

Science Diplomacy, Epistemic Communities, and Practice in Sub-Saharan Africa

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Introduction

The present article contributes to building our understanding of science diplomacy by situating the analysis within the production and ethics pillars of the special issue and through taking a regional view. By looking to efforts to develop the capacity for scientific and technological knowledge and expertise in the area of food safety in Sub-Saharan Africa (SSA), we highlight the diverse ways in which science diplomacy practices and processes play out. We are particularly concerned with the challenges that a developing region, such as SSA, typically encounters in the pursuit and participation of science diplomacy.

To explore how SSA states engage in science diplomacy, we consider an aspect of the epistemic infrastructure that surrounds the process of international trade in food. Epistemic infrastructure refers to the flow of knowledge and the structures established to give that knowledge meaning and legitimacy (Bueger, 2015 pp5-7). Here we look to the roles that scientists play in the trade in food, particularly those embedded in international institutions tasked by the World Trade Organisation (WTO), with overseeing the setting of international standards related to food safety. In this case, science diplomacy takes on the shape of an international effort to mobilise expertise towards building scientific and technical capacity in SSA and through improving SSA state representation in international standard setting. Such efforts hold traction amongst SSA states as they are connected to improving SSA states' participation in the multilateral trading system governed by WTO as well as to advance their capacity to design regulations that safeguard human, animal, plant life and health.

Science diplomacy efforts are particularly challenging in SSA as the continent is comprised of forty-eight countries and maintains a collective population of over 800 million people. It is often regarded as being among the poorest regions in the world, maintaining significant developmental challenges. That said, SSA is improving in a number of aspects that will contribute to realising development aspirations, namely political stability, sustained economic growth and clear strategies for economic development. Central to the economic development strategies of many SSA states is to engage in multilateral trade, particularly of agricultural products and food. Currently, SSA accounts for just under 2% of all global exports (WTO, 2016). A lack of infrastructure, technology, and capacity to meet science-based standards and regulations that seek to protect human, animal, plant life and health contributes to this low level of participation (Desta and Hirsch, 2012, p129). Food safety and environmental regulations adopted outside of the region act as an impediment for SSA states seeking to export their agricultural products and foodstuffs (Winickoff and Bushey 2010, p364). In effect, SSA states economic development can be constrained by a lack of harmony between international or regional standards adopted.

Such a context confronting SSA states implies that science diplomacy in SSA is mobilising knowledge and expertise to foster participation in a western country dominated liberal international order, contribute to economic development and foster the production of knowledge and expertise in the region. While science diplomacy is not traditionally understood to be about enhancing trade capacity or economic development, the structure of the trade in food makes it possible to see the link;

suggesting that science diplomacy can be multifaceted and impact international affairs in different ways. As such, the article proceeds by first presenting the conceptual foundation for science diplomacy employed here, it then makes clear the link between science diplomacy and trade, and moves into exploring science diplomacy in practice in SSA by looking to capacity building efforts and initiatives to improve SSA state representation in international decision-making.

Science Diplomacy and Epistemic Communities

Science diplomacy as a concept for analysis and practice inherently requires that focus be given to the place of knowledge and expertise in state interactions. Both knowledge and expertise are important concepts in International Relations scholarship. Strange (2015, p33) notes that “knowledge is power and whoever is able to develop or acquire and to deny the access of others to a kind of knowledge respected and sought by others; and whoever can control the channels by which it is communicated to those given access to it, will exercise a very special kind of structural power.” Knowledge is traditionally mediated and developed through experts. In International Relations scholarship, the role of expertise can be understood in three different ways: 1) looking to the role of experts as actors with a causal influence in global affairs (Haas, 1992); 2); how discourses of expertise play a constitutional role in defining the international space (Bueger, 2014, pp45-48); and 3) the practices of expertise and how epistemic arrangements form international action (Bueger 2014, pp48-50). Expertise in International Relations can be located in many places including state structures like regulatory agencies or can be found in political arrangements like international organisations, non-governmental organisations, or in private entities. All of these sites for expertise can help in characterising science diplomacy in terms of where, how, why, and when it takes place.

However, in considering science diplomacy in SSA, it should be acknowledged that for many African states the capacity to contribute to knowledge creation and provide expertise through the traditional scientific and technological generation processes, in many areas, is considered weak or underdeveloped (Makindu et al., 2015). This leads to the assumption that many African states engage with science and by extension science diplomacy activities as “consumers” rather than “producers” of knowledge and expertise (Masters, 2016). But such a point should not be overstated, especially when one considers scientific and technological advancements that originated on the African continent such as early forms of arithmetic (Darling, 2004), architecture (Clark and Engelbach, 1930), and metallurgy (Miller and Van Der Merwe, 1994). Further, a recent report by The African Capacity Building Foundation (2017) argues that Africa states have seen a marked improvement in investment in science and technology activities and 91% of African states view this area as important. But for complex reasons related to the distributed effects of conflict, colonialism, and structurally induced and maintained poverty states in SSA continue to lag behind other regions in terms of developing a contemporary scientific and technological capacity particularly in the area of food science and safety. Indeed, according to the World Health Organisation (WHO), African states contribute to one-third of all global food borne diseases (WHO, 2015, pp76-77).

International institutions comprised of scientists that maintain expertise in particular issue areas, like food safety, can also be understood as ‘epistemic communities.’ Epistemic communities are defined as a “network of knowledge based experts with

recognised expertise and competence in a particular domain or issue area” (Haas 1992, p3). Within the International Relations literature epistemic communities can have influence on state behaviour through mobilising expert knowledge towards solving policy problems by creating “shared interpretations”, promoting “values and practices”, and even influencing the “setting of standards and regulations” (Alder and Hass, 1992, pp371-372, 378).

More recent work on the role of experts as actors in International Relations has suggested that epistemic communities can also effect learning amongst policy-makers where gaps in understanding may exist (Dunlop, 2012). In this instance, given the challenge for many SSA states in adopting food safety regulatory systems, epistemic communities assist SSA state policy-makers by mobilising knowledge and expertise to develop necessary regulatory frameworks and scientific know-how. In effect, epistemic communities engage in science diplomacy by fostering learning amongst policy-makers on how to improve domestic regulatory systems and compliance with international standards. In scientific and technical areas, the power to effect learning by epistemic communities can be a mechanism through which science diplomacy is manifested and actually takes place.

Why Science Diplomacy for Trade?

Under the WTO, namely through the Sanitary and Phytosanitary (SPS) Agreement, the space for science diplomacy to improve international trade becomes apparent. Article 2 of the SPS Agreement notes that ‘science’ and the provision of ‘sufficient scientific evidence’ is the threshold for adopting a trade restricting regulation. As such, science becomes crucial in advancing the activities of the multilateral trading system and a determiner of trade flows.

Science in support of trade comes from a host of different sources like expertise existing within state structures, private interest, individual scientists or through international organisations designed to bring together scientists and state actors to address particular issues and develop common standards in the areas of food (Codex Alimentarius, *Codex*), animal health (World Animal Health Organisation, *OIE*), or plant diseases (International Plant Protection Convention, *IPPC*). These three institutions, normally referred to as the ‘Three Sisters’ are of particular importance as each maintains authority under the SPS Agreement to set international standards that facilitate trade in agricultural and food goods. Articles 5.1, 5.8 and Annex A of the SPS Agreement give authority to the Three Sisters to assess the scientific risk and set international standards for food safety and animal and plant health. This means that, in trade terms, the international standard will be considered a representation of scientific consensus unless compelling contrary evidence is submitted and verified by scientific experts. Indeed, SPS Article 3.5 encourages the coordination of efforts between the SPS Committee and the Three Sisters; Article 12.4 requires that the SPS Committee monitor the use of international standards by member states; and Article 12.6 encourages the SPS Committee to invite the Three Sisters to examine the scientific basis of standards, guidelines, or recommendations if these are a source of trade conflict raised in the committee setting.

At a cursory glance, science plays a central role in international trade through a epistemic infrastructure that gives a set of international organisations, rooted and

engaged in science, a privileged space in setting and deciphering the purpose of regulations designed to safeguard human, animal, plant life or health.

Science Diplomacy in Practice in SSA

Under the umbrella of the SPS Agreement, the Three Sisters represent a clear epistemic infrastructure through which science diplomacy for food safety is mediated. They maintain functional niches in terms of issue areas they engage in and offer a structure through which knowledge is given meaning and legitimacy. But what happens when states, like many of those in SSA, struggle to participate or contribute to decision making around international standards due to scientific, technical, or financial capacity constraints? To address this issue, the WTO in conjunction with the Three Sisters and the World Health Organisation (WHO) maintain technical assistance funds. Further, they established the Standards in Trade Development Facility (STDF) in 2001.

The STDF acts as an interlocutor or channel between the Three Sisters, WTO, and developing countries in need of technical assistance. Its main focus lies with developing technical food safety systems through providing training; improving capacities amongst developing countries, so as to “increase the effectiveness of high quality SPS-related technical cooperation” and, in doing so, contributing towards improving standards of food safety, animal and plant health as well as economic growth amongst developing countries (STDF, 2011, p1).

Thus, the STDF also acts as a channel for expertise to assist SSA states develop the necessary scientific and technical capacity to partake in the trade in agricultural products and foodstuffs. The question remains, what actually takes place in practice that could be characterized as science diplomacy? Two areas are explored in more detail: 1) capacity building through training and workshops – that is efforts to assist in the development of knowledge and expertise; and 2) increasing SSA state representation at international standard setting negotiations so that African perspectives can be included and reflect regional considerations.

Capacity Building, Training, and Workshops

Capacity building, training and workshops offer a tangible example of science diplomacy in action. In Royal Society (2010) terms, such efforts represent diplomacy for science as effort and resources are placed into activities focused around building knowledge and expertise. Within the capacity building and training sphere, the STDF has played a pivotal role in bringing together expertise to assist SSA countries to grow their participation within the multilateral food safety arena. The STDF conducts its work through receiving project applications from developing country members and puts together training that will facilitate the establishment of food safety systems in support of conducting trade. Since its inception, two-thirds of all STDF activities have been focused on SSA states (STDF, 2015). Table 1 offers examples of projects the STDF has undertaken.

Table 1: Examples of STDF Funded Projects in SSA

Project	2014	Project	2015
Pest Control Methods for Cabbage Sector	Senegal	SPS Strategy Development	Togo

Sanitary and Export Capacity in Livestock Products	Ethiopia	Cost-Benefit Analysis for Foot and Mouth Disease	Tanzania
Horticulture Phytosanitary monitoring and evaluation	Zambia, Malawi	Developing a Food Safety Authority	Gambia
ISPM-15 training for woodpackaging materials	Botswana, Cameroon, Kenya, and Mozambique	EU Market Access – Flowers	Uganda
Artisanal Fishery Products SPS Training	West African States	Transboundary Disease Control	Cameroon

Source: (STDF, 2014), (STDF 2015)

The *Codex* has also been active in providing technical and capacity development workshops amongst SSA states. In 2013/2014, the *Codex* along with the Food and Agriculture Organisation and WHO was involved in 33 projects in SSA alone. These ranged from a project that sought to collect data on mycotoxin contamination of sorghum in Burkina Faso, Ethiopia, Mali, and Sudan, to strengthening controls of food safety, plant and animal pests and diseases for agricultural productivity and trade in Southern Africa. The extent and range of capacity building that *Codex* is involved with is enormous, and mainly focused on aspects that will advance opportunities for trade. This speaks to the degree of need that exists in SSA in terms of developing the appropriate scientific and technical knowledge and expertise, but it also speaks to how food safety and food science are complex, diverse and evolving areas.

Through establishing the Coordinating Committee for Africa (CCAFRICA) in 1974, the *Codex* has a clear mechanism in place to organise and focus its efforts to enhance scientific and technical capacity on the continent. Meeting every two years, CCAFRICA acts as a focal point to come together and work directly with SSA states to identify issues, develop regional standards and improve coordination and harmonisation. At the most recent CCAFRICA in Nairobi, Kenya, it was agreed that on going issues relating to SSA states capacity to address food safety are: 1) weak national food control systems; 2) consumer awareness and education of food safety; 3) climate change; and 4) antimicrobial resistance. *Codex* officials will now design scientific and technical assistance programs that work within these themes.

By focusing on capacity development, these institutions engage in science diplomacy through mobilising scientific expertise in support of SSA states. By improving capacity to engage in scientific and technical activities, SSA states can contribute to international standard setting by improving their ability to be producers of knowledge and participate in negotiations. This enables SSA states to develop and engage in research and development systems integral to innovation in the food sector, for example - biotechnology. But even under conditions where African scientists maintain the scientific and technical capacity to meet international standards, the ability to be present and represent state interests in the international standard setting process can be a challenge.

Representation

A key facet of diplomacy is the participation in meetings and negotiations pertaining to an issue at hand. The Three Sister's each hold numerous meetings per year where state representatives negotiate international standards for various food products. Actually, at last count, four meetings per institution per year not including regional, sub-committee or issue-area specific meetings. Given SPS issues are often scientific and technical,

government scientists from capitals (as opposed to diplomatic missions) travel to attend meetings to represent state interests. For many SSA states this can be a real financial burden and have spillover effects for international standard setting and decision-making, especially when an issue tabled for discussion directly impacts on the interests of an absent country. For example, in a 2012 SPS Committee meeting, Cameroon missed an opportunity to contribute to discussions around the maximum limits of lead, cadmium and mercury permissible in cocoa and cocoa by-products, due to a lack of funds to send a representative (SPS Committee Secretariat 2012a, p4). Cocoa is an important export commodity for Cameroon and the absence of Cameroonian officials resulted in their interests not being represented. In this case trade tensions with the EU, whom proposed the new measures, were exacerbated. Had scientists from Cameroon been present they could have raised concerns and entered into talks with the EU at the fringes of the Committee meeting, potentially finding a quick solution.

What the Coca example highlights is how SSA states often struggle to attend meetings due to financial costs. Thus a key facet of science diplomacy in SSA focuses on the role of representation. The WTO and *Codex* for example both had established funds that enabled SSA state scientific representatives to attend and participate in meetings. Between 2004 and 2015 *Codex* supported 2300 state delegates to participate in meetings and trained over 1200 individuals in various food safety practices (Codex, 2016, p1). That said, at least in the context of the *Codex* the relevant fund was exhausted in 2015 although discussions are currently underway to re-establish. This has caused some uncertainty with regards to ensuring SSA states continued participation in future meetings - 2016 saw a decline in African state participation down to 42% of states from 50% in 2015 (Codex, 2016, p3).

At the most recent CCAFRICA meeting, approximately 16 nations received funding from private corporations to attend the meeting in Kenya. The incentive for private corporations to provide funding is normally connected to a vested interest in terms of standards under discussion. The role of private corporations presents a clear challenge as it opens up the food safety standard setting process to ad-hoc participation and for conflicts of interest to emerge. Further, it also shows how science can be leveraged and mobilised by private interests and civil society in negotiation moments, highlighting that science diplomacy is not just the domain of international institution and state actors. Whilst the participation of private interests is not uncommon in *Codex* contexts, the role of these actors in funding state participation is and deserves further interrogation and consideration. Clearly, the potential for conflict of interest is real, it is also not impossible to imagine the possibilities for SSA states to utilise the expertise of scientists employed by private companies, particularly multinational enterprises, for promoting societal benefits. Further work is necessary to explore how scientific cooperation between state actors and private actors can be facilitated to improve decision-making around food safety and security at all levels: local, national, and international.

The SPS Committee has also engaged in a process of encouraging SSA state participation. In 2012, the SPS Committee and the African Union (AU) were involved in facilitating co-ordination amongst private and public sectors within the SPS arena, and provided an understanding of the difficulties it faced in establishing regional committees tasked with handling SPS concerns (SPS Committee Secretariat 2012b, p16). Moreover, in November 2012, the AU together with technical assistance received from the SPS Secretariat and the Three Sisters, conducted a workshop for the effectiveness and participation of African countries in the activities of standard-setting

organisations, and also conducted a workshop in Kenya in December 2014 (SPS Committee 2014b, pp17-18). Similarly, the AU has hosted workshops amongst African food safety specialists and *Codex* contact points with the objective of implementing procedures ensuring the safety and quality of food traded on the African continent (SPS Committee Secretariat 2014, p24).

Clearly the issue of representation still poses a significant challenge in science diplomacy efforts in SSA around food safety. The sheer number of meetings that takes place across the international organisations involved, the real cost, and the extent of the need within SSA means that ensuring participation is a challenge. Ensuring representation of SSA states at international and regional meetings is important as the development of international and regional standards directly impacts ability to trade in agricultural products and foodstuffs and thereby SSA states interests. Improving participation is important so as not to reinforce SSA states as consumers of scientific information produced elsewhere but as producers/contributors, as well. There are signs that this is changing insofar that the percentage of GDP allocation provided for science and technology across the continent is increasing. Whilst there is no one figure or focus to science and technology funding amongst SSA states, the African Capacity Building Foundation (2017, pp24-25) highlights that most regions on the continent have seen increases in spending in this area. That said, most SSA states maintain science spending below 1% of GDP.

By working towards improving scientific capacity and representation amongst SSA states in international food standard setting processes and negotiations, science diplomacy implicitly supports the broader notion that expanding a state's scientific capabilities helps them develop and participate in a liberal international order. More specifically, given how the multilateral trading system requires scientific and technical expertise to underpin the trade in food, the support offered by scientists in these international institutions demonstrates how science diplomacy and economic development intersect. Science diplomacy is a mechanism to improve economic development in SSA states through building capacity to meet international standards and thereby trade in food products.

What this intersection between science diplomacy and economic development in SSA also highlights is the different roles that scientists can play beyond that of expert or generator of knowledge in science diplomacy contexts. For example, in discussing how SSA states are included in international standard setting, it is possible to see from the above how scientists act as representatives of international institutions playing a capacity development role and seeking to advance the liberal international order of interdependence through economic development. Whereas other scientists act as state representatives, advancing an interest-based position in negotiations around scientifically based international standards. This seems to conflate the roles of expert, knowledge generator and negotiator into one role. Scientists are also present in international standard setting as representatives of private enterprise which maintain an interest-based position that can influence collective decision-making amongst states. This is particularly possible when scientific expertise from private enterprise is present, funding, or even acting in place of state representatives. These different roles evident deserve further exploration as they may help characterise the epistemic infrastructure of science diplomacy more comprehensively.

Conclusion

The present article describes how science diplomacy occurs via an epistemic infrastructure that includes international institutions with a particular expertise on food safety and related issues. These institutions act as epistemic communities where diplomacy for science is utilised to build capacity to generate knowledge and promote the participation of SSA states in international standard setting and thereby trade. In this sense, this case highlights how science diplomacy can be mobilised for economic development in international affairs.

In moving research into science diplomacy and SSA forward a continued focus on epistemic infrastructure can offer additional understandings. Bueger (2014, pp45-50) suggests that also exploring how discourses of expertise play a constitutional role in defining the international space and the practices of expertise and how epistemic arrangements form international action can be helpful to understanding international relations. For example, how is locally generated knowledge from SSA states influencing international organisations, standards and decisions taken? How are African scientists treated and how is African generated knowledge and expertise considered in international standard setting? What role do African scientists play in international negotiations of standards? Indeed, the issue area of food safety and the region of SSA can continue to provide a theoretically and empirically rich account of science diplomacy, moving forward.

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