The Great Green Forest is here and expanding all on its own: A call for action

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Abstract

Prosopis juliflora is recognized as one of the most invasive tree species worldwide. Following widespread introductions throughout arid and semi-arid regions of Africa and throughout the world, it has spread rapidly, threatening natural ecosystems and livelihoods. Control through utilization as a resource is now accepted as the way forward in developing countries, but efforts have so far been uncoordinated, with only isolated impacts. This paper reports on the global state of knowledge and recent advances, but focuses on prosopis-related research and innovations from IGAD member countries; the successes, failures, challenges and opportunities. It underlines the need to build and apply scientific knowledge to scale up new, resilient, drought-proof livelihood options in the Greater Horn of Africa and elsewhere where introduced, from value-added prosopis wood and non wood products. The authors estimate that there are at least five million hectares of prosopis forest across the region of the perhaps ten million throughout Africa, and growing significantly in extent every year. Experiences from the native range such as in Peru are well documented, where community associations sustainably manage and make a living from fuel, fodder, food, honey and timber from their prosopis forests. Efforts in Ethiopia, Djibouti and Kenya have had mixed results, but milling the sweet protein-rich pods into animal feed is becoming increasingly popular with the introduction of appropriate small scale technologies. Its use as a human food ingredient has also been promoted, though with little uptake, but there is sharp rise in the use of prosopis charcoal in the region, and the possibility of electricity generation using wood chips (bio-energy), with the transfer of experiences from India where there are at least 15 power stations fueled entirely by prosopis. But much more can be done by applying scientific knowledge and innovation to enhance the role of prosopis in improving food security, climate change mitigation and adaptation, and building resilience for millions of the poorest rural and urban people in the Greater Horn of Africa, with great potential for exchange and scaling up in other arid areas in Africa, Asia and the Americas. This paper is a call to the African Union, national governments, IGAD, IFAD, FAO, the Arab League and other international, regional and bilateral donors, to come together and support a regional research and development programme to push the frontiers on prosopis management and utilization and develop a transnational strategy, as the impacts are potentially enormous and immediate. The initial objectives are to take stock of existing knowledge and practices, assess prosopis forest areas throughout the region, estimate wood and pod volumes and production rates, document prosopis management and utilization experiences, enhance South-South knowledge sharing, and rapidly and effectively scale up the successes.

Keywords: Prosopis, underutilized crops, invasive species, food security, resilience

Introduction

What would you say if you were told that a million tonnes of wheat is produced every year in the Greater Horn of Africa, but is left to rot on the ground? And it is produced without any need for ploughing or sowing, no irrigation, no pesticides, and produces in drought years as well. Well, you would say “stop dreaming”. However, it is becoming increasingly clear that even the most conservative estimates for the production of ‘wild’ prosopis pods in the region, and that yield a flour that is nutritionally equivalent to wheat or maize flour, are least in this order of magnitude. We are searching for solutions to problems of food insecurity, fodder shortages and unemployment, and answers to problems of climate change adaptation and mitigation. Yet, a large part of the answer is already here, in the ‘great green forest’ of prosopis that is spreading across the Horn and beyond, also producing at least ten million tonnes of biomass each year.

This paper is the latest call for national, regional and international organizations, governments, civil society and NGOs concerned with research, development and humanitarian aid, to take up the challenge, and to help transform this resource into the food and feed that people and their livestock so desperately need. In doing so, this will also alleviate issues related to environmental problems and loss of native biodiversity caused by the unfettered spread of invasive prosopis. And it will create untold opportunities for the rural poor as well as a multitude of enterprises in urban areas that can add value to the wide range of diverse products from this truly multi-purpose and drought-resistant tree. This paper explores prosopis uses and misuses, and some successes and failures of recent efforts to make advances, and highlights how research, development and policy can play complementary roles in turning this perceived ‘devil tree’ into ‘desert gold’.

Prosopis – traditional uses and its economic value

Prosopis is a genus of legume trees and shrubs, comprising 44 species according to the last complete taxonomical monograph, 40 native to the Americas, with four quite different species native to Asia and Africa. American species were noted by European colonists for their production of fuel wood and nutritious pods (beans), shade, and their ability to survive and thrive even in the most arid and inhospitable environments. As such, they, along with myriad other tree species were widely introduced around the world during past centuries. American prosopis species were first introduced to Africa around 1822 (to present day Senegal), to Asia (India) in 1877 (Pasiecznik et al., 2001), and many other introductions followed. However, it was the widespread introduction and planting of *P. juliflora* in fuel wood plantations into the Horn of Africa in the 1980s and 1990s that were the source of the pervasive invasions seen today. In tropical and sub-tropical drylands, prosopis are classified in the ‘Top 100’ worst invasive species due to their negative impacts – yet they also hold huge potential as a source of food, feed, fuel and other products, if only these could be realized.

The many uses and the high quality products in the native range are well known, and covered in detail in Pasiecznik et al. (2001). The wood has a very high calorific value, burns hot with little smoke and produces excellent charcoal. Larger logs also yield a hard and high value timber used in its native range for furniture and flooring, that is stable, resistant to impact and decay, with a beautiful reddish colour and that has been compared to tropical rosewoods. Prosopis timber is big business in South America, and vast areas of native prosopis forests have been cleared for timber and fuel over the past century, to the point that remnant 'algarrobales' are now being protected in some countries. The small and often crooked logs common in Africa are said to be a constraint to timber production, but appropriate technologies have been tried and tested (Pasiecznik 2006, Pasiecznik et al., 2006) and have proven to be economical (Samuels et al. 2007).

The exudate gum is similar to commercial gum Arabic, the honey fetches a high price, seed gum is similar to guar or carob gum used in the food industry, and leaves and other extracts have a multitude of uses. But it is the pods or beans that perhaps offer the greatest potential regarding potential solutions to food and fodder insecurity in the world's drylands.

Prosopis beans are made up of hard seeds enclosed in a fibrous 'endocarp', surrounded by a sweet fleshy 'mesocarp', commonly 15 cm long but up to 30 cm in some species. Nutritional values vary, sometimes due to the different methods of analysis used, or whether only the mesocarp has been analysed or the whole pod flour including seeds. However, there is also significant variation between species and even between trees of the same species. Nonetheless, the beans generally contain 10-20% crude protein, 30-60% carbohydrate including up to 40% sugar in selected varieties, acceptable amounts of minerals and a balanced amino acid profile making it comparable or superior to most cereals, with no anti-nutritional factors detected (Pasiecznik et al., 2001, 2012; Felker et al., 2012).

In the native 'home' of prosopis, in Argentina, Chile, Peru, Mexico and the south western USA, beans were an important staple food in the past (D'Antoni and Solbrig, 1977; Felger, 1977; Beresford-Jones et al., 2009). Especially during the dry season, they were traditionally ground into flour using simple stone mills with seeds either included or removed, and mixed with maize or other flour to make bread, cakes or a rich gruel, or boiled into a molasses-like syrup for sweet drinks, with home-made products still sold in local markets today (Felker, 2005; Felker et al., 2012). International trade in the flour is also rising, thanks in part to research on the nutritional content and processing methods over the last four decades (e.g. Becker and Grosjean, 1980; Meyer et al., 1986; Del Valle et al., 1989; Bravo et al., 1998; Felker et al., 2003). 'Mesquite flour' is promoted as gluten-free, high fibre supplement, with a subtle sweet, smoky and spicy flavour that includes hints of cacao, coconut, clove, burnt almond and hazelnut (Felker et al., 2012).

Where introduced in Brazil, a company has also pioneered industrial-scale processing for producing livestock rations from *P. pallida*. In 2012, the company was reported to have an annual turnover of US$6 million solely from the manufacture and sale of prosopis-based animal feeds, and had also developed equitable benefit-sharing initiatives with local NGOs and local communities involved in collecting, cleaning and delivering pods.

The beans of *P. juliflora*, the common prosopis found in the Horn of Africa, are nutritionally equivalent to wheat, more so in many respects, being sweeter, having 50% more protein, and are richer in a number of micronutrients and certain amino acids (Table 1).

Table 1. Nutritional content of whole *Prosopis juliflora* bean flour from Kenya, compared with unfortified white bread wheat flour from South Africa (from Pasiecznik et al., 2012).

	Prosopis flour	**Wheat flour**
Dry matter (%)	93.5	86.0
Energy (kJ/100 g)	1530	1473
Proximate composition (g/100 g)		
Protein	16.2	10.4
Carbohydrate	69.2	71.7
Total sugars	13.0	1.5
Fat	2.1	0.9
Ash	6.0	0.5
Minerals (mg/100 g)		
Phosphorus	218	45
Sodium	20	6
Amino acids (g/100 g)		
Alanine	0.47	0.36
Arginine	0.76	0.49
Aspartic acid	1.99	0.42
Cystine	0.07	0.28
Glutamic acid	1.43	3.60
Glycine	0.41	0.41
Histidine	0.32	0.31
Isoleucine	0.34	0.42
Leucine	0.82	0.75
Lysine	0.47	0.22
Methionine	0.08	0.15
Phenylalanine	0.38	0.54
Proline	1.22	1.37
Serine	0.62	0.58
Threonine	0.42	0.34
Tryptophan	0.00	0.12
Tyrosine	0.18	0.27
Valine	0.54	0.46

Data for prosopis beans adapted from Choge et al. (2007) and Pasiecznik et al. (2007).
Data for wheat flour from Danster et al. (2008).

Prosopis in the Greater Horn of Africa

The common invading species throughout the Greater Horn of Africa is confirmed as *P. juliflora* (Swartz) DC. There has been a long history of misidentification of tropical *Prosopis* species which was finally clarified a decade ago (Pasiecznik et al., 2004). Many early introductions in the region were labelled as *P. chilensis*, and use of this name continues, especially but not exclusively in Sudan. A series of studies assessed foliar characters and ploidy (Harris et al., 2003) and matched these to molecular data (Landeras et al., 2006) to produce a simple key (Pasiecznik et al., 2004). This also confirmed that *P. juliflora* was the only entirely tetraploid species in the genus, and as such, ploidy analysis alone can be used to identify it. A global review of ploidy (Trenchard et al., 2008) found that samples from Kenya, Ethiopia and Sudan were all *P. juliflora*, confirming early work.

Whereas *P. juliflora* is clearly the 'common' prosopis in tropical dryland Africa, taxonomical work also identified *P. pallida* is the main introduced species in Brazil, Cape Verde, present in Mauritania and Senegal, and also in Djibouti (Pasiecznik et al., 2010) and rare in Kenya. *P. pallida* is rarely considered invasive, has a more erect, tree-like form, with fewer or no thorns, and longer, sweeter pods. It is far superior to *P. juliflora* in many attributes, and if any further planting of prosopis is to be considered in tropical drylands, then *P. pallida* should be used. There are also isolated specimens of introduced *P. cineraria*, and the native *P. africana* in wetter zones, though these are very different from American prosopis. Other exotic species such as *P. chilensis* are also very occasionally present.

The scale of 'the problem'

Prosopis species have been introduced to at least 129 countries worldwide (Shakleton et al., 2014), with new areas of invasion being reported every year. Regarding the area covered in the Greater Horn of Africa, no international projects or programmes have surveyed prosopis using remote sensing or other GIS technologies. However, there have been some isolated national efforts such as in Kenya (Choge et al., 2002), Djibouti (Pasiecznik 2013), Ethiopia (Tilahun and Asfaw, 2012) and Somalia (Ng et al., 2015). The authors have also collected many additional reports, published and unpublished, and have made repeated visits to areas invaded by *P. juliflora*, discussed with local communities and others with knowledge of the extent of prosopis, and reviewed the literature. Some of the information was rather dated (e.g. in Ethiopia, Dubale, 2006, 2008; Shiferaw et al., 2004, Sertse and Pasiecznik, 2005), so estimates also include an assumption of spread. It is acknowledged that these lack the scientific rigour that would have been available from satellite imagery, aerial photography, etc. and further source material can be provided. However, it is considered that these provide a reasonable guide regarding the extent of existing invasions, as a basis to develop a programme of more detailed evaluation and analysis.

Based on the few reports available, prosopis forests and shrublands today may cover at least ten million hectares across Africa, with about five million hectares (about 50%) in the Greater Horn of Africa alone (Pasiecznik et al., 2012). As for the rate of spread in the region, estimates from Kenya suggest that areas of prosopis expand at a rate of at least 5% per year (Choge et al., 2007). A ten year study of satellite imagery in Afar, Ethiopia and mathematical modelling (Tilahun and Asfaw, 2012), found that prosopis has been spreading at a rate of more than 50,000 hectares per year in this regional state alone, giving a further indication of the scale of the spread.

It is very likely that there are at least one million hectares (ha) of *Prosopis juliflora* in Ethiopia, with 700,000 ha estimated in selected northern areas alone before 2010. More certainly, there are at least 1.2 million hectares of prosopis in Kenya (Choge et al., 2012), and it is considered that similarly large areas exist in all similarly sized countries in the Horn. It is thought that there must also be at least one million hectares in Sudan, with 600,000 ha cited in Kassala and neighbouring states (Babiker, 2006; Abdel Magid, 2007), but this is thought to be a gross underestimate, noting that prosopis is a declared national noxious week in Sudan and is known to be common on many other states. A recent survey in Djibouti using Google Earth with corresponding 'truthing' ground surveys estimated that there were 60,000 ha in this small country alone (Pasiecznik, 2013). Bokrezion (2008) reported on the spread of prosopis in Eritrea but no extent was provided, however it is expected that several hundreds of thousands of hectares are covered. Work had began in Somaliland to estimate prosopis coverage (Ng et al., 2014), but again, several hundreds of thousands of hectares are likely, with equivalent if not more in the rest of Somalia. Prosopis is reported to be present in South Sudan and Uganda but is not considered to be widespread.

Besides these huge invasions in the Greater Horn, prosopis is widespread elsewhere in Sahelian Africa, with large but unsurveyed areas in every country from Senegal to Somalia. To the west in the island Republic of Cape Verde, there was almost no remaining tree cover at independence in 1975, but the government had reforested a remarkable 15% of the national land area by 2000, mostly with prosopis, and mostly *P. pallida*. *P. pallida* is also common in Senegal especially in coastal areas, and both *P. pallida* and *P. julifliora* have also been widely planted in Mauritania for sand dune stabilization. It is known and present, but rarely reported as widespread or invasive, in the drier parts of the Gambia, Guinea-Bissau, Mali, Burkina Faso, Ghana, Benin and Nigeria. In Niger and Chad, *P. juliflora* is still being planted also as part of the Great Green Wall Initiative and cover is thought to be extensive although no estimates are available.

In southern Africa, other species of prosopis are more common but the problem is the same or worse. There are more than 2.2 million hectares of prosopis in South Africa with estimates that invasions increase in their extent by up to 14% per year (Wise et al., 2012), and known invasions in all neighbouring countries. A recent side-event at the 14th World Forestry Congress in South Africa in 2015 reported extensive invasions in Botswana and Namibia, but there are no estimates of extent from other countries in southern Africa, though it is known to be present in Mozambique and Zimbabwe, for example.

Neighbouring the Horn to the north and east, *P. juliflora* is reported to be invasive in southern Egypt, Saudi Arabia, and also Yemen (Al-Shurai and Labrada, 2006), and is also naturalized in the UAE and other Gulf countries. A recent unpublished report has also reached the lead author from Iran, of 160,000 ha of government-planted *P. juliflora* plantations and 50,000 ha of natural regeneration throughout the eight southern provinces. It is also widespread and noted as invasive in Pakistan, and in India there are least five million hectares reported, but much more may be likely. It is invading and spreading quickly in Sri Lanka, and a new report of prosopis invasion is reported from northern Myanmar in 2015. It is thus likely that there are at least 10 million hectares of prosopis in Asia, equivalent to the 10 million hectares estimated for Africa.

P. juliflora is also considered the most common and widespread tree in many other countries outside of Africa and Asia. Prosopis species have been introduced and have become the most common trees in the north east of Brazil, and also in Australia, where more than one million hectares is recorded. Within the native range, prosopis species are also widely reported as invasive, especially *P. glandulosa* and *P. velutina* in south western states of the USA and Mexico, *P. juliflora* in the Caribbean and northern South America, and *P. ruscifolia* and others in Argentina and Paraguay. This list is not exhaustive, however, and is intended as providing here only an indication of the global spread and extent of prosopis, and therefore, also as to the size of the problem and the potential.

The potential – and what are the 'missing links'?

Prosopis have now become amongst the most common trees in dry areas of Africa and Asia since they were introduced from the Americas for their fast growth, drought resistance and valuable products. But although prosopis trees were successfully introduced, the indigenous knowledge regarding their use and management was not. So they remain underutilized, while they have the proven potential to provide enormous quantities of 'free' resources and new livelihood options, improve food security, and buffer against the risks of ever-increasing droughts (Fre and Pasiecznik, 2014). Lack of suitable knowledge is a key constraint to improving the management and use of prosopis tree products, along with a lack of (or no) investment (at all) in the research and development of appropriate technologies for harvesting and processing. Furthermore, as governments and the wider international community are not acknowledging the scale of the problem and the potential, prosopis does not form part of any policies that could assist in achieving the Sustainable Development Goals, where it could play a significant role.

Efforts have been made in the Greater Horn of Africa, however, though these have tended to be isolated and country-specific at best. Of special note is continuing progress in Kenya (e.g. Choge et al., 2002, 2006, 2007, 2012), with great advances made with a combination of project activities (e.g. Pasiecznik et al., 2006). There have also been great efforts made by FARM Africa in Ethiopia (e.g. Dubale, 2006, 2008), and by the government supported by UNDP and FAO in Djibouti (e.g. Choge and Pasiecznik, 2014). In Sudan, Ethiopia, Eritrea and most recently in Somalia, PENHA has been undertaking numerous initiatives promoting prosopis utilization (e.g. Tsegay et al., 2014), supported by IFAD and others. FAO has also assisted with several prosopis-focused Technical Cooperation Programmes and support for workshops and other activities in Kenya, Ethiopia and Djibouti (e.g. Kilawe et al., 2015, also as Kilawe and Habirama, 2015).

However, to date, no one organization has shown, or taken, a leading or coordinating role in the region. However, there is now a new initiative to gather a coalition proposed by PENHA after their Silver Anniversary conference in London on 2 October 2015. Together, the authors of this paper, acknowledging the essential contribution of numerous colleagues, propose below a number of areas where immediate progress could be made, and that are considered as ones that give the best opportunities for rapid and low-cost advances in community and environmental benefits which in turn can contribute towards poverty reduction and sustainable development programmes.

South-South knowledge exchange

Several workshops in the region have allowed the exchange of information between countries in the Greater Horn, such as those reported in Tsegay et al. (2014), but much more is needed. These have also allowed the introduction of information from countries where prosopis is native, and such experiences, notably from Peru (e.g. Parra et al., 2015), will be key to improving prosopis management and utilization. A DFID-funded initiative in India saw experts from Argentina, Mexico and Peru directly transfer knowledge in 1999, and that also led to the production of a training manual (Tewari et al., 2000) and the definitive monograph on *P. juliflora* and *P. pallida* (Pasiecznik et al., 2001). This experience was adapted and transferred to Kenya, beginning in 2006, and later to Djibouti from 2008, with the development of improved training and demonstration activities, learning from previous experiences. The authors feel strongly that a concerted effort should be made to expand the

exchange of knowledge, and which could have the following components, each of which could be taken up by a different donor, national or international.
(1) An all-Africa prosopis conference, or an Africa-Arabian or Africa-Asia conference; to consolidate experience where prosopis is introduced.
(2) An exchange programme between Latin American native range countries and selected countries where prosopis is introduced and invasive. Links for such work exist between Peru and countries in the Horn, and this paper is a part of this developing partnership.
(3) Establishment of a prosopis network, and dedicated website and staff time to coordinate activities and identify and put online new research and developments.
(4) Production and dissemination of associated training materials, including a much-needed training manual on the management and utilization of prosopis, and a new 'state of knowledge' monograph as the previous is out of print and out of date.

Mapping

As highlighted in this paper, information regarding the true extent and rates of spread of prosopis in the Horn is fragmentary at best, and a coordinated programme is urgently needed. There is a gap in understanding the dynamics of its expansion. Indeed, it is clear, however, that areas are huge and the potential production of various products are massive. But as a foundation for strategies and plans – and crucially, to attract the much needed investment – concrete figures are needed on the areas and yields. There is wealth of existing knowledge on the methodologies that have proved successful for surveying prosopis, especially from Australia, South Africa, UAE, India, with different approaches also used in Djibouti, Kenya and Somalia. A preliminary review of literature has been prepared (Pasiecznik, 2013), but now, a region-wide programme must decide on which methods to use and how to apply these methodically throughout the Horn.

The role of research and development

Links must be made with existing and emerging academic and research institutions and centres in the region, to identify available skills and priorities for action. One area already highlighted is the need for appropriate prosopis pod milling technology, using participatory development and testing with the direct involvement of the communities concerned. The following provides a few examples of what has already been tried in the region, to show where we are, but that few may be aware of due to the lack of knowledge sharing as highlighted about.

The Riocon company in Brazil has two industrial-scale factories producing prosopis pod flour animal feeds. Two experts from Riocon came to Djibouti and priced up a new installation that would produce five tonnes of prosopis pod flour per hour. The total cost of the proposed plant was approaching a million US$, and the government rightly wavered, unsure that they could guarantee the supply of pods needed. As part of the FAO-TCP project that followed, a village-level approach was tried, installing 'posho' mills used in Kenyan villages for milling maize, diesel-powered and costing around $4000, and that milled a tonne of pods in a 10-hour day. During 2013, one agricultural cooperative sold 100 (25 kg) sacks to livestock producers for a total of FD150,000 (US$830) and limited milling also began at the other three sites, but no community maintained a management structure and market and none remain operational today. Tractor PTO-powered hammer mills are also cheap and effective, but yet to be widely used. Dry pods can also be ground at home with a pestle and mortar or meat grinder. However, no one-size-fits-all solution has been found, and further work is required.

Appropriate timber processing technologies for the small and often crooked logs from prosopis have already been tried and tested in Kenya and Djibouti, and could be scaled out. Many other areas for research and development exist and would likely emerge, such as with the production and use of exudates gums, and industrial uses of various other tree products.

The role of policy

National governments need to acknowledge the scale of the problem, and the potential. Knowledge exchange, mapping, research and development would all help, by providing hard data and evidence to support efforts to convince government ministers to take the necessary steps. Once awareness was raised in nation government, the next step would be the adoption of national and regional prosopis management strategies and plans. To date, Australia is the only country to have one, though drafts have been prepared for Kenya, Ethiopia and Djibouti, and one is under preparation in South Africa. This would be greatly assisted by further knowledge-sharing such as the proposed all-Africa conference, with much-needed building of political momentum through targeted invitations, briefs and reporting.

Scaling up and out – conclusions

The Greater Horn of Africa offers great opportunities, but many challenges also, and prosopis is a good example of both. Climate change and economic shocks caused by globalization are affecting food security across the region, and elsewhere in the world’s drylands. With challenges only expected to worsen in the future, peasant farmers, pastoralists and policy makers alike need as many options as possible available to them. This paper introduces one – in the shape of the long golden fruit of the much-maligned prosopis tree. Why is there malnutrition where people are surrounded by an abundant ‘free’ food from wild prosopis beans? Rich in protein, carbohydrates and essential amino acids, they were for centuries a staple food for indigenous peoples in their native Americas. But where introduced they are not being eaten. The millions of tonnes produced each year are at best browsed by livestock, at worst left to rot (Pasiecznik et al., 2012). What is needed is simply a new way of thinking, turning a previously perceived problem into a resilient resource for the future.

Milled prosopis pod flour is the nutritional equivalent of white wheat flour, sweeter, and with a better amino acid profile that maize. In the Horn, pastoralists only see their animals browsing fallen pods, and complain that they get sick. But there is a missing piece of information, the 'secret' from its native Americas. You must grind the pods. The protein is in the seeds, and if consumed whole, the seeds pass through undigested, and is ready to germinate. One tonne of *P. juliflora* pods contains about two million seeds – and so two million potential future weeds are also destroyed by milling (Pasiecznik et al., 2006). A tonne, or 40 (25 kg) sacks can be collected by a family in a good week. A tonne of wheat flour for week's work seems too good to be true. And today, it is of course, but it need not be in the future, if we can develop and introduce appropriate mills to turn the pods into flour.

Between us, we have the experience, the skills, and the connections, to forge ahead and make all of this a reality. There many determined and dedicated individuals, but there are also those who use scarce national and international public funds unwisely. As a colleague said in the recent 14th World Forestry Congress in South Africa in September 2015, “what we need is public service, not self service”.

The Great Green Wall for the Sahara and the Sahel Initiative (GGWSSI), launched in 2005, is a wonderful concept and has made a great beginning, with emerging interest in linking the development of prosopis as a new resource into this work. And we implore the African Union to support this, especially within the scope of the new round of EU-ACP programme funding. IGAD has a mandate that includes mapping, and their expertise and support could surely assist at least in this regard. FAO has a long history of working with prosopis, and it is hoped that they will continue to build on this experience and use their regional and global scope to give this issue the added attention it deserves. IFAD have supported a number of important activities and could also help greatly in the future. UNEP and UNDP have been supporting many activities in the native range areas of prosopis and where introduced, and would be well placed to forge links and provide much-needed support. Many European country development assistance programmes have funded prosopis-related projects in the past and could offer support in managing invasive prosopis into the future, and the UNCCD and CGIAR centres may also be able to provide complementary support in areas of research and policy.

Of course NGOs and CSOs will continue to provide small project funds, but we hope that we can get out of the cycle of isolated and small-scale work that has characterized prosopis research and development to date, and that we can move forward with longer term, larger scale, and more integrated approaches to address the prosopis problem and realize the huge potential.

We want a great green wall across the Sahara from Dakar to Djibouti. And now there are plans for one from Djibouti to Durban. And why not from Djibouti to Delhi? But we have a forest already along much of the way in all three directions that has come about all on its own, and much of it prosopis, along with other ‘weedy’ trees, mixed with native species that have arisen from rootstocks cut back over many years. Together, these make up already expansive groups of trees that should now be treated as ‘new’ forests throughout dryland Africa and Asia. And by ‘joining the dots’, we can make great green walls from these without the need to plant hardly a single tree.

But we also need to join the dots between us, as individuals and organizations, to create a ‘great green wall of purpose’, with meaning, substance and commitment, to identify with local communities, appropriate drought-proof livelihood options, and scale them up and out throughout the drylands in the Greater Horn and beyond. And one of these is without any doubt, by developing value-added products from invasive prosopis trees.

As an afterthought, we ask you to remember history, and the humble potato. It is hard to imagine now, but the potato took almost a century to be widely adopted as a food plant in Europe, after first being brought from South America in the late 1500s. At first, some people ate the fruit, leaves and unripe tubers, and became sick. This led to a belief that the plant was poisonous (as with prosopis in parts of Africa today). Only later did the potato become ‘the food of the poor’ in Europe, and today, the fifth most important food crop in the world. With the application of new knowledge from its native range on how to manage and utilize it, prosopis too will surely become a source of food for people in the dry areas of Africa and Asia – the new ‘potato bean’ perhaps – and the sooner it does so, fewer will go hungry.

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