends to disguise questions related to unequal distribution of, access to, and control over, natural resources within society.

Climate change, water, and human security

Various studies and models suggest that climate change will have a significant impact on the availability of freshwater resources, on water quality, and on the demand for water. Climate and regional hydrologic models suggest changes in the variability of storms, in the frequency, intensity, and area of tropical disturbances, and in the frequency of droughts and flooding in particular areas. The availability of water resources is not only influenced by climatic conditions, but also by other environmental changes, such as rapid deforestation. Deforestation is known to result in erosion, lower water retaining capacities of the soil (soil-moisture deficit) and diminished soil fertility. The characteristics of the impacts of climate change are explained in more detail by Tao et al [23]:

> The water cycle is an integrated and dynamic component of the earth's geophysical system and both affects and is affected by climate conditions. Changes in the earth's radiation balance affect winds, temperatures, atmospheric energy and water transport, cloud dynamics and more. Changes in temperature affect evaporation and transpiration rates, cloud characteristics and extent, soil-moisture, and snowfall and snowmelt regimes. Changes in precipitation affect the timing and magnitude of floods and droughts, and shift runoff regimes. Synergistic effects will alter cloud formation, soil and water conditions, vegetation patterns and growth rates.

Ragab and Prudhomme provide estimates of changes in temperature and rainfall per region. They indicate that, over the past century, there has already been a decrease in rainfall throughout the Mediterranean region, southern Africa and the Sahel, Australia and the Aral Sea Basin [24]. They furthermore state that by 2050 rainfall is expected 'to be reduced in North Africa, parts of Egypt, Saudi Arabia, Iran, Syria, Jordan and Israel by 20-25% less than the present mean values and a temperature rise between 2 and 2.75 ºC'. The estimates for the Thar Desert (India, Pakistan, Afghanistan) are a decrease of mean annual rainfall of 5-25% and an increase of mean annual temperature by 1.75-2.5 ºC [8].

Several country case studies show in more detail the potential impacts of climate change on water availability and human security. For example, Tao et al analysed the possible impact of climate change on the dryland crop production in North China (including Northwest and Northeast China and the north China plain), where an estimated 24% of Chinese total food production is produced. They conclude that, 'although the expected increases in precipitation may alleviate water stress on crop in Northwest China, the expected increases in water demands and soil-moisture deficit, and decreases in precipitation would challenge the rain-fed crops in the north China plain and Northeast China'.

Climate change has not only an impact on arid and semi-arid regions, but also on regions where flooding frequently occurs. Mirza shows [25] the potential impact of climate changes on the probability of the occurrence of floods in Bangladesh and its implications, in terms of characteristics of floods and crop damage, for the basin areas of the Ganges, Brahmaputra and the Meghna river:

> future changes in precipitation regime have four distinct implications. *First*, the [...] onset and withdrawal of monsoons may be delayed or advanced. *Second*, an increase in monsoon precipitation in the Ganges, Brahmaputra and Meghna basins may increase the magnitude, frequency, depth, extent and duration of floods. *Third*, timing of peaking in the major rivers may also change […] Fourth, increased magnitude, depth and duration of floods will bring a dramatic change in land-use patterns in Bangladesh.

These studies show that the data on climatic and hydrological conditions from the past are not reliable anymore to guide decisions on long-term water planning and construction of new water supply and irrigation systems for the future. If governments and water authorities want to address demand- and supply-induced scarcity, or respond to an increase of 'magnitude, frequency, depth, extend and duration of floods', it is a prerequisite to re-examine existing policies and instruments, using new information from climate change forecasts [26] and using information from forecasts on the upcoming trends in population growth and migration patterns (urbanisation, regional transboundary migration) [27].

The question is not only how climate change affects human security directly in terms of protection from floods, food security, or access to safe drinking water. The question is also how governments and powerful groups will respond to domestic water scarcity, to changing soil and water conditions, and to climate change as such. As indicated before, the impact of climate change will strongly vary among states due to a number of reasons, including their geographic location, widely different capacities [28] to mitigate the expected impacts of climate change, and due to asymmetrical power relations at the international level. Even within countries, different impacts can be expected for different groups. The impacts of climate change are likely to be much more severe for many developing countries, whereas these countries are less able display effective responses. In her book on the climate change convention, Gupta [29] observes that climate change is still a 'pseudo-domestic agenda item' in many developing countries: at the time, it is not perceived as a priority by domestic actors [30]. One of the reasons mentioned by Gupta is the ideological vacillation, which reflects confusion about the world-view which is most appropriate for their country. One of the competing frames is between the environmental ideology and the liberalisation ideology. According to Gupta 'The environmental hype [with UNCED (United Nations Conference on Environment and Development)] has come at the same time as the liberalisation hype' [with the World Bank's Structural Adjustment Programmes]. The environmental ideology has been imported at a rhetorical level, and the liberalisation ideology is being implemented in policy'.

Privatisation of water and human security

The global commitment made in Johannesburg to reduce the proportion of people without access to safe drinking water by 50% by the year 2015 [31], seems to be contradictory to global

patterns of privatisation and liberalisation which are reported to affect the demand for, quality of, and access to, water [32]. Over the past decades, one could observe a rapid and global trend towards transfer of the production, distribution, and management of water or water services from public entities into private hands [9]. This transfer of responsibilities towards the private sector is partly caused by inappropriate management of water by government agencies. In recent years, several international aid organisations and the Bretton Wood Institutions (BWI) have pushed developing countries towards privatisation and public-private partnerships in the water sector. Water rights [33] and water markets have become common terms, and water is increasingly treated as a tradable commodity. The poor implementation of these privatisation policies and the lack of attention to vulnerable groups in society are subjected to severe criticisms. Gleick *et al.* [9] observe that: 'Rapid implementation of private-public partnerships for water supply has, in too many cases, blatantly disregarded the needs of the poor'.

The denial of the control by communities over their own natural resources, the sharp increase in water rates, the withdrawal of water for industrial purposes or large scale production, and the distrust of the power of multinational corporations, have resulted in protests and marches, sometimes in social unrest and violence. In many cases where civil protests seem to revolve around water resources, other socio-economic problems play a role as well. Again, not only the scarcity as such, but in particular the perceived injustice in allocation of, or access to, water resources is likely to inflame sentiments among the affected population groups.

One of the examples in which such changes led to social protest is the 'water war' in Bolivia. This 'war' erupted in 1998 when the Bolivian government entered into a contract with Aguas de Tunari, a consortium led by the Italian-owned International Water Limited and the US-based Bechtel Enterprise Holdings. The new company modified the rate structure, resulting in much higher rates for local residents (up to 200% of the original price). Aguas de Tunari claimed that the increases in prices would mainly affect industries, not the local population, but this was contradicted by local farmers and residents of the town. As stated by one of the managers of the company, their aim was to make profit, not to contribute to development. Thousands of people participated in a march to protest against the concession to the consortium which, according to the local population, did not have attention for the concerns of the poor. It was one of the few cases where the demonstrations and fights resulted in defeat of the water company: in late April 2000, the Bolivian government cancelled its contract with Aguas de Tunari [34]. Unfortunately, as referred to by one of the women activists involved in this struggle, 'afterwards, what had we gained? We were still hungry and poor' [35].

Regional conflicts related to water scarcity

Several authors, politicians, leaders of international organisations, and journalists have cautioned the world community to the fact that the increasing scarcity of freshwater resources might lead to national and international conflicts [36]. These predictions are not new: water scarcity is often related to future war. Three observations seem to support this assumption. First of all, more than 200 river systems are shared by two or more countries. Toset [37] indicates that 'many rivers run between countries with a history of conflict, where water plays and important role in the economic life of the country'. Secondly, some countries depend for more than 80% on upstream countries for their renewable water resources, such as Syria, Sudan, Turkmenistan, Egypt, Mauritania, Kuwait and Bahrein [8]. Such dependency is expect-

ed to create potential for conflict. Finally, overexploitation of water, as shown in section one, in combination with the impacts of climate change, may well lead governments to divert major rivers, construct large dams, or tap underground aquifers which extend beneath their neighbours' territory. Ragab and Prudhomme [8] view the potential draining of these aquifers as major potential for future conflict. Examples of such aquifers are the great fossil-water-filled aquifers beneath the Sahara desert; the Eastern Erg artesian aquifer, south of the Atlas Mountains (Algeria, Tunisia); and the Nubian aquifer (Libya, Egypt and Sudan).

One of the most visible areas where regional instability is partly related to the control over water resources is the Middle East. Ragab and Prudhomme explain how structural scarcity and resource capture of freshwater resources by the Israelis has played a role in the conflict between Israel and its neighbours, not only by diverting the River Jordan to the Sea of Galilee, but also by draining more than 300 Mm3/yr from the aquifer through boreholes on the Israeli territory near the coast. Obviously, although the occupation of territories offers Israel strategic control over water resources, it is not the main cause for political tension between the countries in the region. That the Israeli-Arab water conflict cannot be discussed separately from the overall conflict, is also indicated by Feitelson [38], who distinguishes two perspectives among political scientists and international relations experts:

> One strand suggests that while the two levels of conflicts are intertwined water issues can be decoupled and addressed separately, perhaps setting the stage for a resolution of the wider conflict. That is, as water is not necessarily the crux of the inter-state conflict, and as there are benefits to be reaped from co-operation over water issues they can be indeed a basis for co-operation before the inter-state conflict is resolved […] The second line of argument suggests that the way water conflicts are conducted, and the options for resolving them, are a function of the power relations between the parties, the hydrological situation, the importance of the water resource under contention for the different parties and the benefits of co-operation for each riparian. Miriam Lowi concluded on the basis of an extensive study of the Israeli–Arab water conflicts that in this case the second strand applies.

One can distinguish between two different scenarios. The *conflict scenario* foresees serious water scarcities and an increasing potential of conflicts between numerous countries. In this scenario, access to water may be seen by nations as a matter of national security. The other scenario is the *co-operation scenario*: 'while freely admitting the possibility of conflict, it denies its inevitability […] The co-operation scenario further points to the possibility of co-operative arrangements for sharing river resources between the upstream and downstream countries, including treaties and joint river administrations' [37].

Kliot, Shmueli and Shamir [3] examined the nature, characteristics and shortcomings of co-operative arrangements for the management of 12 transboundary river basins [39]. They indicate that co-operative water resource management faces several obstacles, such as the critical nature of water for human existence; the multiple use of water; the sheer scale and the gap between policies and implementation of these policies. However, they conclude that:

> many institutions which govern the management of transboundary water resources point to the fact that in many river basins countries are able to overcome their differences and co-operate to the benefit of all.

Similar findings have been presented by Wolf [4] and Yoffe, Wolf and Giordano [40,41]. They conclude: 'We found that international relations over freshwater resources are overwhelmingly co-operative and cover a wide range of issue areas, including water quantity, quality, joint management and hydropower' and 'Most of the commonly cited indicators linking freshwater to conflict proved unsupported by data. Neither spatial proximity, government type, climate, basin water stress, dams or development, nor dependence on freshwater resources in terms of agricultural or energy needs showed a significant association with conflict over freshwater resources' [41]. Also Toset reaches a similar conclusion: although the results of their study indicate that 'the low availability of water in both countries in the dyad is significantly related to disputes' they conclude that there is not sufficient evidence to claim that sharing a river provides a major source of armed conflict [37].

Conclusion

The last section clearly showed that at the international level, water appears to pose a reason for transboundary co-operation rather than for war, often preventing escalation instead of causing it. Yoffe, Wolf and Giordano found that highly co-operative events often involved more than two countries. Furthermore, the analysis of multilateral treaties on fresh water resources shows that a large share of these treaties stressed several objectives: economic development, joint management and water quality, rather than only water quantity and hydropower [41]. This confirms the effectiveness of a coherent approach which foresees actual or potential competition over water between different user groups as was indicated in the introduction of this article. This positive conclusion does not mean that there are no concerns left. The degrading situation under which many people have to live gives no reason to celebrate the stability of the *status quo*. Further co-operation to improve their position is required in order to have a larger group of people living in relative security. Such improvement might at the same time empower them to stand up against an existing elite.

One of the main concerns is the unequal access to freshwater resources at the national level. Although privatisation measures in the water sector are not necessarily negative with respect to the water demands of the population, it can result in concerns and resistance among the population as could be seen in the case of privatisation in Bolivia, where the contract between the government and the company bypassed the local population, worsened economic inequities, and ignored the affordability of water. Therefore, these measures and reforms should be accompanied by measures to 'permit equitable access to water for poor populations, include affected parties in decision-making, and improve water-use efficiency and productivity' [9]. Gleick also emphasises the need for openness, transparency and strong regulatory oversight. This dimension has hardly received attention in this article. In an administrative-political context where the institutional framework is weak and regulations are easily circumvented, this dimension can be extremely important.

Another concern can only be answered in the future. When the expected impacts of climate change increasingly become reality, will governments be able to address the challenges

at the national and international levels without resorting to resource capture? Will they be able to formulate a coherent framework with policies and instruments which reduces structural forms of water scarcity?

Notes

1. In defining 'human security', the Human Development Report 1994 distinguishes two main meanings. Human security means, first, safety from such chronic threats as hunger, disease and repression. And second, it means protection from sudden and hurtful disruptions in the patterns of daily life – whether in homes, in jobs or in communities.
2. A. Dupont, The environment and security in Pacific Asia, International Institute for Strategic Studies, Adelphi paper 319, Oxford, Oxford University Press, 1998.
3. N. Kliot et al., Institutions for management of transboundary water resources: their nature, characteristics and shortcomings, Water Policy 3 (2001) 229-255.
4. A. T. Wolf, The transboundary fresh water dispute database project, Water International 24(2) (1999) 160-163.
5. For more data on water use per country per sector, see: http://www.worldwater.org/table2.html
6. M. Acreman, Wetland and hydrology, in: J. Skinner and R. J. Crivelli (Eds.), Conservation of Mediterranean Wetlands (MedWet), Tour du Valat, Arles, France, 2000.
7. F. Pearce, Wetlands and water resources, in: J. Skinner and A. J. Crivelli (Eds.), Conservation of Mediterranean Wetlands (MedWet), Tour du Valet, Arles, France, 1996.
8. R. Ragab and C. Prudhomme, Climate change and water resources management in arid and semi-arid regions: prospective and challenges for the 21st century, Biosystems Engineering. 81 (1) (2002) 3-34. (Published by the Silsoe Research Institute).
9. P. H. Gleick et al., The New Economy of Water; the Risks and Benefits of Globalization and Privatization of Fresh Water, Pacific Institute for Studies in Development, Environment and Security, Oakland, CA, 2002.
10. For more information on waterborne diseases, see: http://www.worldwater.org/table22.htm.
11. For more information see: World Water Assessment Programme, 2003.
12. Falling groundwater levels may reduce water levels in shallow dugwells located in the same area.
13. Ridgeway and Jacques [18; p. 601]] refer to Homer-Dixon and Blitt who 'identify five key social effects of environmental scarcity: constrained agricultural output, constrained economic production, migration, social segmentation, and disruption of institutions'.
14. L. Ohlsson, Water conflicts and social resource scarcity. Physics and Chemistry of the Earth, Part B: Hydrology, Oceans and Atmosphere 25 (3) (2000), 213-220.
15. T. Homer-Dixon and J. Blitt (Eds), Ecoviolence: links among environment, population, and security, Rowman and Littlefield, Lanham, MD, 1998.
16. T. Homer-Dixon and J. Blitt (Eds.), Environmental Scarcity and Global Security, Foreign Policy Association, New York, 1998.
17. One of the questions which is not that often addressed in the literature on water scarcity, is the question whether water scarcity has been induced as instrument to cause human suffering among particular groups of the population. Earlier publications on food distribution policies suggest that deliberate withholding food from populations has been used by various regimes as means to weaken particular groups in society such as by the former Iraqi regime toward Kurdish people. In India, discrimination in access to water and land resources between members of various castes reflects an

asymmetry of power relations between these castes. This discrimination further weakens the position of Dalits (http://www.idsn.org).

18. S. Ridgeway and P. Jacques Population-conflict models: blaming the poor for poverty, The Social Science Journal 39 (2002) 599-612.
19. T. F. Homer-Dixon, Environment, Scarcity, and Violence, Princeton University Press, 1999.
20. B. M. Knauft, Melanesian warfare: a theoretical history, Oceania 60 (1990) 250-311.
21. P. Richards, No Peace, No War: An Anthropology of Contemporary Armed Conflicts, Ohio University Press, 2004.
22. This can also include non-material dimensions, such as access to media and political titles (see [21; p. 7]).
23. F. Tao et al., Future climate change, the agricultural water cycle, and agricultural production in China, Agriculture, Ecosystems & Environment 95 (1) (2003) 203-215.
24. Ragab and Prudhomme [8] discuss the disruption of prevailing water balance in more detail. Population increase and large scale irrigation development has led to a large reduction of the Aral Sea, and to loss of climate modifying function, and a change of the climate with 'shorter, hotter, rainless summers and longer, colder, snowless winters' (p. 24).
25. M. Monirul Qader Mirza, Global warming and changes in the probability of occurrence of floods in Bangladesh and implications, Global Environmental Change 12 (2) (2002) 127-138.
26. The Intergovernmental Panel on Climate Change (which published its main assessment reports in 1990, 1996 and 2001) has urged water managers to begin a systematic re-examination of engineering design criteria, operating rules, contingency plans and water allocation policies.
27. The West Africa Long Term Perspective Study (WALTPS) is an example of a large-scale programme which sought to consider the relations between population, economy, space and social change in the long term, although climate change was not included. See J. M. Cour and S. Snrech, West Africa Long-Term Perspective Study: preparing for the future – a vision of West Africa in the year 2020, OECD/Club du Sahel, 1998.
28. This capacity is related to the availability of economic resources, human resources, technological capacity, political willingness, legislative powers, etc.
29. J. Gupta, The Climate Change Convention and Developing Countries: From Conflict to Consensus? Environment and Policy, Vol. 8, Kluwer Academic Publishers, Dordrecht/Boston/London, 1997.
30. Gupta argues that the domestic position of policy makers 'has been influenced by (a) a lack of domestic debate; (b) the lack of well-developed scientific communities on climate change and hence the resort to a historical perspective; (c) issue linkages and the different order of priorities; and (d) ideological vaccillation (or uncertainty)' [29; p. 52].
31. See http://www.johannesburgsummit.org.
32. For a detailed analysis of the relation between globalisation and privatisation of fresh water, see [9]. See also A. Hildering, International Law, Sustainable Development and Water Management, Eburon Academic Publishers, Delft, 2004, chapter 5 (on water as an economic good).
33. Domestic conflicts over water are often related to economic or agricultural reforms, or changes in water legislation, which affect water rights of different groups. For a more detailed discussion, see Boelens and Hoogendam (Eds.), Water Rights and Empowerment, Van Gorcum, Assen, 2002.
34. The company filed a case against the Govt. of Bolivia for several million of dollars compensation.
35. Based on the presentation of one of the female activists at the Seminar on 'Globalisation, power and gender'; IUED, Geneva, 31 January-1 February 2003; see also Gleick et al. 2002, p. 32.

36. For several quotes reflecting the assumption that water shortages are likely to develop into violent conflict, see [37; pp. 972-973].
37. H. P. W. Toset et al., Shared rivers and interstate conflict, Political Geography 19 (2000) 971-996.
38. E. Feitelson, The ebb and flow of Arab-Israeli water conflicts: are past confrontations likely to resurface?, Water policy 2 (4-5) (2000) 343-363.
39. The Mekong, Indus, Ganges, Nile, Jordan, Danube, Elbe, Rio Grande and Colorado, Rio de la Plata, Senegal and Niger.
40. They conducted research on factors which contribute to conflict or co-operation, including biophysical, socio-economic, and geopolitical variables at multiple spatial and temporal scales from a GIS of international river basins and associated countries, testing these variables using a database of historical incidents of water-related co-operation and conflict across all international basins, 1948-1999.
41. A. T. Wolf, S. B. Yoffe and M. Giordano, International waters; identifying basins at risk, Water Policy 5 (1) (2003) 29-60. S. B. Yoffe, A. T. Wolf and M. Giordano, Conflict and co-operation over international freshwater resources: indicators and findings of the basins at risk project, in: S. B. Yoffe et al. (Eds.), Basins at Risk: Conflict and Co-operation over International Freshwater Resources, 2000, pp. 64-120.

Indo-Pak 'new peace'

Sarahh Bokhari

As the two South Asian nuclear rivals, India and Pakistan, step into an era of 'new peace', things have started to change [1]. The Bollywood film industry has started to produce films on Indo-Pak relations where the villains are portrayed to be against the Indo-Pak peace process. In the past it was quite the opposite [2]: a ceasefire now exists at the Line of Control (LOC) between the Indian occupied Kashmir and the Pakistani part of Kashmir [3]; prisoners of war are swapped; there is a reactivation in trade talks, air, rail and road links are resumed; artistes, sports men and journalist are being exchanged; the ban on each others TV channels is lifted; patients are moving across borders for treatments of fatal diseases; and, no wonder, the most vital of all, the visits of the foreign secretaries and foreign ministers to each other's land for negotiating peace announce the arrival of a spring teamed with happy relations between India and Pakistan. Only time will tell how long this spring will last.

Both Pakistan and India celebrated their 57th independence days on the 14th and the 15th of August 2004, respectively. This half-a-century relation is fraught with acrimony, mistrust, and pessimism. Both have fought three conventional wars and a small war in 1999 at the heights of Kargil on the status of the state of Kashmir.

Their relation could be defined as chequered, which implies cycles of alternating periods of crisis and normalisation. Every crisis between India and Pakistan is followed by a normalisation process. After the 1987 crisis, when India designed to pre-emptively attack Pakistan's nuclear installations, President General Zia-ul-Haq flew to New Delhi for reconciliation; after the 1990 crisis over Kashmir, Benazir Bhutto and Rajiv Gandhi drafted a set of Confidence Building Measures; the Lahore Declaration, was passed in February 1999 after the tit for tat nuclear explosion by Pakistan, which was followed by the Kargil mini-war; subsequently, Musharraf held summit meetings with Vajpayee in Aagra in Spring 2001.

This time, India and Pakistan decided to unleash the process of normalisation after a long spell of tension as they looked forward to start a composite dialogue under different baskets which include contentious and bilateral issues such as Kashmir, Wullar Barage, Siachin Glacier, and trade and cultural ties.

January 6th, 2004 marked the first real step towards thawing the bitter-cold relations as witnessed in the landmark meeting on Pakistani soil of the then Indian Prime Minister Atal

ISYP Journal on Science and World Affairs, Vol. 1, No. 2, 2005 145-151 (Comment)

Bihari Vajpayee with the Pakistani President Pervez Musharraf, under the auspices of the South Asian Association of Regional Co-operation Summit.

Only two years earlier, relations between India and Pakistan were in such fragile state that armies of both countries stood eye ball to eye ball on their borders with the persistent threat of a possible nuclear exchange. This was due to the assertion of the Indian government that blamed the December 2001 bombing of its Parliament in New Delhi on Pakistani-backed terrorists. Following this event, the two erstwhile neighbours were not even willing to communicate with each other. All lines of communication were severed. Prime Minister Vajpayee and President Musharraf who participated in a conference at Al Matay, Kazakhstan were not even willing to shake hands, much less to enter into some sort of debate on issues of war and peace.

This comment focuses on, and tries to delve more deeply into, the following issues. It is a well established fact that this time the normalisation process is far more dynamic than the past peace processes. Thus, the question arises as to what is the urgency which has pushed India and Pakistan to look towards rapprochement at this point in time? What is the role of international community (and especially the United States) in this thaw of relations? Did the changed geostrategic environment that followed the attacks of 11 September 2001 drive India and Pakistan to take initiatives aimed at reaching peace? What are the hurdles in achieving this peace between India and Pakistan, among which the hurdles posed by the Pakistani hardliners? This comment argues that it was Track II Diplomacy which paved the way for a dialogue at the official level of the governments.

Why go for peace?

Below are some of the reasons which could explain the latest rapprochement between India and Pakistan.

Nuclear factor

Nuclear optimists believe that the possession of nuclear weapons leads to co-operation between two countries in conflict [4]. A situation in which competitors come to accept the status quo is one which opens the way for the emergence of other common interests. It has been argued that nuclear weapons have achieved this. With respect to nuclear weapons, it is significant that the habit of co-operation in the Soviet-US relationship began to develop as early as 1946 when the US and the Soviet Union first tried (but eventually failed) to reach agreement on the international control of atomic energy. By the early 1950s co-operative efforts to manage this threat had begun in earnest. The death of Stalin in 1953 encouraged both Malentov in the USSR and Eisenhower in the US to propose initial and highly tentative steps towards transforming the nuclear arms race into more peaceful forms of competition. The 1963 Partial Test Ban Treaty, the 1968 Non-Proliferation Treaty, the 1972 Strategic Arms Limitations Talks (SALT) I and the 1979 SALT II are examples of co-operation between two nuclear superpowers under the threat of nuclear attack [5].

Nuclear weapons caused cold war statesman to approach a common standard for rationality in issues of war and peace. Nuclear weapons, in this sense, have been an improbably effective instrument of cross-cultural education. The mere possession of nuclear weapons has compelled those who behold them – notwithstanding their other dissimilarities – to find similar modes of thinking about the new realities with which they are confronted.

I do not agree that a strong parallel has been drawn between India and Pakistan on the one hand and the former cold war rivals (the USSR and the US) on the other. In all dimensions, there still remain a few similarities here and there. Thus, in a way similar to the understanding of both the USSR and the UN on the devastations of the nuclear bomb, India and Pakistan have realised the urgency for creating peaceful relations to face the challenges of the new world order.

In addition, nuclear pragmatists believe that steps and measures should be taken to build peace and resolve contentious issues and to contain the nuclear technological demon in South Asia. 'The positive development clearly reflects that the two countries are conscious of the inherent dangers of continuous confrontations and appear to be determined to deal with it rather constructively'. noted nuclear pragmatist Pervaiz Iqbal Cheema, president of a renowned Pakistani think tank while referring to the two day talks between the foreign secretaries of India and Pakistan in early July 2004 on Nuclear related issues [6]. Both are fully cognisant of the fact that there is no winner in a nuclear confrontation and are acutely aware of the grave dangers that accompany the possession of nuclear weapons along with their carrier systems. Both the Indians and the Pakistanis have already started a process to introduce restraint measures. The Lahore meeting, and more specifically the Memorandum of Understanding that was signed on February 22, 1999, clearly reflected the desire to cage the nuclear monster.

Domestic factor

Over the last year, President Musharraf has made some rather striking statements, in stark contrast to the conventional policies of Pakistan. Departing from the ritualistic positions on Kashmir, he has called for a mutually flexible solution for Kashmir, urged for a relaxed Pakistani insistence on holding a plebiscite, and pledged directly to Prime Minister Vajpayee that he would not permit any territory under Pakistan's control to be used to support terrorism. Musharraf's repositioning on Kashmir fits within his larger vision of transforming Pakistan into a 'moderate, developed, enlightened and welfare Islamic state' [7]. During the Independence Day celebrations Musharraf urged the need to project a 'soft image' of Pakistan through culture, sports and tourism [8]. Musharaf represents a larger civil military oligarchy, 'The Establishment' of Pakistan. The foreign, domestic and economic policies of Pakistan are drafted by this 'Establishment' which knows that locking Pakistan in an arms race with a larger and expanding India would take Pakistan nowhere. The 'friends' of Pakistan have time again used it and then left it in lurch. There is an understanding among the 'elite' and even the commoners that once Afghanistan is stabilised and Al-Qaeda erased, the Americans would vanish, leaving Pakistan without a major ally. China, a long 'time tested' Pakistani friend is alarmed at the popularised support for Islamic radicals within the country and has thus bettered its relations with India while trying to resolve the Indo-China border dispute [9].

Pakistan is bearing the brunt of US cold war policies in Afghanistan which gave rise to the elements of Mujaheedins. However, Pakistan now has to clear its image of backing any Mujahideens and Talibans, the so-called terrorists. Pakistan is undergoing all efforts to root out the terrorists and extreme Islamists from its soil, thus goes the official Pakistani line [10].

Economic factors

The doves in Pakistan and the nuclear pessimist lobby are of the view that a normalisation of relations with India would divert the huge resources spent on Pakistani defence and more towards intra-economic development. Musharraf and other military leaders have often admitted that the stability of Pakistan rests on two pillars, i.e. armed forces and economics [11]. For attracting foreign investment and seeking positive economic benefits, the Pakistani delegates at the 2004 World Economic Forum in Davos, Switzerland, prepared a brochure which, under the section 'Relations thaw with India', contained a passage with the phrase 'looks as though commerce may succeed where diplomats have so far failed'. There is no doubt that the trade benefits would be massive.

Pakistan is a very poor country by all standards. In the last fifteen years, the incidence in poverty in Pakistan has risen from 20 to 33%. Pakistan's burgeoning population, now approximately 140 million, is poorly educated and cared for. According to the United Nations Development Program's Human Development Report, for 2003 Pakistan spent 1.8% of its GDP on education and 0.9% on health, compared to 4.5% on defence.

As long as Pakistan does not clear its image of siding with Talibans and supporting jihadi groups 'carrying freedom struggle' in Kashmir, it will not achieve the status of an attractive place for investment. Statistics show that US foreign direct investment in Pakistan over the five year period from 1998-2003 averaged $202 million – or twenty times less than Bermuda and five times less than in Panama. Since the insurgency in Kashmir began, Pakistan's rating of attractiveness for foreign investment dropped from 92 to 129 out of 140 countries surveyed by the United Nations Conference on Trade and Development.

The geostrategic position of Pakistan makes it a gem for it can become a transmission belt for trade and energy between Central Asia and the subcontinent. However, its failed national security policies towards Afghanistan and partly towards India have forfeited both markets. In 2001-2002 Pakistan's direct trade with five central Asian states was a paltry $27 million. Pakistan could earn more than twice this amount by serving as a conduit for natural gas or oil between Iran, Central Asia and India.

The elite in India, meanwhile, has been sharply critical of the Bharatiya Janata Party (BJP) government's costly and failed attempt to extract concessions from Islamabad by mobilising the army in attack formation on the Pakistani border for ten months in 2001-02. Increasingly, the BJP is of the view that it can secure its claim to power by coupling a massive expansion in India's armed forces with a strategy of economic partnership with the six other South Asian states. A key decision of the South Asian Association of Regional Co-operation (SAARC) summit, and one which figured in New Delhi's readiness to enter into a dialogue with Islamabad, was the finalising of plans to create, over, a South Asian Free Trade Zone a 10 year-period beginning in 2006. Dr. Tanvir Ahmed Khan, a former Pakistani Foreign Secretary, commented: 'It looks to me that India is giving up its hegemonic designs over small neighbours and now wants to establish its economic domination in the region' [12].

Post 9/11 factors

September 11, 2001 was a defining moment in the process of Indo-Pakistani normalisation. Fearful of the emergence of India as a major destination for international investment and its

growing geopolitical partnership with Washington, many in members of the business and political elite in Pakistan argue it would be better to seek a deal with New Delhi now, while Pakistan remains a valued ally of the Bush administration in its 'war on terrorism', rather than to risk having to deal with a stronger India in the future. Moreover, many share Musharraf's view that the military promotion of Islamic fundamentalist extremists in Afghanistan and Kashmir has redounded against their interests, bringing Islamabad into conflict with Washington after September 11 and fuelling increasing sectarian strife within Pakistan itself. Fears among the Pakistani elite are that the jihadi groups are turning against the regime [13].

The role of the international community

The Bush administration, which has embraced the military regime in Pakistan as a key ally in its 'war on terrorism' and has identified India as a potential strategic partner of the US, is a moving force behind the Indian-Pakistani rapprochement. Yet Washington has found it is politically useful to downplay its role. US officials will only admit to encouraging the two sides to talk, although it is evident that the Bush administration is using the growing economic and military leverage of the United States in Central and South Asia as a means to prod the two sides to the negotiating table.

As for the Bush administration, it views developments in South Asia from the standpoint of its goal of securing the unchallenged military and economic dominance of the US in the 21st century. It is anxious to partner with India both because of its economic potential – Wall Street increasingly refers to it as the future 'office of the world' – and because it can serve as a geopolitical and military counterweight to China.

Indeed, only a few days after the 'breakthrough' in Indo-Pakistani relations at the SAARC summit, George W. Bush announced what he termed the 'next steps in strategic partnership' between India and US. These include greater co-operation in non-military nuclear activities and space exploration, an invitation to India to collaborate on missile defence, and a resumption of high technology trade.

At the same time, the US views Pakistan as pivotal to its occupation of Afghanistan, to future ambitions elsewhere in oil-rich Central Asia, and its struggle against Al-Qaeda and other Islamic extremist groups.

During the Cold War the US fanned the Indo-Pakistani conflict so as to secure Pakistan as an anti-Soviet ally. Now, however, Washington wants to bring about a settlement between its traditional ally (Pakistan) and its new Indian ally in order to secure its predatory interests and ambitions across Asia.

The United States has played an important role to avert major wars both in the 1999 Kargil crisis and during the fiasco which followed the 2001 December Delhi Parliament bombing. The United States also wants to create peace in the region as a means for stopping an Anti American movement started in the valley by the jihadi. These jihadi were used to oust the red Soviets from1979 till the demise of USSR. Later they gave momentum to the Kashmiri war of independence and became very strong while they gave rise to the Taliban factor [14].

The role of track II diplomacy

Behind-the-scenes initiatives taken up by many Track II Diplomats have also a role to play in the new peace process [15]. Of course Pakistani, official line does not agree with it. They

believe that its only official level understanding that starts a dialogue [10]. The US has been the driving force of this unofficial diplomacy. Many individuals and think-tanks funded by the US government have become involved in supporting track II initiatives. The Regional Centre of Strategic Studies in Sri Lanka, with General Rtd Dipanker Banergee as its previous Executive Director, has held summer workshops every year to give a chance to young scholars as well as senior policy makers from both countries to meet in an unofficial environment. In addition the FRIENDs Institute in Pakistan headed by General Mirza Aslam Beg has been involved in organising conferences and seminars in a very cordial atmosphere where interaction could be made possible and where ideas are formed away from the official policy line and more towards building confidence and finally resolving contentious issues.

Conclusion

There is both scepticism and hope pinned to the peace talks in South Asia. India and Pakistan need to have trust, confidence, and a will to make this peace process into one which seeks a resolution of all conflicts inflicting on their relations. Hardliners need to be uprooted or their ideology ought to be change. Musharraf has even risked his life by starting military operations all around Pakistan and especially in the Wanna region with the objective of ousting the menace of extreme jihadis.

Many times the peace process has been derailed due to the presence of the parochial interests of the elites. The world is changing into a global economy, and if policymakers in both India and Pakistan look to their vested interests then the prospects of peace seems very bleak. Much reward goes to Musharraf rather than to the Indian leadership for the initiating of this peace process as he is ready to take a U-turn in Pakistani foreign policy.

Notes

1. The term 'New Peace' was first used by Dr. Shaun Gregory, The Department of Peace Studies, University of Bradford, 'New Peace, New War: Global Perspective', read on the launch conference of the International Center for peace and conflict Studies, Islamabad, 20 May 2004.
2. Bollywood motion picture: Mein Hoon Na, released June 2004.
3. On Nov. 26, 2003 Indian and Pakistani armed forces ended 14 years of virtually daily artillery exchanges, when they began a 'general' ceasefire – a ceasefire that covers the international border between India and Pakistan and the Line of Control (LOC) and Siachen Glacier in the disputed Kashmir region.
4. David J Karl, Proliferation pessimism and the emerging nuclear powers, International Security 2 (3, Winter 1996/97); also Sarahh Bokhari, Nuclear risk reduction in South Asia – nuclear instability in Asia, CISS Journal (Spring 2003), p. 40.
5. James R Schlesinger, The impact of nuclear weapons on history, in: Jorn Gjelstad and Olav Njolstad (Eds.), Nulcear Rivalry and International Order, International Peace Research Institute, Oslo and Sage Publications, 1996.
6. Pervaiz Iqbal Cheema, The News, Sun, July 4, 2004.
7. Trading Militancy for Peace in South Asia, Feb 26, 2004, www.stimson .org.
8. 15th Aug 2004, Daily Times.
9. Dr. Stephen P Cohen, India and Pakistan: Steps Towards Rapprochement, Testimony Prepared for the Senate Foreign Relations Committee, The Brookings Institution, January 28, 2004.

10. Interview with the Honorable Counsel General of Pakistan in Canada, Mr Ghalib Iqbal by the author, Aug. 10, 2004.
11. Referred to in [7].
12. Keith Jones, India and Pakistan to Pursue Composite Dialogue, 30 January 2004. (http://www.countercurrents.org).
13. Ibid.
14. Syed Saleem Shahzad, Keeping the Peace Initiative on Track, Asia Times 16th February 2004.
15. Fifteen years ago in Foreign Policy, Joseph V Montville described the relatively new concept of citizen diplomacy. By this he meant the unofficial initiatives of private citizens and groups to help open lines of communication and build trust between countries involved in conflicts.

The Weapons of Mass Destruction Awareness Programme and Student/ Young Pugwash UK involvement

Luca Ciciani

Top Floor Flat, 12 Pepys Road, SE14 5SB, London, UK;
l.ciciani@imperial.ac.uk

In 2002, members of several British organisations came together, under the aegis of Nobel Peace Laureate Prof. Rotblat, to develop a programme to raise public awareness on the danger of present nuclear weapons and WMD related policies. The aim of this programme is to 'shift public perception towards the feasibility of a secure world free from the threat of nuclear weapons'. Since then, research on public opinion was conducted and a proper communication strategy was developed. The programme was divided in several elements, which were elaborated and implemented over the past three years. These are: a website (to be a clearing-house of information on NW/WMD); a series of events across UK cities bringing together influential speakers and/or celebrities/media personalities; the creation of a security curriculum (focused on NW/WMD) to be inserted in the Citizen Curriculum; the development of communication with Members of Parliament in order to bring the debate back into politics; the linking with other similar organisations in Europe, the US and worldwide to broaden the initiative. In this context, each collaborating organisation participates according to its expertises and possibilities. The programme was officially launched in September 2004 in London by a public lecture from former President M. Gorbachev, receiving since then positive feedbacks. Other events followed this launch in order to keep the momentum going. Student/Young Pugwash UK joined the programme in January 2003 and since then contributed, according to its capability, to raise awareness among the students. The different local groups organised lectures, working groups (at the Student/Young Pugwash UK Annual Conference) and workshops regarding NW/WMD related issues. Since its beginning, the programme made great strides, which constitute an enormous stimulus to continue the programme's implementation.

In the new millennium, the unchallenged existence of vast nuclear arsenals [1] (mainly in the United States and Russia), with a total yield equal to several hundreds of thousands times the Hiroshima bomb, constitutes a serious threat to human civilisation and ultimately to life on Earth itself. Amazingly, after the end of the Cold War, the awareness of such threat faded away

ISYP Journal on Science and World Affairs, Vol. 1, No. 2, 2005 153-160 (Brief)

from public interest and at present is largely ignored by the majority of the population. In the UK (one of the five nuclear weapon states), regular opinion polls [2] conducted monthly since 1983 represent very well this phenomena: since 1993 the nuclear weapon (NW) issue is seen as a priority by less than 1% of the population [3], while in 1983, just ten years earlier, about 40% of the population considered it to be the first priority. Indeed, in the western world, despite a generalised opposition to NW [4], the public opinion is for the most part disinterested and unaware about NW and WMD related domestic and international policies. Western governments, led by the US, still rely very much on these weapons not just as a political tool, but also as strategic and military means [5]. Furthermore, the shift in US nuclear policies, summarised by the 2002 Nuclear Posture Review [6], is quite worrisome as it may lead to test resumption and a new arms race, involving declared and non-declared nuclear weapon States [7].

Affront of this dangerous international situation, in the year 2002 members of several British organisations [8] came together, under the aegis of Nobel Peace Prize Laureate Prof. Sir Joseph Rotblat, to develop a programme in the UK named Weapon of Mass Destruction Awareness programme (WMDAP). Its aim is to promote 'public awareness of the present danger of nuclear weapon policies' and to 'shift public perception towards the feasibility of a secure world free from the threat of nuclear weapon'. Student/Young Pugwash UK was invited to join the programme and decided to do so in January 2003 at the National Conference in Cambridge.

In the initial phases of the programme, representatives of the participating organisations discussed and defined programme objectives, basic elements, and strategies. The following were identified as the programme's strategic objectives:

1. Educate a significant percentage of UK public about the perils of current NW/WMD policies;
2. Raise the NW/WMD issues higher up the political agenda;
3. Shape the public debate on NW issues to increase pressure on the UK government to fulfil its obligations under the NPT;
4. Encourage and facilitate expansion of the programme to Europe, the US and worldwide.

The formulation of a communication strategy was identified to be a crucial element for the programme. Indeed, in a context of limited availability of funds, it was believed that it was extremely important to identify and deliver an effective message, capable of exciting media and public interest, using cost effective means. This required further research on public opinion and media to map the current opinion on NW and WMD. The research was conducted in stages with the help of specialised public relations agencies [9]. The results, besides confirming the general lack of interest of public opinion on NW and WMD, pinpointed some important areas of optimism around which to build the programme's communication strategy. One of these was the importance of linking the nuclear issue to more general public concerns, such as environmental issues, terrorism, intercultural-clash, globalisation and proper use of national (financial) resources. The research also underlined how important it is to remind people of the horrific consequences of a nuclear war but at the same time to offer a hopeful and positive way out. Clear advantages derive also from keeping the arguments simple: they are better understood and taken as their own, increasing the chance to propagate by themselves (go 'viral'). The nuclear debate has to be taken away from the Cold War bi-polar issue and reframed around

contemporary and live issues. The key message is that we are entitled to a choice on the nuclear issue and that 'to create real security in the 21st century we need to find and neutralise all WMD and build security through international treaties and negotiation'. It is also crucial to develop a communication strategy addressing the population's fears and concerns using communication methods likely to resonate within specific groups to get them involved. It was also reminded how critical it was to avoid, at least in the initial stages of a public opinion campaign, any reference to nuclear disarmament, which is likely to alienate public interest but rather, as already mentioned, to relate NW and WMD more pressing public concerns, as terrorism, use of financial resources, environmental issues, etc.

Extremely important results came out of the research's final stages [10], as it was indicated that the population could be divided in three broad groups, depending on their attitude towards NW and WMD. These groups are: *Abolitionists* (2-5% of population), convinced that NW have always been and are a live issue, likely to support peace/disarmament organisations; *Sceptics* (15%), highly concerned at global insecurity and at belligerence of the US and UK, lacking trust on politicians, but not necessarily believing in nuclear disarmament; *Resigned* (80-85%), unlikely to be engaged in political discussion, convinced that security issues are business of experts and politicians and nuclear weapons are a necessary evil. Since the programme is more likely to gain the interest of the Sceptics, it was decided to focus it (at least at this stage) on this particular population group.

The programme's basic elements were elaborated in the light of the research outcomes. They included: the development and launch of a website that can be a clearing-house of information on NW/WMD issues for all target audiences; the launch of the programme nationally by a series of events across UK cities, bringing together influential speakers, celebrities/media personalities/musicians; the design of a security curriculum, focused on nuclear weapons, to be inserted in the Citizen Curriculum, so to work with teachers and students to raise awareness within the classroom; the development of communications with Members of Parliament in order to bring the debate back into politics; the linking up with other similar organisations in Europe, the US and worldwide to circulate the results of our research and share our programme of actions in order to encourage similar initiatives. It was also agreed that in this context, each collaborating organisation participates in a way that makes use of their own particular expertise as well as sharing responsibility for the achievement of the programme's objectives.

During the past three years, the generous and passionate work of the WMDAP members led to developing those elements. The programme was launched in London on the 23rd of September 2004 by a public meeting hosting a lecture from Nobel Peace Prize Laureate and former USSR President M. Gorbachev. The lecture was well attended and had a warm response, catching the interest of domestic and international media (especially in the US). In his address 'Global Security in the 21st Century', President Gorbachev reiterated the need to achieve national security through different means. He also underlined how important is to involve the civil society in the nuclear debate in order to accomplish the disarmament objectives stated in the Non-Proliferation Treaty (NPT) [11]. A visit to a North London school by President Gorbachev was organised and he received an enthusiastic response from pupils and teachers. What could be a better way to promote awareness on WMD related dangers among youngsters? Video material on President Gorbachev's visit to London was recorded and a video (DVD) will be

produced as a future reference on the event. Possibly such a video will be available for circulation among participating organisations so as to help on diffusing the WMDAP message.

The web site was prepared and named *Come Clean* [12]. It went live on the night of 22nd of September and was presented at the President Gorbachev WMDAP launch event. Following its launch, the website received a large number of hits and many positive comments. The possibility to monitor the number of hits following international or WMDAP related events also provides us with a good means to take the public opinion pulse. The website is characterised by a clean and welcoming design and it is aimed specially to a young audience. Divided in several sections, it presents in a clear manner the basic information on WMD, with links to other websites for those interested on deeper investigations. It has been designed to be highly interactive so as to stimulate the user's interest. It contains on-line competitions, quizzes and fun games. The section 'Tell us a Secret' merits a special mention, as it aims to share and verify information and promote direct involvement of the public in local/specific WMD related issues. It also contains all the necessary information to join or support the programme. The website is frequently updated in order to keep the resources fresh at all times.

Regarding educational material, a six lesson plan has been developed with the help of professional consultants and teachers and it is now ready to be tested in volunteer pilot schools during the next school year. The lesson plan, aimed at 14-16 years old pupils, looks at conflicts, conflict resolution, democratic processes, media and public awareness with special focus on WMD and in particular on NW. It provides guidance for teachers of Citizen Curriculum, with background information, suggested activities, maps, cards, and cartoons to stimulate the discussion. Several websites are also suggested to satisfy deeper interests. With this programme element there was also the opportunity to implement the recommendations of the UN Study on Disarmament and Non-Proliferation [13]. The lessons were made available for free download on the Come Clean website in order to encourage a wider distribution. During the next academic year, workshops with teachers will be held to explain to them our approach to global security and receive their comments and suggestions. The material will be then modified and improved according to the feedback of teachers, so it will be ready to be used widely the following year.

Efforts have been made during the past three years to establish links with other organisations with similar goals. Indeed, close links were established with the Mayors for Peace campaign [14], leaded by the Mayors of Hiroshima and Nagasaki. This permits us to share views and ideas and to maximise the impact of each other's events by mutual collaboration. The NPT 2005 Review Conference in New York was attended by Carol Naughton, WMDA Programme Co-ordinator, on behalf of the programme. In this occasion the programme was officially presented to other NGO's and the UN, receiving a warm welcome.

Once the programme has been launched it is very important to keep the momentum going. In February 2005, Senator Douglas Roche, former Canadian Disarmament Ambassador and Chairman of the Middle Power Initiative [15], visited the UK. The British Pugwash group hosted, on behalf of the programme, a public meeting with a lecture from Sen. Roche and Alyn Ware (Global Coordinator of the Parliamentary Network for Nuclear Disarmament). During his visit in London, Sen. Roche held meetings with the All Party Non-Proliferation Group in order to promote the awareness on NW issues among parliamentarians.

In the last month of June it organised the participation of Mr. McNamara in the 2005 Hay Festival of Literature [16], organised by the UK newspaper 'The Guardian' [17]. The high pro-

file of Mr. McNamara, former US Secretary of Defence in both the Kennedy and Johnson administrations and also involved in the Canberra Commission on the Elimination of nuclear weapons [18], together with The Guardian collaboration, guaranteed an attractive media coverage and public interest. Prior to the Festival participation, Mr McNamara held a well attended press conference in London on behalf of the programme. Mr. McNamara expressed deep concern for the present situation, embracing the programme message on the urge of achieving national security by means different than NW [19].

An important activity of the programme was to establish contacts with Members of Parliament (MPs). These have been established by members of the programme and there is intense activity on promoting an inter-party debate on WMD issues. In order to link MPs with the programme, other possible activities are considered, as holding fringe meetings with Labour's MPs at the next Labour Party Conference in September.

For the foreseen future other events are being organised to commemorate the 60 years from the dropping of the Hiroshima and Nagasaki bombs. The first one is the distribution of leaflet regarding the WMDAP at the Glastonbury music festival, a very-well known event in the UK. A quiz competition, with questions regarding WMD, will be included in the leaflets. The aim of this is to publicise the Come Clean website, since participation to the competition will be made possible just through it. The massive young participation to such a festival should guarantee a large diffusion of our message among young people. The second event is a visit of two historians from the United States (Professors Peter Kuznick and Mark Selden), who will discuss once more the real reasons behind the dropping of the bomb in a public meeting. The goal of this event, organised in collaboration with Greenpeace, MEDACT, the Atomic Mirror Project and Scientists for Global Responsibility, is to dismantle one of the most common thoughts behind the rationale supporting NW, essentially that the use of the bomb was necessary and unavoidable to bring World War II to a quick end. The last one of the planned events is a Peace Concert to be held in Birmingham on the Hiroshima commemoration day, the 6th of August. During the concert, media, political, religious, and art personalities will delivery their views on global security, WMD and disarmament. Once more, the focus of this event is to promote our message among young people so to encourage their interest on NW and WMD and gain future support for the programme.

Regarding fundraising, the agreed strategy is to approach founders separately for programme core costs and specific elements (events, education material, etc.). Until now, financial support has come from different founders, such as Greenpeace UK, British and International Pugwash, the Joseph Rowntree Charitable Trust (JRCT), Network for Social Change, the Institute of Law and Peace, Crysostum Fund and two generous anonymous donations. The last grant from JRCT has assured the programme financial support for the year 2005, permitting to plan the next activities/events more comfortably.

In the last part of this article the author intends to present how Student/Young Pugwash UK (SYPUK) has supported, as an organisation, the WMDAP, and also to suggest possible alternatives to support it in the future. In this context, it is important to remember that Students are a very important 'target group' for the programme, as they will be tomorrow's voters. Therefore their opinion is particularly valuable.

As Prof. Rotblat reminded us, the NW/WMD issue is historically a central topic for Pugwash [20]. In Prof. Rotblat's opinion, in this historical moment it is extremely important for Student Pugwash to get active on such an issue so to help in preventing a possible future

catastrophe involving NW or WMD. To do this, his suggestion was to return to the basis, that is, to remind the public the general principles upon which our modern society is built and to show them how NW/WMD policies violate these principles.

In respect of the Pugwash tradition to educate people, local groups are invited and encouraged to promote Awareness on WMD by seminars, lectures, open debates, movie projections, photographic exhibitions, articles on student magazines or on general press regarding WMD related issues. In this context, it is particularly significant for ourselves to get well informed on the issues so as to transmit appropriate knowledge to the public.

As a national group, Student/Young Pugwash UK (SYPUK) organises an Annual Conference for its members, also extending and welcoming the participation of members from other national groups. In the last three conferences, topics regarding WMD were debated in working groups and reports from these discussions are available on-line for public consultation [21]. They intend to provide, together with general information, the Pugwash approach to conflict and global problem resolution.

In January 2004, a study group was proposed at the 2004 National Conference at Imperial College, London. Several SYPUK members volunteered their participation and among the proposed topics it was chosen to focus on Nuclear Weapon Free Zones (NWFZ). Shortly after the Conference, the group started its research and information was shared over the web. The NWFZ topic was divided into different areas and each participant selected a particular area to analyse thoroughly. After six months the study group culminated in a workshop, held at Cambridge University in June 2004 [22]. On that occasion, the research completed by the participants was presented and debated under the supervision of an expert, Prof. Peter Nicholls, from Abolition 2000 UK [23]. Given the positive outcomes, in term of knowledge acquired and participation, similar initiatives ones are warmly encouraged, both in the UK and abroad.

In parallel, other initiatives to promote and support the programme were undertaken by the groups at Imperial College, Cambridge University and Queens & Mary University in Belfast. Lectures and debates were organised, focusing on different aspects of the WMD dangers: from the present and past threat from NW (Prof. Rotblat), to the NPT 2005 Review Conference or consequences on public health following the deployment of chemical or biological weapons [24]. Attendance at these events varied, but they all shared the same enthusiasm from the participants. In this context it appears to be valuable to have good communication among local and national groups on possible speakers as they also may become available when visiting abroad.

It is also valuable to link with other student organisations to make them aware of the WMDAP and possibly to get their support. In addition, it is this author's opinion that students' views and feedbacks about the programme are very important, as they can sparkle new energy and idea to it. The possibility to debate specific WMD related issues in research/study groups, at national or international level, seems also quite attractive and therefore it should be particularly welcomed and encouraged.

Summarising, the WMDAP, a project for promoting public awareness in the UK on the danger of present WMD policies, made great strides since it started in 2002. Developing and taking new approaches to the NW/WMD issues, it reinvigorated the concerned NGO community. Student/Young Pugwash UK, as part of this programme, has undertaken a series of initiatives, in respect of the Pugwash tradition, to support it by promoting awareness on NW/WMD issues. This is particularly valuable since students represent a very important section of the

population, therefore more initiatives are encouraged and welcomed. Since they could also be organised at national or international level, a closer collaboration between the different local and national groups would favour this possibility. In conclusion, the goods results obtained in the past three years constitute a great stimulus to continue the implementation of the WMDA programme.

Notes

1. Bulletin of the Atomic Scientist 58 (6) (2002) 103-104
2. The MORI surveys are available on-line at: http://www.mori.com.
3. John Finney, UK public Attitudes to nuclear weapons and international security, paper prepared for 53rd Pugwash Conference on Science and World Affairs, Halifax, Nova Scotia, Canada, 17-21 July 2003.
4. Public opinion on NW: http://www.abolition2000.org/resources/docs/poll_worldwide.pdf.
5. Joseph Rotblat, The Nuclear Threat is Real, Address to the 3rd World Summit of Nobel Peace Laureates, Rome, Italy, 19-20 October 2002.
6. Resources on the Nuclear posture Review are available at: http://www.wslfweb.org/nukes/npr.htm.
7. See [5].
8. Organisations participating to WMDAP are: Abolition 2000, Atomic Mirror, BASIC (British American Security Information Council), British Pugwash Group, CND (Campaign for Nuclear Disarmament),
9. Greenpeace UK, Movement for the Abolition of War, Oxford Research Group, Pax Christi, Quaker Peace, Social Witness UK, MEDACT, Student/Young Pugwash UK, VERTIC and World Court Project UK
10. FRANK: Greenpeace/nuclear weapons – General Public Research – Debrief Report, April 2003; HOST: nuclear weapons: uncovering key insights – Workshop at Greenpeace, June 2003.
11. John Finney and Robert Hinde, The UK WMD Awareness programme, a Report from the British Pugwash Group, consultable on-line at: http://www.pugwash.org/uk/projects.htm.
12. President Gorbachev's lecture is available on-line at http://www.comeclean.org.uk/articles.php?articleID=47.
13. The Come Clean website address is: http://www.comeclean.org.uk.
14. The study is available at: http://disarmament.un.org:8080/education/study.html.
15. Mayors for Peace website: http://www.pcf.city.hiroshima.jp/mayors/english/campaign/2020vision.html
16. Middle Powers Initiative: http://www.middlepowers.org/mpi/index.html.
17. Hay Festival of Literature: http://www.hayfestival.com/2005/index.html.
18. The interview released by McNamara at Hay Festival can be listened to at: http://www.hayfestival.com/2005/archive05.asp?eventid=339
19. Report of the Canberra Commission on the Abolition of nuclear weapons, National Capital Printers, Canberra, Australia (1996); available on-line at: http://www.comeclean.org.uk/articles.php?articleID=29.
20. McNamara opinion on NW is expressed in the recently published article 'Apocalypse Now' available at: http://www.truthout.org/docs_2005/050505B.shtml.
21. Joseph Rotblat, The UN after the Iraq: tasks for Student/Young Pugwash, ISYP Journal on Science and World Affairs (1) (1) (2005) 73-77. (This volume.)
22. The working group report are consultable at: http://www.student-pugwash.org/uk.

23. The NWFZ workshop report is consultable at: http://www.cam.ac.uk/societies/pugwash/enwfz.html.
24. Prof. Nicholls is Visiting Professor of Biological Sciences at the University of Essex and former President of Science for Peace and Chairman of Abolition 2000 UK.
25. For a more complete list of the lecture/debates organised by SYPUK local groups please refer to the their websites (links to University of Cambridge, Imperial College and Queen's University Student Pugwash group websites are available on the SYPUK website).