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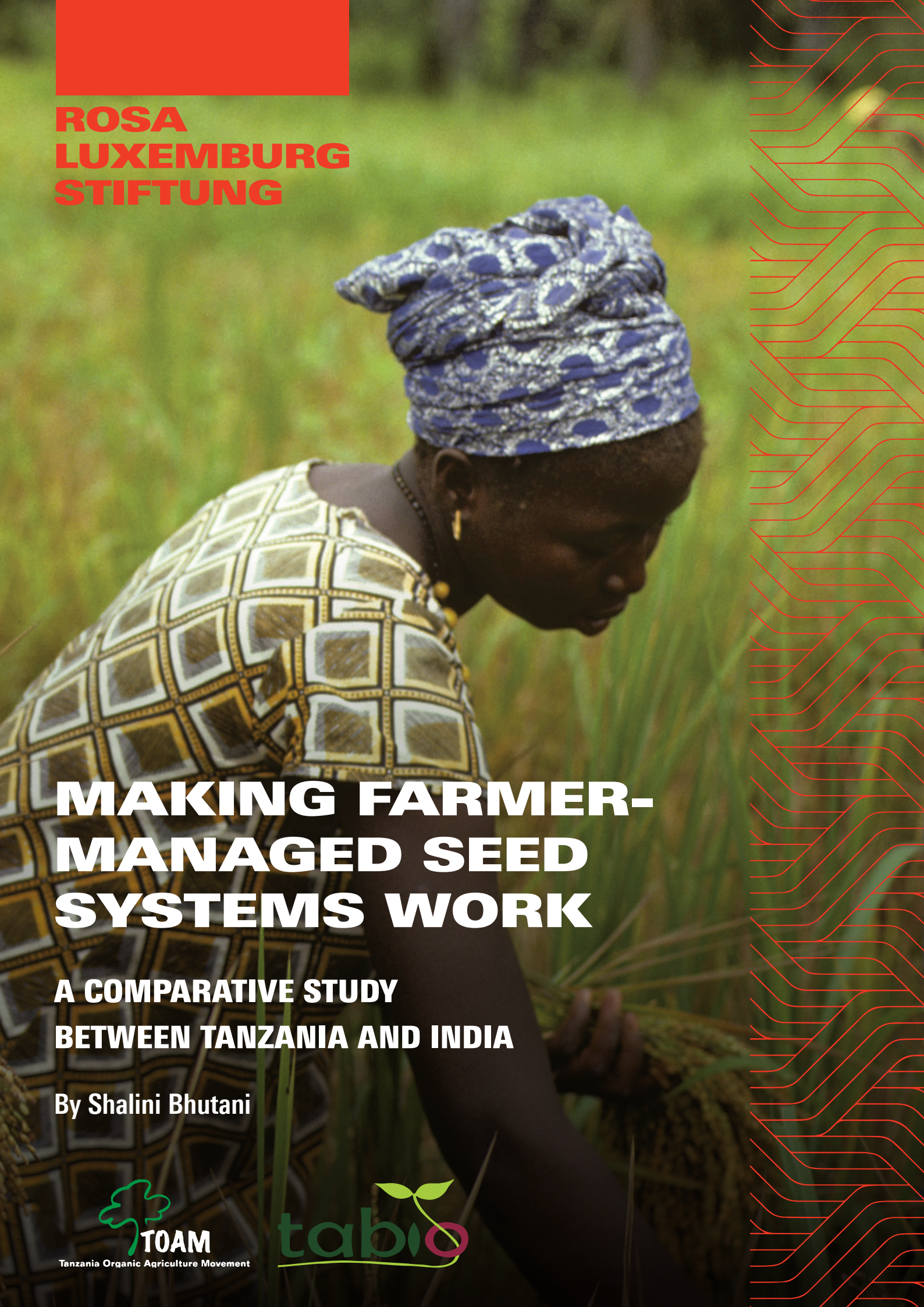

MAKING FARMER-MANAGED SEED SYSTEMS WORK

A COMPARATIVE STUDY BETWEEN TANZANIA AND INDIA

By Shalini Bhutani

TOAM
Tanzania Organic Agriculture Movement

tabio

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The kind cooperation of those in Tanzania who responded is especially appreciated; it speaks of the possibilities of South-South exchanges between India and African countries that this project intended in its process. It pays homage to the fundamental ethos of farmer seed systems – sharing and exchange.
Ahsante sana!

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EXECUTIVE SUMMARY

This is a comparative study of farmer-managed seed systems and their wider environment in two countries across two continents, India in Asia and Tanzania in Africa. The research project was undertaken in collaboration with the offices of Rosa Luxemburg Stiftung (RLS) in India, Tanzania and South Africa. The project also involved local partners Tanzania Organic Agriculture Movement (TOAM) and Tanzania Alliance for Biodiversity (TABIO) and a key researcher from India. The research was designed to take a relative look at the seed scenario in India and Tanzania from the perspective of Small Holder Farmers.

The study entailed looking at the anticipated differences, which could provide learning on both sides of the Indian Ocean. It recognizes that both countries are at very different stages of agricultural transformation. India has been through the so-called first Green Revolution (Green Revolution I) and is moving into a second one – Green Revolution II; it is also debating a 'Gene Revolution' with biotech crops. The Indian government, as a strategic partner of USA, is in fact amongst the set of actors pushing the new Green Revolution in Africa. Tanzania is at the frontline of that Green Revolution initiative currently being promoted in Africa. Yet it is recognized that there are similarities and common challenges that confront both India and Tanzania with respect to farmer-managed seed systems, which makes the case to build solidarities on the issue.

The purpose of the study is to generate a better understanding of the seed landscape in India for those working on the seed issue in Tanzania, but also in the various other African countries where a current push for a corporate seed system is taking place. It is also aimed at providing an updated picture of seed-related laws and policies with respect to farmer-managed seed systems in both countries. The key objective of the study is to give more visibility to the issue of local seeds and farmer-managed seed systems. This is not only just presented as a justice issue, but as a multidimensional one that has the potential to address social, ethical, political and ecological problems faced by farmers. The findings of this study might help farmers and their representatives in Tanzania and other African countries to confront corporate controlled seed systems and impress upon their governments to support farmer-managed seed systems.

KEY FINDINGS – PROMOTING FARMER-MANAGED SEED SYSTEMS IS THE WAY FORWARD

1. The study finds evidence of a wide variety of farmer-managed seed systems in both India and Tanzania. When referring to themselves and their seed systems, most Small Holder Farmers simply call it apna beej/yetu mbegu (our seed) or desi beej/jadi mbegu (traditional seed). No matter what form and shape farmer-managed seed systems take, farmers' seed freedoms are essential for their continuance. The diversity of farmer-managed seed systems is their strength, which also makes them relevant to their local contexts with the potential to address local problems, though there may not be one opinion amongst Small Holder Farmers regarding whose seeds ought to be used.

2. The prevalence of farmer-managed seed systems implies that farmers' knowledge on seeds have stood the test of time. This warrants giving visibility to the knowledge and the knowledge-holders as well. The invisibility implies that there is also generally a lack of attention to gender dimensions; the women and seed connection are very much a reality in both India and Tanzania. There are also other marginalized groups in both countries, which embody unique seed and food know-how.

3. Respect and recognition of farmer-managed seed systems by the state do not come automatically. While the legal and policy support for farmer-managed seed systems in both countries are inadequate, there is no law in either Tanzania or India that stops farmers from saving, sharing and exchanging their own farm-saved seed. However, the terrain for seed sales by Small Holder Farmers is slowly becoming uncertain.

4. The growing corporate power in agriculture in general and in the seed sector in particular is a challenge in both countries. As the seed industry expands, and seeks new frontiers, it will seek to restrict farmers' sales. The industry has a focus on regional capitals and global markets. Governments are largely pro-industry and popular pressure is crucial to make it pro-Small Holder Farmers instead. Seed multinational corporations (MNCs) in general have been able to establish themselves in both countries. Their corporate practices in India, particularly with respect to genetically modified (GM) seeds and intellectual property can provide valuable learnings for Tanzania and other African countries as well.

5. Seed quality is often used as a justification for governments wanting to regulate farmer-managed seed systems. Fake seeds in circulation are a real and urgent problem in both countries. This study argues that farmer-managed seed systems need to be regulated through different policies, respecting the seed sovereignty of Small Holder Farmers, rather than extending on them the same parameters applied to industrial seed. There are a number of popular initiatives such as the Participatory Guarantee Scheme to ensure quality control in seed produced by Small Holder Farmers, through more decentralized, community-based certification.

6. Farmer-managed seed systems cannot run on their own without a strong public sector supporting them. The research priorities of the public sector are generally not supportive of farmer-managed seed systems. The study makes a call for collaborative research between the farmers and the scientists. The seed MNCs will not have any research and development (R&D) focus on orphan or neglected crops and that is where the public sector has an important role to play. Likewise, with regard to *ex situ* conservation (conservation and maintenance of samples of living organisms outside their natural habitat), Small Holder Farmers cannot physically store all potentially useful germplasm. The role of the public sector in safekeeping of seed and planting material is critical. Currently, *ex situ* conservation of plant genetic resources is neither adequate nor appropriate. Moreover, legal issues of access from such national collections are yet to be sorted out.

7. In India, a biodiversity framework opens up policy space for farmer-managed seed systems. Such space is currently missing in Tanzania. Under the Biological Diversity (BD) Act in India, local-level conservation work is undertaken. There is also a framework for benefit sharing in India. While the situation has to be further fine-tuned in India to harness meaningful benefits for Small Holder Farmers, a framework for access and benefit sharing (ABS)[1] is completely absent in Tanzania.

8. Both countries have some form of seed production by farmers that is supported by the state. The quality declared seed (QDS)[2] model is a good entry point in Tanzania, while organic farming policies in India, both versions, popular and official, have opened up doors for farmer-managed seed systems.

9. New seed technologies such as modern biotechnology and nanotechnology pose a challenge to sustainable seed systems in both countries. This is particularly so in the absence of appropriate biosafety regimes. GM seeds can put at risk both farmer-managed seed systems and the organic supply chain. India's experience with one GM crop – Bt cottonseed from 2002-2018, provides valuable insights to governments and Small Holder Farmers alike on a

whole lot of challenges modern biotechnology can pose to farmer-managed seed systems. The fact that India has kept GM food crops on hold should be a reason to reconsider them in Tanzania and East Africa as well.

10. Generally with laws related to seed, there is either a lack of awareness or legal illiteracy that poses a challenge for the Small Holder Farmers to effectively engage in the deliberations. A role of NGOs/CSOs in accessing drafts of laws and translating them into an accessible language for farmers, is critical. While there is a lack of legal awareness, the general perception amongst farmers is that they will not get much from the legislature. However, the legal landscape on seeds continues to change. Another issue is that laws other than those directly related to seeds also need to be understood and strengthened in support of farmer-managed seed systems.

11. The tendency to centralize laws and policy-making has to be recognized. These are spurred by the international treaties and regional agreements that both countries are part of. Farmer-managed seed systems also continue to be marginalized in dominant top-down development strategies by both countries' governments. As a counter response to these, civil society in India has helped to organise farmers' juries and rural assemblies. They could serve as role models in many parts of the world. Where people's initiatives have worked they have been supported by local and district-level administration.

12. A specific area of law and policy relevant to farmer-managed seed systems' in both India and Tanzania is that of intellectual property (IP). Both countries have specific IP legislation on plants and plant variety protection laws in place, though they are differently oriented to Small Holder Farmers. On either side of the Indian Ocean, the results of having a plant breeder rights system are yet to be seen. Plant variety protection laws do not really support farmers' innovation. There is no evidence of farmers' varieties (FVs) being introduced into the official seed supply system in a plant variety protection regime.

A concrete lesson from India is the positions that it has taken at many international fora. It has firmly stood its ground against any restrictive intellectual property regime for plants and seeds. It has also stayed out of the International Union for the Protection of New Varieties of Plants (UPOV) despite pressures from developed countries and the seed MNCs to become a member. This has given its domestic policy space to farmers' seed freedoms. India also subscribes to the Convention on Biological Diversity (CBD) of the UN and the International Seed Treaty (official term: International Treaty on Plant Genetic Resources for Food and Agriculture, ITPGRFA), which is not the case with Tanzania.

Based on these findings, this comparative seed study between farmer-managed seed systems in India and Tanzania makes recommendations in five broad areas:

1) CONCEPTUAL CLARITY

The study suggests that the principles on which farmer-managed seed systems are based must be clearly articulated. Farming communities must be facilitated to cull these out through state-supported processes. The seed stakeholder forum (SSF)[3] process in Tanzania could be an avenue to develop a seed policy for farmer-managed seed systems along with Small Holder Farmers. What Small Holder Farmers stand for and what goes against farmer-managed seed systems must be clearly stated. Collectively clarifying key concepts, such as farmers' rights and seed sover-eignty would help keep the focus and build a common understanding.

2) LOCAL ACTION

The ground level work on seeds is very important. No amount of advocacy work will suffice if there are no living instances of farmer-managed seed systems. There are several working examples of farmers' seed banks and seed fairs/festivals/exhibitions, etc. organised in India. Farmers' exchanges between India and Tanzania could be coordinated. This could start with a process to document existing local seeds and bio-cultural practices. Organisations like TOAM can play a key role in this process. They can also help build the rural-urban linkages.

3) PUBLIC REBUILDING

The public sector has the responsibility to hold seeds in public trust and regulate the access of public collections to ensure benefits to Small Holder Farmers, who are the very source of the materials. Only a strong public sector can be an effective countervailing force to powerful seed multinational companies. However, R&D budgets, public resources, agenda-setting and monitoring have to be made open to Small Holder Farmers and their organisations. Issues that can be researched from the viewpoint of Small Holder Farmers need to be identified and taken forward. The role of public sector researchers, scientists and extension workers has to be orientated to the needs of farmer-managed seed systems. This could be realized through participatory research approaches.

4) NATIONAL ADVOCACY

The spaces in existing laws must be used to push for farmer-managed seed systems. The Tanzanian Seed Stakeholder Forum is already asking for an inclusive process in the future amendments of the seed laws. The comparative analysis of plant variety protection laws must be used to develop an intellectual property rights policy that recognizes the rights of farmers. There must be an institutional architecture in the state to reign in intellectual property abuses in the seed sector. Apart from specific seed legislation attention has to be given to other laws. In Tanzania there is a need for a biodiversity law. Laws in both countries must address the gaps in accountability of seed companies. It is recommended that there must be policies to organise and incentivise Small Holder Farmers for sustainable seed production. Fair Competition Commission in Tanzania and Competition Commission of India could be encouraged to share experiences on not only the mega mergers of global agribusinesses, but also the cases of abuse of dominant positions in the market by seed corporations.

5) INTERNATIONAL SOLIDARITY

There are some common threats to farmer-managed seed systems from international law and global players. South-South solidarities in the interest of Small Holder Farmers need to be forged at international level. This is particularly true in the area of global trade rules like the WTO and its TRIPS Agreement (Trade-Related Aspects of Intellectual Property Right Agreement) and UPOV Convention. Urgent work is needed to confront intellectual property rights in the seed sector. There has to be two-way learning on the impacts of UPOV-styled plant variety protection between the two countries. The global open source seed movement is something to plug into as well. Collaborative work at the UN, ranging from the FAO's Seed Treaty, the Committee on World Food Security (CFS) to the new UN Peasant Declaration must be undertaken.

1. ABS refers to the way in which genetic resources may be accessed, and how the benefits that result from their use are shared between the people or countries using the resources and the people or countries that provide them. https://www.cbd.int/abs/infokit/brochure-en.pdf
2. The FAO has introduced the quality declared seed system which makes use of resources already avaiable in seed production organizations. The system is designed to provide quality control during seed production which is less demand-ing on government resources than seed certification but is adequate to provide good quality seed both within countries and in international trade. http://www.fao.org/3/a0503e/a0503e00.htm
3. In 2016, a multi-stakeholder platform called the Seed Stake-holder Forum (SSF) has emerged in Tanzania. It has brought together different interested parties to discuss on the issues around seeds.

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Interactions with smallholder farmers are vital to understand farmer-managed seed systems Source: Shalini Bhutani

1: BACKGROUND

There are two dominant narratives about India's agriculture widely known in Africa; firstly, that of the so-called Green Revolution. Various actors from the private sector, media and governments are extending the idea of such a revolution to Africa (including Tanzania). One of the most important proponents of Green Revolution is the Alliance for a Green Revolution in Africa (AGRA). The Government of India (GoI) also participated in the African Green Revolution Forum 2018[4]. The said Forum, which rests on deeper public-private partnerships (PPPs), does so with the aim for development agencies and large agribusinesses to reach more African smallholder farmers (Small Holder Farmers)[5]. However, it is important to take a closer look at this much talked about revolution in India, particularly from the viewpoint of Small Holder Farmers. The development strategy of both governments with the second Green Revolution is to bring the maximum numbers of farmers into the fold of an agro-industrial and input-intensive model of food and farming.

TEXT BOX 1: Alliance for a Green Revolution in Africa (AGRA)

The Alliance for a Green Revolution in Africa (AGRA) was founded by the Bill and Melinda Gates Foundation and the Rockefeller Foundation in 2006 with the aim of supporting the transformation of African agriculture through assisting to build commercial input (especially improved seed and synthetic fertiliser) and output markets. The projects supported by AGRA in the different countries are being implemented with different partners at different levels. This is usually about bringing small-scale farmers closer to input-intensive forms of agriculture in training sessions or supplying them with hybrid seeds and synthetic fertilizers. Between 2007 and 2016, nearly 40,000 so-called agro-dealers were trained in AGRA projects, with the help of which 1.5 million tonnes of synthetic fertilizers were sold. Another important focus of AGRA is policy advice with the aim of achieving structural reforms in favor of commercial and input-intensive agriculture in the target countries[6].

Secondly, there is a strong presence of seed compnies in India. The organised seed sector, particularly seed multinational corporations (MNCs) have been able to establish themselves in the country. The general impression this gives to those particularly outside India is that the organised seed sector, which includes domestic and foreign seed companies are working well together to meet the country's seed needs. Yet the relationship is not all that smooth. The presence of the MNCs in the seed sector poses unique challenges. There is not an assured seed supply for Small Holder Farmers.

There is a third less dominant narrative, which needs to be better understood, i.e. a large majority of Small Holder Farmers still rely on farm-saved seed for their seed needs. Farmer-managed seed systems are not part of the dominant narratives, and are in fact rendered to the sidelines despite being the lived reality of many Small Holder Farmers[7]. However, in recent years, there are many people's initiatives on seed conservation and the revival of lost varieties through farmers' efforts in India. Local seed keepers have also creatively used spaces in existing laws to continue their practices. Clearly, there is a gap that they are filling. There are also some government schemes that promote traditional farming. Comparatively, India appears to provide some space for Small Holder Farmers to continue their seed practices vis-à-vis local and traditional varieties. Tanzanian groups are keen to know more of that, as there is a popular perception that the space in their country is under threat of being compromised. There are also farmers' mobilisations and popular protests on farming issues in India within which the seed issue is located.

1.1 INDIA AND TANZANIA – LINKAGES

There is increasing cooperation between several African governments and the Government of India (GoI); an India-Africa Forum Summit is held every three years since 2008. These summits prioritise agricultural cooperation[8]. The Indian industry seeks to participate in establishing a market-oriented agri-food value chain in Africa and investing in Africa's agri-input segment (FICCI 2016). Several Indian companies have carved space for themselves in African agriculture in general participating at all levels of the value chain in different commodity crops.

The linkages between India and Tanzania must also be viewed from the perspective of India being a part of BRICS[9]. As part of this grouping, India plays a major role in advancing the BRICS agenda and economic interests in Tanzania and the rest of Africa.

At a bilateral level, when the Prime Minister of India made an official visit to Tanzania in 2016, agriculture was identified as an important area for collaboration[10]. At a people's level, there is equal scope for collaboration. While farmers exchange visits and CSO/NGO events have been held in both countries, there is interest in other African countries to know more about the seed work from the perspective of Small Holder Farmers in the global South.

1.2 OBJECTIVES AND METHODOLOGY

The key objective of the study is to give more visibility to farmer-managed seed systems. Those who together conceptualised the research study did so with the belief that Small Holder Farmers are the main seed stewards and through their seed systems, seed diversity can and must be maintained. This is not only from a point of view of ensuring diversity in the farms, but also with interest to keep the different farmers and their farming practices alive. There is an expectation to learn from India on that front. The objective is to facilitate learning on both ends.

Amongst the common challenges are the mainstream approaches to agriculture in the respective countries. The key is to know and show how that does or does not accommodate peasant agriculture and farmer-managed seed systems. However, to engage in and influence the formal policy process in both countries, it is critical to build capacity and understanding on the multi-dimensionality of the seed issue.

The design of the study was developed collaboratively. This entailed discussions and e-conferences with several of the main players – TOAM, TABIO, RLS staff in Delhi, Dar es Salaam and Johannesburg. A comparison matrix was also charted out.

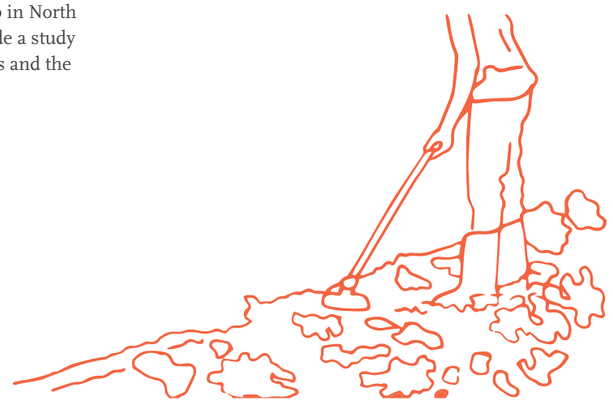
In line with that the methodology prioritised interactions with Small Holder Farmers, the author and key researcher undertook two visits to Tanzania to get firsthand exposure to the realities of the country, as well as to carry out interactions with Small Holder Farmers themselves and interview several key stakeholders. The methodology laid emphasis on participatory techniques. The researcher had the opportunity of participating in the SSF from the 2nd - 3rd November 2017 held in Dodoma, Tanzania. This fast-tracked the introduction to the diverse stakeholders. The researcher also participated in and presented some initial thoughts at the National Seed Symposium held on 16th December 2017 in Sokoine University of Agriculture (SUA) Morogoro. All these events provided an opportunity of collective inquiry in the seeds question with other participants.

In India various events also helped to hasten the necessary interactions with those active in the seed scene. The Indian government hosted the World Organic Congress through 9th -11th November 2017 in Noida at the outskirts of the capital city – New Delhi. Several seed keepers' groups from not only India, but also different countries in Africa, including Tanzania and Kenya, were in attendance. A Seeds Pre-Conference was held on 8th November 2017 at New Delhi. The event was co-organised by the International Federation of Organic Agriculture Movements (IFOAM) and the Indian Seed Sovereignty Alliance – Bharat Beej Swaraj Manch (BBSM). This was a useful venue for interaction with small-scale farmers. TOAM and TABIO along with farmers from Tanzania were also present there.

As part of the comparative seed study, the key researcher undertook field visits in India in early 2018 after the Tanzania visits. These were carried out in two key states in the country – Punjab being the birthplace of the Green Revolution in India, and Telangana, considered the hub of the seed industry in India. The locations were carefully selected for their importance in the seed issue. Both Punjab in North India and Telangana in South India provide a study in contrasts with both alternative pathways and the mainstream approaches.

The methods used included direct interviews with seed actors, CSOs/NGOs working directly with Small Holder Farmers and relevant government officials. Keeping equity considerations in mind, women farmers were also approached to capture the gender perspectives.

There were limitations in this approach – the lack of literacy in farmers in general and legal literacy in particular in both countries. MVIWATA – the National Network of Small-Scale Farmers Groups in Tanzania explains that though there might be groups in Tanzania engaging in the seed issues, like them it is not necessary that all of them are also engaged in the discussions on seed legislation. Many of the Small Holder Farmers interviewed did not know of the proposed legal changes in seed legislation or the policy-level discussions. Thus substantive discussions on contents of legal documents were not entirely possible. Many women farmers who are strong in their seed work were shy to interact.



4. http://venturesafrica.com/african-green-revolution-forum-2018/
5. https://agrf.org/innovation-partnerships-and-knowledge-for-african-farmers-meet-at-agrf-2018/
6. https://www.forumue.de/wp-content/uploads/2018/11/Hintergrundpapier_AGRA_Unheilvolle-Allianzpdf.pdf
7. The similar concept of farmers managing seed systems is known by different names in different parts of the world. In India it is usually referred to as community-managed seed system (CMSS). FMSS as a term is more popular in Tanzania and other parts of Africa.
8. https://www.mea.gov.in/in-focus-article.htm?25950/IndiaAfrica+Cooperation+in+Agricultural+Sector+for+Food+Security
9. BRICS is the acronym coined for an association of five major emerging national economies: Brazil, China, India, Russia and South Africa
10. Joint Communiqué, 10th July 2016 https://www.mea.gov.in/bilateral-docu-ments.htm?dtl/27007/joint+communique+between+india+and+tanzania+during+the+visit+of+prime+minister+to+tanzania+july+10+2016

Farmers' own varieties face many challenges today. Source: Shalini Bhutani

2. CONCEPTS AND PERCEPTIONS OF SEED IN VARIOUS CONTEXTS

2.1 SEED - WHAT IS IT ABOUT?

Amongst the most fundamental concepts that organises farmer-managed seed systems is that of seed itself. For Small Holder Farmers, seed is simply life. Farmers have not only had a direct relation with seed, and a connection with the Earth where they sow, but their seed practices also determine the social relations between farmers. Farmers' own seeds are at the centre of farmer-managed seed systems. In most of the interviews conducted amongst seed keepers and Small Holder Farmers in both countries, it was insisted upon that farmers' seeds belong to farmers.

Farmer-managed seed systems face challenges currently as farmers' seeds come under threat. Now seeds seem to belong to the companies, or at least they are asserting so over their seed products. When asked why the scenario is changing, there is an impression that government policies have allowed that to happen and business interests have taken precedence over others. Even the public sector is turning its research to be more market-responsive, rather than responding to farmers' needs. Some farmers that were interviewed in Tanzania also lamented that the situation has come to this because many farmers themselves have stopped saving seeds. They introspect how this needs to be revived.

Representatives from Participatory Ecological Land Use Management (PELUM), a network of civil society organizations working with Small Holder Farmers in East, central and Southern Africa, add that in Tanzania no one officially in the government is encouraging Small Holder Farmers to use their own seeds because they are considered inferior and as a result, the knowledge and the skills of Small Holder Farmers are also at risk of getting lost.

Most farmers spoken to in different parts of Tanzania say that seed should belong to farmers. State agencies and bodies like Tanzania Official Seeds Certification Institute (TOSCI) now are visibly more in control of seed issues. In fact, some seed inspectors (interviewed on the condition of anonymity) say that seed belong to the government. This might be right in some aspects because in Tanzania, without going through the public system, farmers' seeds cannot be recognized as seed for planting, but instead as grain and legumes. The seed is first tested and validated in the Agricutural Research Institute, and then TOSCI has to test for distinctiveness, uniformity and stability (DUS) as well as for value for cultivation and use (VCU). In parallel, in India if farmers do not come forward to claim intellectual property rights on certain existing varieties within the prescribed time for plant variety protection registration, the same are then registered in the name of the state under the category of extant varieties[11].

Text Box 2: Mbegu – Seed as defined in Tanzania's Seed Act, 2003

Seed means that part of plant which is or is intended to be used for propagation and includes any true seed, any vegetative material including seedling, corm, cutting, bulb, bulbil, layer, marcott, root, runner, scion, set, split, stem, stock, stump, sucker or tuber so used or intended to be so used.

On the other hand, in India at the many seed festivals and display exhibitions, when the same question of ownership was asked of farmers, most of them replied that seed and farmer go together. They explained that seeds cannot be owned, but are a collective heritage. There is a new realisation of the deep connection between the seed communities and the seed. It is a matter of food cultures and people's identity, rather than a need for a mere economic activity. Nevertheless, in India there is a perception at least amidst officials of the National Agricultural Research and Extension Services (NARES) officials that the public sector should hold all seeds in trust.

Text Box 3: Beej – Seed as defined in India's Seed Act, 1966

Seed means any of the following classes of seeds used for sowing or planting –

- seeds of food crops including edible oil seeds and seeds of fruits and vegetables;
- cottonseeds;
- seeds of cattle fodder;
- jute seeds, and includes seedlings, and tubers, bulbs, rhizomes, roots, cuttings, all types of grafts and other vegetatively propagated material, of food crops or cattle fodder

2.2 DIFFERENT SEED SYSTEMS

While in each country peasant populations and their socio-economic and political contexts are unique, there are some common lived experiences of peasant farming. What is common is that farmer-managed seed systems are at the centre of lives and livelihoods in both countries.

At the outset it is important to level off on what is meant by farmer-managed seed systems. It essentially implies that all the diverse historic seed practices working together and running as a complex whole, which in their structure and activities are realised by Small Holder Farmers. A farmer-managed seed system is essentially farmer-managed and localised, using local seeds. The localisation necessitates that they stay ecologically relevant. Local seeds help keep the local agro-biodiversity and having adapted to the particular ecological setting they stay climate resilient. Farmers' knowledge on seed characteristics in the context of climate-induced stress is vital to keep alive. There are already studies to show that Small Holder Farmers rely on a menu of seed sources, depending on availability and affordability. Yet the fallback option is usually farmer-managed seed systems. It operates at a small scale locally. It may neither have a formal structure, nor be designed by economic imperatives, but may be by cultures, or even both. The informality of farmer-managed seed systems does not mean that they do not have their own set of rules. For every system has a set of organising principles on which it is based; farmer-managed seed systems are premised on sharing and exchange. They privilege agro-biodiversity knowledge, farmers' innovation and bio-cultural practices around seeds. For example, the month-long mobile seed festival being held by Small Holder Farmers for nearly two decades in Medak District in Telangana promotes millets, which are the basis of Telangana's food and farm cultures of Small Holder Farmers in dry land India[12].

In the slogan of MVIWATA, the defender of the farmer is the farmer herself/himself. If one were to succinctly explain a farmer-managed seed system, it would essentially be of the farmers, by the farmers and for the farmers. In PELUM's words, "it is practically what farmers do!" And there is a wide range of practices by Small Holder Farmers, which is also evidenced in Tanzania's National Sample Census of Agriculture 2007/8 released in 2012. Farmer-managed seed systems need all kinds of support from the state. A research study by TOAM and RLS (October 2016) on farmer-managed seed systems brings light to the fact that this is the most widely used source of seed for most farmers in Tanzania[13].

FIGURE 1. THE LINEAR VIEW OF SEED SYSTEMS: STAGES AND LAWS

5. LIABILITY & REDRESS	Take responsibility for or non-performance or biosafety if farmers suffer
4. SALE	Register & sell seed to farmers
3. ORGANIC/GM	Get certification/approval from government authorities
2. INTELLECTUAL PROPERTY RIGHTS	Seek intellectual property rights on 'new' seed products; charge royalties to farmers
1. ACCESS AND BENEFIT SHARING	Access planting material from farmers

Source: Developed by the author

Governments usually see the formal seed system in a linear way as depicted in Figure 1. Such a uni-directional model, essentially extracts the raw material – seed and other planting material – from Small Holder Farmers, who are the seed keepers on the ground. This practice has been recognised as 'biopiracy', for which global rules on access and benefit sharing (ABS) have been designed[14]. If there is no provision in policy and practice at the national level to regulate the access of seed and planting materials from Small Holder Farmers, it creates a situation where the formal seed system can effectively free ride on farmers' seed knowledge and planting materials.

Farmers' varieties are the raw material for the seed industry. Once breeders in the industry – public or private – access the knowledge of farmers' seeds, it is worked upon as per the R&D priorities of the research institute/seed enterprise. The 'new' seed products developed are given intellectual property rights protection and then sold to the very farmers themselves. Intellectual property rights over plant varieties through domestic legislation give economic rights to formal plant breeders. Unless governments balance the rights of breeders and farmers, the seed freedoms of the latter can be severely restricted. The ultimate aim of the formal seed system is to keep the farmer as the end-user/consumer of seed accessed, produced and marketed by the seed industry.

Small Holder Farmers can also be put to risk by seed from external sources. That is why it is important for the state to make provision for liability and redress. There are few or no laws in either Tanzania or India to impose costs on seed companies in case of non-performance of seeds. Adequate legal and regulatory regimes are required if and when any genetic contamination of farmers' fields takes place or if in-digenous varieties are lost to GM varieties. The loss of desi (indigenous) cotton heritage in India is evidence of that point[15]. Likewise, local cotton in India getting contaminated with transgenic Bt cotton is another case in point[16]. Yet India's existing GM Rules of 1989 do not lay down how smallholder cotton growers would be compensated in such situations. This means Small Holder Farmers may not even be redressed in cases where seed systems are negatively impacted. This could become an issue in East African Community too.

The linear model underpins the dominant narrative and ideology of policy makers and the private sector

both in India and Tanzania. It is inappropriate though, as it ignores the origin of seed cultivation and the reality of the informal seed sector. A more appropriate way would be to understand the seed system as a circle, as shown in Figure 2. A farmer-managed seed system would be best depicted by a set of concentric circles, where the farmers and their seeds are at the core; with the state's public sector playing a support role and the seed and related businesses only at the periphery.

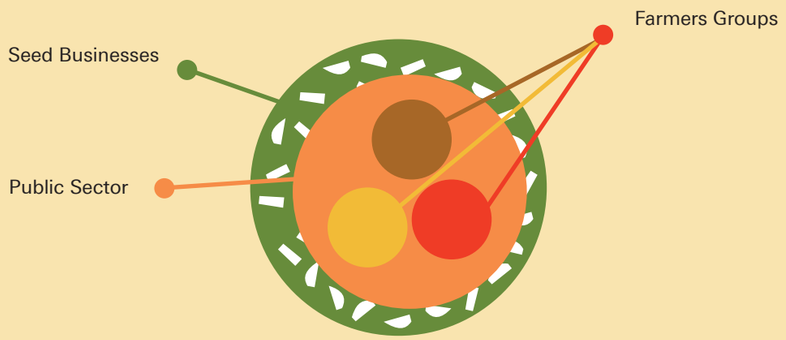
A seed system in which Small Holder Farmers do not have to always rely on external sources for their seed supply is in a better position to be seed secure. However, farmer-managed seed systems are not insular. They interact with both other informal and the formal seed systems. Farmers always seek what they consider from their contexts interesting planting materials. This could be from other farmers or the state seed corporation or buy them from seed businesses. As shown in Figure 2. the state has to play a role to ensure that these interactions do not compromise farmer-managed seed systems and their seed freedoms. Both seed and its knowledge must not flow out of the centre, outwards. Such a unidirectional flow can create dependencies of Small Holder Farmers on external supply of seed. This can relocate the control to other players.

The seed preferences of Small Holder Farmers are an indication of the crops they are interested in; open-pollinated varieties (OPVs) that do not need to be replaced every planting season as well as traditional varieties, in view of either preferred tastes or customary recipes. Several crops that have come to be categorised as 'neglected' or 'underutilised' crops have been kept alive by farmer-managed seed systems[17]. Their potential in dealing with the multiple challenges of food security, poverty alleviation, malnutrition and the climate crisis are well recognised by the Consultative Group on International Agricultural Research (CGIAR) and others (William and Haq, 2002).

PELUM Tanzania laments that there is a lack of supportive policy for farmer-managed seed systems in Tanzania and even a lack of awareness of what it is. This is a direct result of the simplistic linear understanding of the seed system pointed out above. And it is despite the reality that there are many Small Holder Farmers in Tanzania. According to FAO (2015), in Tanzania where agriculture contributes towards 28 percent of the GDP and 73 percent of the population lives in the rural areas, there are about 3.7 million smallholdings (those smaller than the middle-size farm threshold of 2.2 hectares)[18], which make up for 80 percent of total farms (Rapsomanikis 2015). The same survey states that small farmers produce 69 percent of the food in the country.

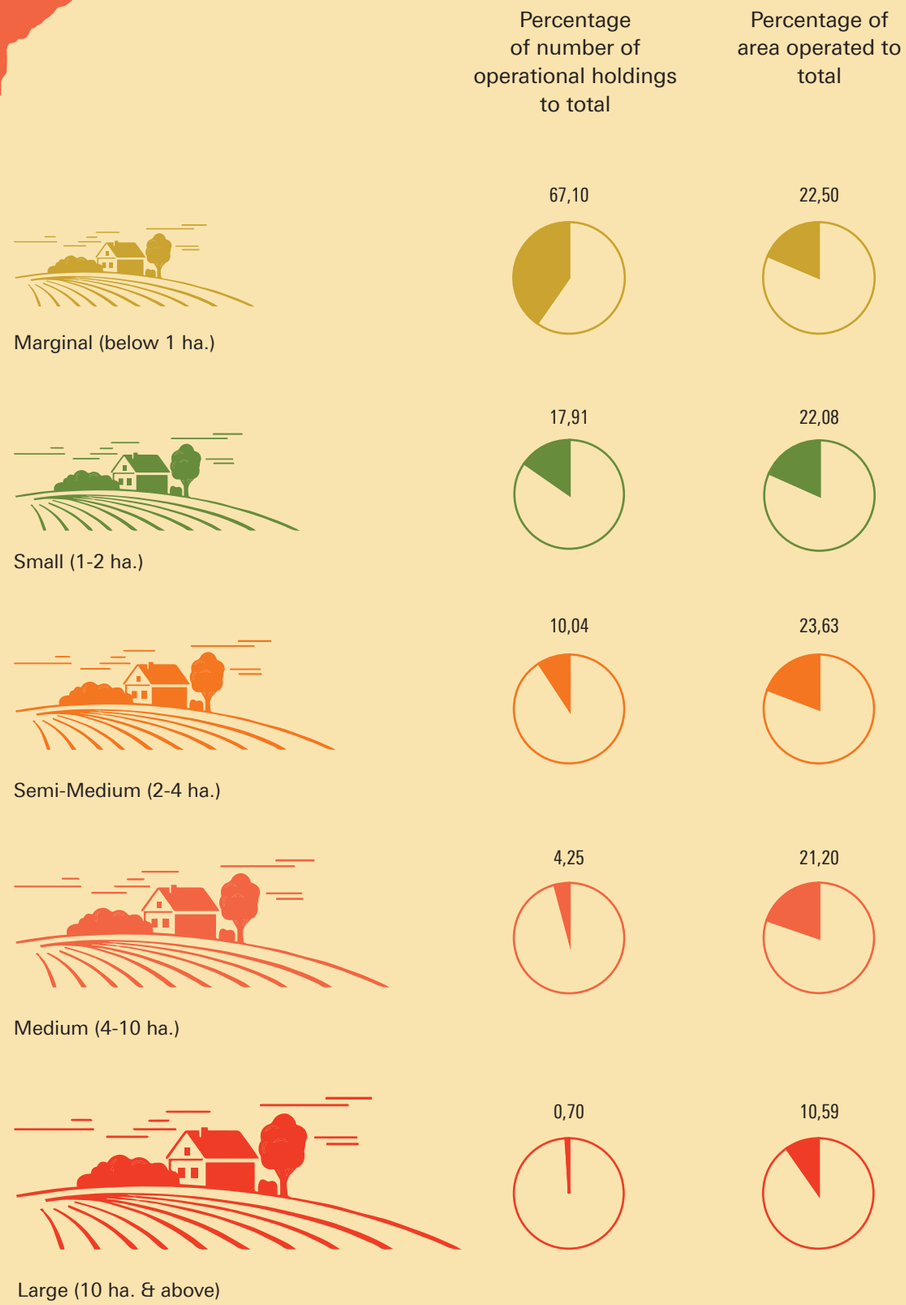
In India too smallholders are the majority of the farming population, with landholding size up to maximum of 2.5 hectares (1 hectare equals 10,000 metres). As per the Agriculture Census 2010-11 of the GoI, small and marginal farmers also constitute the major portion of operational holdings[19].

FIGURE 2. THE CIRCULAR MODEL DEPICTING FARMER-MANAGED SEED SYSTEMS



Source: Developed by the author

FIGURE 3: FARM HOLDINGS IN INDIA



It is important to note that the seed issue touches the lives of a vast majority in both countries. Most of them are economically underprivileged and politically might not have a voice. In such a situation, as PELUM states seed freedoms, particularly the saving of seed becomes all the more urgent, as among other things Small Holder Farmers have a limited capacity to buy seed. Meanwhile, having their own seeds helps Small Holder Farmers to keep local control over the resource.

That also speaks about the overarching agricultural development strategies in both countries; the state focus is on transforming smallholder agriculture. This has implications for farmer-managed seed systems, as official state policies may not expressly privilege farmers' seeds, but rely more on external inputs from the formal seed sector. Small Holder Farmers in most countries are considered part of the informal seed system and not organised as the formal seed sector. As the latter organises itself on corporate principles and capital interests, it is able to extend its claims on seeds. This is made possible through laws and policies; therefore it becomes important to put these under scrutiny to understand the conceptual foundation.

2.3 FARMERS' RIGHTS

The idea that farmers have a connection with seeds is universally recognized. This also finds expression in international law as contained in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA, in this paper referred to as Seed Treaty). The preamble of this treaty reaffirms that:

"The past, present and future contributions of farmers in all regions of the world, particularly those in centres of origin and diversity, in conserving, improving and making available these resources, is the basis of Farmers' Rights;"

In Part III of this treaty, Section 9 recognizes farmers' rights to include rights to save, use, exchange and sell farm-saved seed/propagating material. The treaty also requires national governments to protect and promote:

a) Farmers' traditional knowledge relevant to plant genetic resources for food and agriculture;

b) Farmers' right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture; and

c) Farmers' right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.

Yet it is left to individual governments to guarantee these rights in law and policy; farmers' rights are thus made subject to domestic legislation. That is why it becomes important for farmers' groups to engage with their governments domestically to ask for due protection of their rights. There is acknowledgement by the treaty's Governing Body that governments are not entirely certain how to go about implementing farmers' rights and the challenges to implement are different in every country[20]. For that reason there are ongoing treaty processes to assist governments. An Ad Hoc Technical Expert Group (AHTEG) on farmers' rights has been constituted[21]. Its task is two-fold:

1. Produce an inventory of national measures that may be adopted, best practices and lessons learned from the realisation of Farmers' Rights, as set out in Article 9 of the Seed Treaty; and
2. Based on the inventory, develop options for encouraging, guiding and promoting the realisation of Farmers' Rights as set out in Article 9 of the Seed Treaty.

India and Tanzania are both members of the Seed Treaty, since 2002 and 2004 respectively. The membership of the treaty requires governments to provide for farmers' rights as per the country's realities. As a concept, farmers' rights appear much more recognized on paper in India. GoI's submission to the AHTEG details out its specific intellectual property rights law – Protection of Plant Varieties and Farmers' Rights Act (PPV&FR Act), as an example of a possible option to implement farmers' rights in line with the Seed Treaty. This also comes through as the main difference between the Tanzanian Plant Breeder Rights Act, 2012 and India's PPV&FR Act, 2001. Due to popular pressure India has a specific chapter on 'Farmers' Rights', while there is no such concept in any current law in Tanzania. Additionally, India has a policy document for farmers[22], while Tanzania does not. But the fact is that many seed groups in India have evolved their conceptual position from the idea of rights to that of 'seed sovereignty'; the Indian Seed Sovereignty Alliance – a network of seed savers across India, is one such example.

Laws can take a limited view of farmers' rights, reducing them to either economic entitlements or making them subject to the rights of corporate breeders and seed businesses. Therefore, as many are against the idea of rights, it is much more helpful to move to ideas of responsibility and that of freedoms, when talking of farmer-managed seed systems. At a practical level having seed freedoms means being free to produce seeds and sell or exchange seeds.

In most of the debates, majority of the Small Holder Farmers are not asking for the kind of economic rights that the seed industry is asking for. As an appendage to the idea of seed rights, there are other ideas of the possible relations between farmers and seeds underlying the bio-cultural[23] practices of seeds in both countries. Not all farmers treat seed as an economic resource; instead they see seed as heritage. From this viewpoint they seek space for the continuance of custodianship over seed, as against exclusive economic rights granted by intellectual property rights law. Such ideas have yet to be articulated and internalised in the official seed-related laws, policies and programmes. For example, the idea of seed stewardship rather than ownership over seed is not reflected in official laws and policies. Many Small Holder Farmers are neither aware nor appreciate the idea of intellectual property rights over seed, which is what the new generation seed laws prescribe.

In India on the more practical aspects, there is an understanding amongst seed groups that there are different needs of the diverse categories of farmers. The categories include[24]:

1. Seed Breeder Farmers

   These are the plant breeders amongst the farmers who are interested and engaged in developing varieties.

2. Seed Conserving Farmers

   These are the farmers who are focused on conserving existing local and traditional varieties.

3. Seed Seller Farmers

   This set of Small Holder Farmers includes those who sell their seeds, either to their neighbours or in the local market.

4. Seed Consumer Farmers

   These farmers are sourcing seeds from others, whether through sale or exchange, as against producing seeds themselves.

5. Seed Producing Farmers

   This set of farmers usually cover those who are contracted to do seed multiplication work either by state seed agencies or seed companies.

2.4 QUALITY OF SEED

Good quality seed is a major concern in both countries. But the important discussion about quality should also reflect what farmers perceive is best for their lived realities, as they make the practical decisions and work with the seed. Additionally, farmers in both countries have to face the problem of fake or spurious seeds. For that reason Small Holder Farmers do want some kind of regulatory role by government. So on that issue the perceptions of farmers and the state meet. But in both countries farmers are wary of quality becoming a means by the state to control seeds in general.

Most state officials argue for strict seed quality, with their emphasis being on yield. Hence, they argue for hybrids and GM seeds, which may offer resistance to pests and diseases. This inevitably leads to a discussion of which is the best source of seed for the nation's needs. That's where the divergence of opinion between farmers and state agencies emerges; the latter believe that quality seed from so-called high-yielding varieties can only come from the commercialized corporate driven seed sector. There is an inherent bias of the state against farmers' seed with respect to quality. In cases where the state promotes seed production by farmers, the seed and the standards are pre-prescribed. For instance, in the seed village scheme in India and in Tanzania where farmers are trained to produce quality declared seed with prescribed standards.

The concept of quality is a relative one; it is usually measured against an agreed standard. The standards may vary depending on who sets them for whom and what reason. Industry standards for seed quality may not incorporate criteria that Small Holder Farmers might regard as important. Farmer-managed seed systems could include not only germination, appearance and purity, but also cultural significance, nutritional values, medicinal uses, culinary characteristics, fodder options, etc. In a farmer-managed seed system the standards would ideally be set locally and collectively amongst the farming community.

Apart from the technical requirements for quality control, the commercialized corporate driven seed sector considers seed as good simply if it yields more. But this view can ignore equally important considerations such as ecological constraints, social impacts and political ramifications of such a seed choice. Also, given the fact that there are no equal amount of resources made available to study the yield from farmers' varieties, it is not fair to disregard them on mere bias. Productivity as viewed from the lens of farmer-managed seed systems, is a more holistic idea. Even if yield were to be the only criteria, there do exist landraces and farmers' varieties than can compete with high-yielding varieties. The work of the ecologist Dr Debal Deb in Eastern India on traditional rice varieties shows how they can be both hardy and nutritious (see Text Box 4)[25]. Therefore, there have to be other criteria to gauge their productivity. The mainstream view is to look simply at grain per acre yield.

Text Box 4: The Myth of Yield

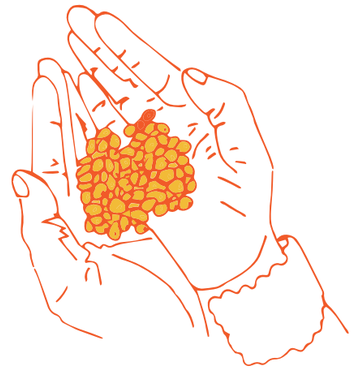
According to seed keepers in India who have witnessed equally high yields from folk varieties, the term 'high-yielding varieties' has been deliberately used to create the myth that existing farmers' varieties are low yielding. Moreover, high-yielding varieties require optimal conditions such as irrigation and inputs under which to produce high yield. As Dr Debal Deb explains, 'yield has to be seen in a context; high-yielding varieties will simply not survive in certain conditions'. There are local landraces that can flourish in challenging conditions, such as rain fed landscapes. Drought-resistant local varieties can perform even when there is less water and salt-resistant varieties can give yield even with submergence. Because traditional varieties used in farmer-managed seed systems are not labeled as 'high-yielding', the language creates a lack of confidence amongst farmers about their varieties. With on-farm demonstration in the Indian states West Bengal and Odisha, Deb has shown how some landraces of paddy, such as Bahurupi in West Bengal and Baigana Manjia in Odisha exceed the mean yield of modern high-yielding varieties grown in identical conditions. This has encouraged Small Holder Farmers in the area to turn to their own paddy varieties.

Source: Living Farms (2011)

Small Holder Farmers themselves have self-identified seed quality as a problem that needs to be addressed. The need for ensuring that any farmer seed producer must be as responsible and not pass on sub-standard seed is recognized amongst Small Holder Farmers. But whether the insistence on certain seed standards close options for Small Holder Farmers to produce 'quality' seeds has to be seen. A case can be made for a differentiated approach, with a different set of criteria for quality. There are examples of Participatory Guarantee Schemes (PGS) in India, wherein quality parameters of both seed and produce from them are co-developed by farmers and their end consumers. These are discussed in the section on organic policies.

The biggest problem with farmers' seeds, as explained by PELUM representatives is the notion that indigenous seeds do not perform (as good as industrial seeds). Small Holder Farmers are also concerned with the loss of soil fertility due to the chemical inputs linked with the use of industrial seeds. Farmer-managed seed systems are considered somewhat inferior to the formal seed supply system by governments (ACB, 2016). There is a preference for 'improved' varieties from the formal sector. PELUM's member organisation IRDO grew maize, both QDS, with agricultural inputs, and the indigenous varieties with organic manure. The latter outdid or was at least same in terms of yield.

In the words of Abdallah Mkindi of TABIO, as with different ideologies, about seeds there are beliefs on what is 'good' and what is 'bad'. Every seed actor when advocating their cause to the government goes with the idea to protect their territory. Those unable to lobby, the voiceless, are left without any territory. So the endeavor for state support for farmer-managed seed systems is not simply about the seeds, but giving voice to the many Small Holder Farmers who might not be heard in the corridors of power.



11. Section 28 (1) of India's PPV&FR Act, 2001
12. http://www.ddsindia.com/www/pdf/MBF%202018.pdf
13. http://www.kilimohai.org/fileadmin/02_documents/Policy_Files/Farmer_Managed_Seed_Systems_Policy_Brief.pdf
14. The international law – CBD & ITPGRFA, and corresponding national laws are discussed in the sec-tion 3.0 on policies and legal framworks.
15. https://india.mongabay.com/2018/09/17/a-lost-desi-cotton-heritage/
16. http://indiagminfo.org/wp-content/uploads/2011/11/cot-ton-contaminated.pdf
17. Promoting neglected and underutilised crop species. FAO, Rome 28 August 2017 News Article http://www.fao.org/news/story/en/item/1032516/icode/
18. Tanzania's National Sample Census of Agriculture 2007/08 uses the FAO methodology to classify a 'smallholder' as one who operates at least 25 square metres of arable land; own or keep at least one head of cattle or 5 heads of goats/sheep/pigs or 50 chicken/ducks/turkeys during the agricultural year 2007/08.
19. http://pib.nic.in/newsite/PrintRelease.aspx?relid=132799
20. Resolution 2/2007 http://wwsw.fao.org/3/a-be008e.pdf
21. http://www.fao.org/plant-treaty/areas-of-work/farmers-rights/expert-group/en/
22. National Policy for Farmers, 2007
23. Biocultural means that diversity in nature (biodiversity) and diversity in culture (cultural and linguistic diversity) are inter-connected andinterdependent facets of the diversity of life. https://terralingua.org/wp-content/uploads/2018/09/Biocultur-al-Diversity-Toolkit_vol-5.pd
24. See discussion in Workshop Report of Seed & Laws, organ-ised by the author in Bengaluru, India 14-15 November 2015
25. Debal Deb: 'We have more hardy, nutritious grains than GM can offer'. https://www.ecologise.in/2017/04/26/debal-deb-hardy-nutritious-grains-gm-can-offer/

Maize laid out on the ground. Source: Benjamin Luig

3: POLICIES & LEGAL FRAMEWORKS

Policies in general are the set of principles of action adopted by governments, which declare the objectives of the state. These can take the form of laws, programmes or budget allocations. This section discusses the wide range of international conventions and regional agreements that India and Tanzania are part of. It then goes into the national laws that are of direct relevance to the discussion on farmers' seed. It then lays out the intra-country landscapes on seed production, organic agriculture, farmers' marketing and seed technologies.

3.1 GLOBAL RULES

There are several international treaties and conventions, membership of which influences the kind of seed systems governments support domestically. The most important ones are listed in the table below.

TABLE 1. INTERNATIONAL TREATIES, ORGANISATIONS AND CONVENTIONS INFLUENCING SEED SYSTEMS

	TANZANIA	INDIA
World Trade Organisation (WTO)	Joined 1 January 1995	Joined 1 January 1995
International Union for the Protection of New Varieties of Plants (UPOV)	Joined 22 Nov 2015	Not a member
International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA, Seed Treaty)	Acceded 30 April 2004	Ratified 10 June 2002
Convention on Biological Diversity (CBD)	Party since 6 June 1996	Party since 19 May 1994
Cartagena Protocol on Biosafety (CPB)	Acceded 11 September 2003	Ratified 11 September 2003

Source: Compiled by author

Both Tanzania and India participate in the processes of international rule making. However, executive policy based on geo-strategic and political considerations has made their governments take different approaches. The negotiating positions that national governments take at international fora reflect how protective they are about their farmers, seed systems, and domestic seed industry.

The most important example, relevant to the context, is the position with respect to intellectual property rights on seed in compliance with WTO and its intellectual property rights prescriptions contained in the TRIPS Agreement. The said agreement requires all WTO members to provide for patents on life forms; its Article 27 makes all products including plants and seeds patentable subject matter. This in effect privatises planting material and makes it globally tradable, very different from how Small Holder Farmers in both India and Tanzania deal with seeds locally. In fact, many peasant movements, including La Via Campesina, question the very legitimacy of WTO as a multilateral trade agreement, to make rules on agriculture[26]. The WTO functions through an intergovernmental process amongst its 164 member countries that make rules for international trade. India and Tanzania are both founder members of the WTO.

India has taken a more guarded approach to implement WTO prescriptions, to balance farmers' seed rights with those of formal plant breeders. While it is a member of WTO, India does not subscribe to patents on plants and instead has chosen the *sui generis* option available in the TRIPS Agreement to design its own plant breeder's rights law. India has incorporated a farmers' rights chapter in its plant breeder rights law – Protection of Plant Varieties and Farmers' Rights Act, 2001. Internationally, the European International Union for the Protection of New Varieties of Plants (UPOV) is held as the gold standard for plant breeder rights. The Indian government chooses to stay away from UPOV membership that is offered to developing countries as a shortcut for WTO compliance. Many officials in Tanzania argue that Tanzanian government too opted for the *sui generis* route; on a closer look at Tanzania's Plant Breeder Rights Act, 2012 it is based on UPOV Act of 1991. (This is further discussed in the section on laws).

Tanzania is one of the few countries in Africa that is a member of UPOV to date[27]. As other African countries might follow Tanzania and consider to become UPOV members, the impacts in Tanzania are of key relevance for civil society outside the country as well. The Tanzanian government's decision in 2010 to accede to the international convention on plant breeder rights, UPOV, can prove to be a significant challenge to farmer-managed seed systems if and when seed freedoms over intellectual property rights -protected varieties are curtailed. It has the potential to limit farmers' seed freedoms, in terms of what and how much they can save seed, if and when they use intellectual property rights-protected varieties. And if farmer-managed seed systems are not continued, farmers will have no alternative but to use the seeds of intellectual property rights-protected varieties.

Accession to UPOV required changes in Tanzania's Plant Breeder Rights Act, 2002 to become UPOV-compliant. Since 2007 the UPOV Council was providing comments to Tanzania on the proposed amendments[28]. The changes for all of Tanzania were done in two stages; in the first instance, the Draft Law for Mainland Tanzania was submitted for examination by the Council and, at a later stage, the Draft Law or adopted Law for Zanzibar. The Plant Breeder Rights Act, 2012 applies to all genera and species with effect from these time lines in the Tanzanian mainland from 1st June 2013 and in Zanzibar from 2nd January 2015[29]. Since then, Tanzania has become a member of UPOV. And as Haugen (2015) shows it is a matter of concern that the domestic plant variety protection law now goes well beyond the UPOV 1991 version; its provisions make the breeder rights extendable beyond 15 and 18 years, and it provides civil and criminal remedies to the breeder that UPOV does not make mention of (see table below). ACB explains the pulls and pushes and how this was part of seed industry's drive for regional harmonization. The key drivers are the large seed companies, which are further discussed in the section on actors and strategies[30].

In terms of other seed-specific international rules, both the countries are part of the International Seed Testing Association (ISTA) and the Organisation for Economic Cooperation and Development (OECD)[31] seed schemes. ISTA focuses on the quality of industrially produced seeds and their trade across countries. During the course of the research study, TOSCI and its facilities in Tanzania were undergoing an evaluation for ISTA membership. The main purpose of ISTA is to standardise seed testing to facilitate the trading of seeds across borders. Therefore, it is centered on uniformity. Both these ideas are distant from what farmer-managed seed systems are organised on, i.e. localised exchange and diversity. While it is important that governments focus on their seed testing infrastructure to ensure good quality seed is circulated in the country, the criteria of quality of farmers' seeds and their capacity to do seed testing as per those criteria also warrants state support.

Though India and Tanzania are not members of OECD per se, they both have subscribed to be members of the OECD Seed Schemes. In each country, an official national list of varieties is accepted into the scheme after tests. The Ministry of Agriculture and Famers' Welfare (MoA&FW) in India, and TOSCI in Tanzania are the national designated authorities responsible for the implementation of these schemes. This entails compliance with the *OECD Schemes for Varietal Certification or the Control of Seed Moving in International Trade*[32]. These are designed to promote the use of certified agricultural seeds of high quality as per their criteria. Membership to the set of schemes means a harmonised procedure across the 61 countries that follow them; it is focused on seed trade.

What is of significance, is to balance farmers' rights and seed conservation on one hand and economic interests and seed trade on the other. And this balance has to be struck in the domestic space when implementing CBD and Seed Treaty, while being compliant with global trade rules and their intellectual property rights and other prescriptions on standards, etc. Tanzania to date has not implemented either of these two conventions. This is unfortunate, as these two conventions provide arguments for taking further the national level work needed in support of farmer-managed seed systems. Nonetheless, civil society has had to be active in the CBD processes to skirt the industry's attempts, among other things, to dilute the *de facto* ban on the use of terminator technology in seed, which makes the next generation of seed sterile. Likewise, industry has been attempting to dilute the Cartagena Protocol on Biosafety[33], a sub-treaty under the CBD.

The CBD has three objectives, each of which is of significance to farmer-managed seed systems; these are:

1. conservation of biological diversity;
2. sustainable use of its components;
3. fair and equitable sharing of benefits arising out of the utilization of genetic resources (such as seed).

India was amongst the first countries to develop a full-fledged legislation, i.e. Biological Diversity (BD) Act, 2002, to implement the CBD objectives. However, Tanzania has not made progress to finalise its draft plant genetic resources law to domesticate the CBD. For farmer-managed seed systems in Tanzania this means they are not yet able to get the kind of support a CBD-compliant domestic regime can offer. The Indian government has consistently held that the TRIPS Agreement must be amended as in its current form it goes counter to the CBD objectives[34].

A notable development at the United Nations (UN) has come after a 17-year struggle by the international peasant movements. On 17th December 2018, the

Seed quality needs to be assured as per farmers' criteria. Source: Shalini Bhutani

UN General Assembly adopted the *United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas*[35]. The Declaration includes a specific Article 19 on peasants' right to seed (Annex 2). The said article reiterates peasants' right to save, use, exchange and sell their farm-saved seed or propagating material. Among other things, it also makes it the duty of member states to:

- recognise the rights of peasants to rely either on their own seeds or on other locally available seeds of their choice, and to decide on the crops and species that they wish to grow;
- take appropriate measures to support peasant seed systems, and promote the use of peasant seeds and agro-biodiversity; and
- ensure that seed policies, plant variety protection and other intellectual property laws, certification schemes and seed marketing laws respect and take into account the rights, needs and realities of peasants and other people working in rural areas.

India and Tanzania both voted in favor of the declaration[36].

3.2 REGIONAL PLANS

There are clear trends of regional harmonization both in Asia and Africa. This is particularly true in the context of agricultural trade and in laws on seed and related intellectual property rights.

3.2.1 India's Regional Agreements

India is a member of the eight-country South Asian Association for Regional Cooperation (SAARC) South Asia. SAARC governments recognise that community-level seed banks exist in their respective countries for decades, but there is no specific effort to link them in any way. Farmers are not allowed to exchange seeds across borders. At a SAARC Summit in 2010, the member governments agreed to establish a SAARC seed bank for regional cooperation. India joined this initiative in 2011[37]. After all the SAARC member governments ratified the agreement, it came into force in 2016[38]. But the bank is yet to be fully functional. A board is to facilitate harmonization of legislative measures like acts, rules/regulations, orders and procedures concerning the seed system(s) (Article XIII). Member states are to develop a common minimum seed quality standard (CMQS) (Article V).

The institutional setup of the seed bank does not encourage participation of Small Holder Farmers. Though the board has a farmer representative, it does not focus on farmers' seeds. The agreement establishing the bank expressly states that member states will recognize the need to preserve the local/indigenous varieties, as may be appropriate (Article IV). The priority focus is on establishing a regional seed reserve, with each member apportioning 1% of its total seed stock from the formal seed sector. The seeds have to be those on an agreed list of common varieties, initially rice, wheat and oil seeds. Similarly, a list of farmers' varieties, particularly those shared across similar agro-ecological zones could also be developed. Thus farmers' seed knowledge can be acknowledged and strengthened.

Outside SAARC, India is negotiating several free trade agreements (FTAs), including a mega regional FTA called the Regional Comprehensive Economic Partnership (RCEP)[39]. This requires all 16 RCEP member countries to bring their intellectual property rights standards in line with UPOV 1991. This would be a direct attack on the seed freedoms provided for in India's PPV&FR Act. Also, a more liberalised trade regime would mean imports of cheaper subsidised agricultural products. This in turn eats into the domestic market share of small local producers. Small Holder Farmers in India are protesting against this mega regional FTA[40]. By and large India's RTAs do not help the cause of farmer-managed seed systems.

3.2.2 Tanzania's Regional Agreements

Tanzania is also a member of several regional agreements at an inter-governmental level. It has been part of three out of the eight regional economic communities (RECs) in Africa: Southern African Development Community (SADC), Common Market for Eastern and Southern Africa (COMESA) and East Africa Community (EAC) (see Table below). [Tanzania officially withdrew from COMESA in 1999, while it became a founder member of EAC in 2000[41].]

TABLE 2. REGIONAL AGREEMENTS WITH AN IMPLICATION ON TANZANIA'S SEED SECTOR

REGIONAL AGREEMENT	YEAR OF FOUNDING	MEMBER COUNTRIES	TANZANIA
South African Development Community (SADC)	1992	16	Yes
Common Market for Eastern and Southern Africa (COMESA)	1994	21	Former member
East Africa Community (EAC)	2000	6	Yes
COMESA-EAC-SADC Tripartite Free Trade Area (TFTA)	2015	26 signed, 14 ratifications needed for entry into force	Yes
African Continental Free Trade Area (AfCFTA)	2018	49 AU member states signed; 22 ratifications needed for entry into force	Only signed yet

Source: Compiled by author

Tanzania is a founder member of SADC. SADC has a harmonized seed regulatory system, the technical agreements for which came in to force in 2013[42]. Under the SADC rules a variety released and registered in two states becomes a regional variety. If it is so, the testing requirement of three planting seasons is done away with in Tanzania. The government of Tanzania is also trying to shorten the time for release of varieties from other countries in the region.

Tanzania is deeply embedded in the EAC. The EAC is a regional grouping of six African governments in the Great Lakes Region, including Tanzania[43]. It strives to have a customs union, single currency, a common market and eventually a political federation[44]. Trade liberalisation is seen as an essential part of that. Agriculture is an important sector for all EAC countries. The EAC as an intergovernmental body has several technical committees, including one on seed laws. Tanzania has been hosting the meetings of the EAC seed regulatory experts. A process of harmonization of seed standards in EAC is underway with the support of the World Bank Group. This is being done under a project to deal with inconsistent seed standards and testing methods across countries, so that the differences do not work as non-tariff barriers to more open seed trade in the region[45]. Standardising seed import-export documents amongst the EAC is also underway. This is with the aim of pushing seed trade within the region. Seed companies in the region, such as Kenya Seed Company, lobby EAC for seed policy development that is favorable for cross-border trade[46]. The government of Tanzania has been making the law and policy changes to be able to sell its commercial seeds in the region[47]. Seeking ISTA accreditation for its seed-testing facilities at TOSCI is part of that plan, which is pushed by Tanzania Seed Trade Association (TASTA)[48]. Seed companies with aspirations to export seed to Europe and other countries in East Africa, such as Kenya, can only do so with ISTA certificates. There have been some farmer exchanges organised, but not with the intent to support farmer-managed seed systems in similar agro ecological zones across the EAC.

COMESA is a free trade area with twenty-one member states in Africa[49]. It is designed as a trading bloc for the region's development through economic integration. The industrialisation of agriculture is a key element of COMESA's strategic plan[50].

COMESA's seed trade harmonization regulations were developed in 2014. Its Seed Harmonization Implementation Plan (COMSHIP) was rolled out in 2015 through its specialised agency the Alliance for Commodity Trade in Eastern and Southern Africa (ACTESA). COMESA is shortly becoming the first regional economic community to issue

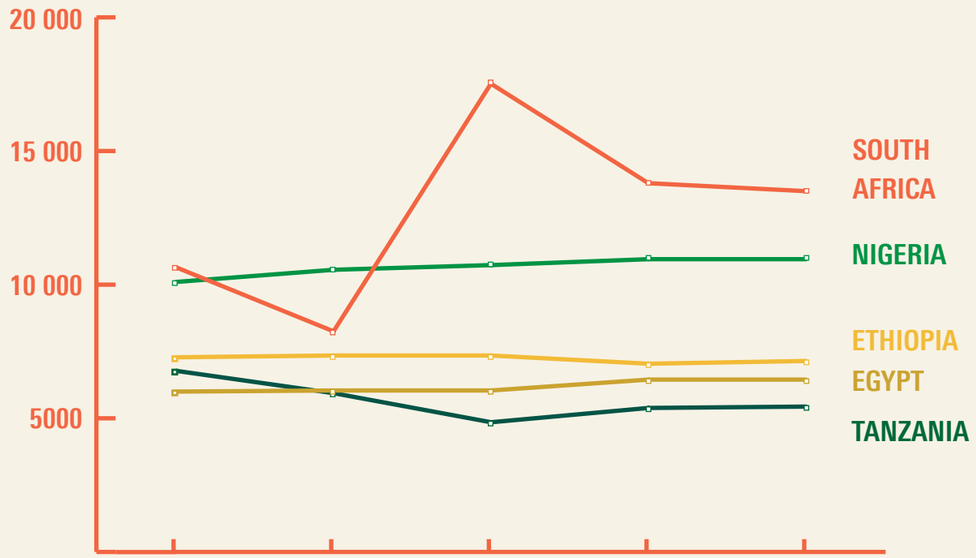
…Sometimes they (women) are victims of the typical problems of small traders, because the architecture of East Africa integration defines a 40-foot container being transported from Dar es Salaam to Nairobi as regional trade, but a 20-kilo sack of maize is seen as "smuggled goods". Because the framers were catering to the interests of big business in the cities, they did not pay attention to the right of border communities and small-scale traders to cross the border...

- Dr Mukhisa Kituyi, the secretary-general of the United Nations Conference on Trade and Development (UNCTAD)[51]

out regionallevel seed labels and seed certificates through national seed authorities in COMESA countries. The seed industry continues to push for the implementation of harmonized seed regulations[52]. Seed companies like Bayer-Monsanto, ChemChinaSyngenta, and East African Seed are looking to tap into the market of 80 million Small Holder Farmers in the COMESA region[53]. Bodies like the Syngenta Foundation also recommend that under regional harmonization the processes for variety release should be shortened and eased[54]. This is because varying seed laws in different countries increase cost and time for the seed companies.

Tanzania's withdrawal from COMESA was mainly due to concerns about the impact of tariff elimination on its industrial development. Today the Tanzanian government appears less protectionist in wanting to integrate Tanzania not only regionally, but also continentally. For instance, it is amongst the world's top twenty and Africa's top five maize producing countries and seeks market for it outside Tanzania[55]. Formalisation of the maize trade is also necessary for Tanzania to curb illegal maize exports, which bring no revenue to the government (see figure 4: p30). Some EAC countries themselves make requests for maize to Tanzania when they face a poor harvest at home.

FIGURE 4: AFRICA'S TOP MAIZE PRODUCING COUNTRIES 2014-18 (IN 1000 METRIC TONNES)



Source: Compiled by the author from USDA GAIN Reports Country Reports

With respect to the seed sector, Tanzania also wants to be an exporter of seeds in the region. This confidence comes from the law and policy changes it has made to position itself for commercial production.

There are other intergovernmental processes underway in Africa at a regional level, which push member countries towards intellectual property rights policies and practices that prioritise protection of seed technologies of the formal plant breeders, as against Small Holder Farmers. Notable in this context is the work of the African Region Intellectual Property Office (ARIPO). This regional inter-governmental organisation on intellectual property rights set up in 1978 has 19 member countries, including Tanzania. It has adopted three protocols, one of which is of relevance to the protection of farmers' knowledge on seeds, i.e. the *Swakopmund Protocol on the Protection of Traditional Knowledge and Expressions of Folklore*[56]. It came into force in 2015 but Tanzania is yet to ratify it. However, there is more concern about ARIPO's regional *Protocol for the Protection of New Varieties of Plants*. This Protocol was adopted by ARIPO at a Diplomatic Conference at Arusha, Tanzania in 2015; hence called the 'Arusha Protocol'. It essentially takes all the ARIPO countries into an UPOV 1991 system when they ratify the Protocol. Regulations to implement the Protocol were adopted in 2017. Since then, civil society has been resisting it[57]. Groups active in the region on this issue, point out how the Protocol specifies that small- and large-scale commercial farmers will need to pay remuneration when reusing farm saved seed, yet fails to differentiate and define small- and large-scale commercial farmers. They urge countries not to ratify the Arusha Protocol, in the interest of Small Holder Farmers. Tanzania signed the Arusha Protocol on 28th September 2015.

On 21st March 2018, 44 African countries (including Tanzania) signed an agreement to establish the African Continental Free Trade area (AfCFTA); five more countries subsequently joined them. This is a Pan-Africa FTA pushed by the African Union with the aim of borderless trade on the African continent.

Traditional foods and local recipes require farmers' varieties. Source: Shalini Bhutani

The intent is to bring the eight regional economic communities (RECs) closer together on the trade front, including on agricultural trade. Within the framework of AfCFTA there is expectation that it will push an agro industrial model of farming. The Rockfeller Foundation articulates it:

> "The establishment of the AfCFTA could support Africa's agri-business, create new regional markets for farmers and enhance agro-value chains while helping to replace the need for imports[58]."

India's Commerce Minister has hinted at a possibility of an FTA with AfCFTA as a bloc in the future. The scope of this mega regional FTA also covers intellectual property, investment rules and competition policy. All of these subject matters have implications for the seed sector. This study and existing literature already points to how intellectual property rights in seed, through plant variety protection law impact the seed sector. Similarly, if under such FTAs investor rights to local resources are given more primacy, it is at the cost of Small Holder Farmers. And if large seed companies are not controlled through appropriate competition policies, they can abuse their dominant position in the market, which has implications on the quantity and pricing of seeds.

3.3 LEGAL FRAMEWORKS AT NATIONAL LEVEL

There are new sets of seed-related laws under discussion in both countries. The proposed changes are part of a global trend, as the NGO GRAIN (2005) traces it. GRAIN explains how seeds laws go hand in hand with intellectual property rights regimes like plant variety protection and patents. And as it is typical, most legal texts are not easily accessible to Small Holder Farmers. This is the case even if some of the texts relating to seed issue might be in the local language, such as in Kiswahili in Tanzania. According to TOAM, most farmers, big or small, do not have adequate information and knowledge of the law. Only those actively engaged in the seed production work by default have to keep abreast of the quality declared seed rules and regulations. It takes efforts by NGOs and others to communicate any legal developments to the farmer groups. The many laws and the interplay of different laws remain somewhat distant from Small Holder Farmers. The main seed-related laws in Tanzania are listed below.

The specific seed law (2003) of Tanzania is undergoing a review and an overhaul is planned.

So far, the review process underway is limitedly on the issues of fake seeds and quality declared seed. There is nothing (yet) officially to actively promote farmer-managed seed systems through the new legal framework. In terms of process, after Cabinet approval it depends on when it is cleared in the Parliament session. There are little opportunities for farmers to engage in the process. There was a time bound process by which to input into the parliamentary process. Other than that, Small Holder Farmers do not have the kind of access to government officials and relevant decision-makers, as much as the seed industry has.

Under Tanzania's Plant Breeder Rights Act, the varieties that are currently provided in intellectual property rights include those of barley, bean, cashew, coffee, maize, rice, sesame, sorghum and tomato. Notably many of these are cash crops, e.g. coffee is essentially produced for export. The maximum registrations under the Act have been for coffee varieties – 23 out of the total 73 as of December 2017. The Plant Breeder Rights Act in line with UPOV 1991 provides intellectual property rights on all genera and species of plants.

TABLE 3. TANZANIAN LAWS RELATED TO SEED

1. Plant Protection Act, 1997
2. Seed Act, 2003[59] (and its amendment of 2014) – UNDER REVIEW
3. Seed Regulations, 2007 – AMENDED 2017
4. Guideline for Control of Quality Declared Seed, 2007
5. National Biosafety Regulations, 2009
6. Ministerial Circular on Licensing of Protected Varieties of Plants, 2011 - AMENDED 2017
7. Plant Breeders' Rights (PBR) Act, 2012
8. Zanzibar Plant Breeders' Rights Act, 2014
9. Plant Genetic Resources Bill – NOT LAW YET

This kind of information regarding registration of plant varieties is not publicly available in Tanzania as it is in India. In India, information of applications for plant variety protection are published online and in the Plant Variety Journal (PVJ) for possible (pre-grant) opposition before grant of the intellectual property rights. Upon registration, information of the registered variety is entered in the National Register. The varieties granted intellectual property rights are again published post-grant in the PVJ for any benefit sharing claims to be made by farmers.

There is currently no standalone law in Tanzania to give effect to the CBD in the country. The proposed Plant Genetic Resources Bill was listed as a priority in Tanzania's Country Report on the State of Plant Genetic Resources for Food and Agriculture, 2009, but it is yet to be legislated. Biological diversity issues are most likely to have been mainstreamed in other relevant laws. This is in sharp contrast to the situation in India, where a specific Biological Diversity (BD) Act was legislated in 2002. The implication for Tanzania not having such a law is that there is no legal framework, which:

1. makes it the duty of the state to undertake conservation of plant genetic resources;
2. allocates resources for the purpose, as do the national, state and local biodiversity funds in India;
3. establishes due procedure by which to seek the prior informed consent of farmers, if and when their seeds are accessed;
4. provide for benefit sharing with farmers and other rights of local communities who conserve the genetic heritage of the country;
5. sets up an institutional architecture for agro-biodiversity governance at all levels;

In Tanzania, people's knowledge on seeds is often mentioned, but it is not formally recognized in any way through law or policy.

FIGURE 5: CATEGORIES FOR INTELLECTUAL PROPERTY RIGHTS UNDER PLANT VARIETY PROTECTION LAWS IN TANZANIA & INDIA AND FARMERS' OPTIONS

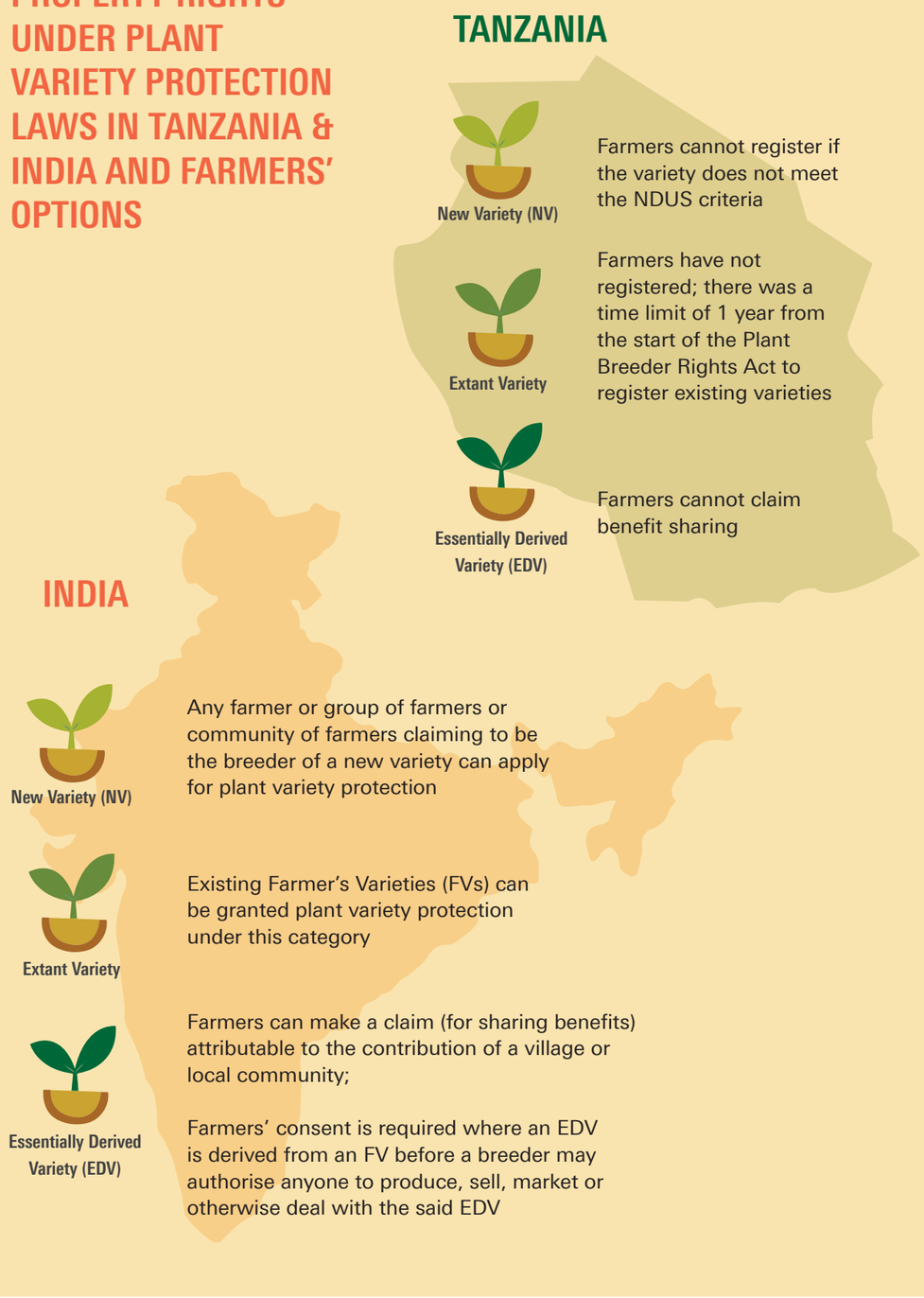


TABLE 4. INDIAN LAWS RELATED TO SEED

1. Seed Act, 1966
2. Seed Rules, 1968
3. Seed (Control) Order, 1983
4. Protection of Plant Varieties and Farmers' Rights Act, 2001
5. Biological Diversity Act, 2002
6. Biological Diversity Rules, 2004
7. Biotechnology Regulatory Authority of India (BRAI) Bill, 2013 – NOT LAW YET
8. Licensing and Formats for GM Technology Agreement Guidelines, 2016 – WITHDRAWN
9. Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations, 2014

Tracing the laws and policies chronologically helps to understand the historical processes the country went through. The first seed legislation in India was passed in 1966; this coincided with the Green Revolution. The law focused on regulating the quality of seeds that were notified by the Central Government to be sold for agriculture. Those kinds or varieties are required by law to conform to the prescribed standards for identifiability, germination, purity and labeling. As a corollary, non-notified seeds are free from such requirement. This creates a space for farmers to market and sell their seeds, and that too as per their own criteria of quality. India's Seeds Act, 1966, a specific provision exempts farmers from the seed regulation with the language:

"Nothing in this Act shall apply to any seed of any notified kind or variety by a person and sold or delivered by him on his own premises direct to another person for being used by that person for the purpose of sowing or planting."

-Section 24 of the Seed Act

In other words, any farmer selling or exchanging seed that s/he has grown intended to be used by the other farmer for sowing/planting, does not need to conform to the seed standards under the existing seed law. This is still the current legal position in India. In this way, seed keepers and Small Holder Farmers who are not in the business of seed (as large corporate and smaller companies are) have the freedom to keep seed in circulation amongst themselves. Some informal networks still use the 'Truthfully Labeled Seed' label, to market their seeds.

The Statement of Objects and Reasons that prefaces the legal text explains that in order to eliminate undue hardship, provision has been made in the Bill for exempting the sale of seed by

1. plant breeders, (breeder seed does not come under the purview of seed certification as it is not meant for public sale);
2. certain classes of producers (such as Small Holder Farmers and researchers' whose hybrid varieties are also non-notified);
3. any other persons for purposes other than for the purpose of sowing or planting.

This implies that not all seed sales are regulated by the state. The law only regulates the quality of "certain seeds for sale". It does not regulate the sale of seeds by farmers. There have been attempts by several successive central governments to change the seed law through the Seed Bill, 2004. India's Parliamentary Standing Committee on Agriculture[60] in its report of 2006 on the text of the said Bill acknowledges that the farmers' exemption is ambiguous. The proposed amendments could prohibit the sale of seeds by farmers if they were not of industrial standards. It is the popular protests against the Seed Bill that have kept it from becoming the new law on seeds.

The comparison of the plant variety protection laws in both countries points to the key differences in approach. The Indian law with its provisions for farmers, is much more supportive of farmer-managed seed systems on paper. The practical level experience with the law began with its implementation, as plant variety protection registrations began to be granted in 2009. Analysis by Kochhar (2010) soon after indicates that the legislation was not effective in either the conservation, or the commercialisation of farmers' varieties. The consequence is that plant variety protection registration does not make any real difference to Small Holder Farmers, in terms of support to their varieties.

What is observed with respect to legal frameworks in both countries is that they are largely focused on organising and regulating the formal seed sector. This in itself can have implications for farmer-managed seed systems if the laws do not either create or leave spaces open for Small Holder Farmers to continue with their seed practices. It is also noted that two types of laws, one on intellectual property rights and the other on quality are the key ones to focus on if farmers' seed freedoms have to be safeguarded. The law is yet to accommodate the customary or 'soft law' that is embodied in farmer-managed seed systems.

3.4 STATE PROGRAMMES THAT IMPACT FARMER-MANAGED SEED SYSTEMS

3.4.1 POLICY PRESSURES

Tanzania and India have had a somewhat dissimilar history in terms of changes in the seed sector. Nonetheless, most of the changes in the seed sector in both countries can be traced to a mix of measures, some pushed by external pressures and others through unilateral decisions by governments to transform agriculture.

The formal seed sector in Tanzania can be said to have begun from the 1970s, with

- the Seed Act, 1973 & its Regulations, 1976;
- the government seed company TANSEED;
- Tanzania Official Seed Certification Agency (TOSCA) and
- four national seed farms. Since then there have been or are going to be changes in all four with the government vision to expand and commercialise the seed sector;
- the Seed Act, 2003 & its Regulations, 2007 is under review to make it more industry-friendly;
- TANSEED was bought up and privatised to become TANSEED International Ltd., which is also a member of Tanzania Seed Trade Association;
- TOSCI was established under the Seed Act of 2003 replacing TOSCA, with a decisive orientation towards regulating industrial seed quality and;
- the parastatal ASA has eight seed production farms today, expanding its capacity and also partnering with the private sector.

With Agricultural Sector Development Programme (ASDP I) in 2006, the Tanzanian government had started working closely with the private sector. In Tanzania during the post-AGRA (2006-7) period, the previous president launched a programme called Agriculture First, through the 'Kilimo Kwanza' Resolution, 2009. This was primarily to facilitate investment on what are considered underutilised lands and water for agricultural activities. It gave the foothold for what the large private sector was seeking[61]. The programme has no long-term vision on seeds from the point of Small Holder Farmers. The Southern Agricultural Growth Corridor of Tanzania (SAGCOT) followed this as an investment project to link Small Holder Farmers to agribusinesses. The project imports seeds and does not envision support to farmer-managed seed systems. From an industry viewpoint, Tanzania's large commercial space for farming is of strategic importance from an investment focus[62]. Arusha in North Tanzania is offered by Tanzanian government as a land open to investors. In South Tanzania SAGCOT is seen by local farmers as promoting 'land grab'.

In June 2018, the President of Tanzania officially launched the second phase of the Agricultural Sector Development Programme (ASDP II) from 2017/18 to 2027/2028, a flagship programme for Tanzania's development agenda[63]. A total of six Agricultural Sector Lead Ministries (ASLMs) who have been at the forefront of developing the ASDP II, will be the

key implementers of the programme. ASDP II also includes focus on crops. However, it will only mean more private sector involvement in the seed sector and Small Holder Farmers are mostly viewed as the end beneficiaries. The first five years of ASDP II implementation started in 2018 and will prioritise commodity value chains. The focus is on maize, rice and increased use of fertilisers and AGRA has hailed the move[64]. Stakeholders in organic farming led by TOAM have drafted and shared the Organic Sector Development Project 2017-2022 to be part of the ASDP II. The main thrust of the programme is to transform Small Holder Farmers into commercial producers.

Members of the SSF are aware of the state policies to liberalise the seed sector, yet there seems to be agreement that Small Holder Farmers should not be marginalised further. There is also awareness that for long Small Holder Farmers have not been adequately involved in the processes of policy-making even though they are the most affected by any change in laws and policies related to seed.

So it is in India. Even before 'economic reforms were announced in India in 1991, the seed sector had begun to be liberalised. Subsequently, most of the central government policies related to seed and agriculture, talk about a much larger role for private seed companies. The idea is to develop an agro industrial model of farming. The GoI's Ministry of Commerce and Industry has come up with a draft "Agriculture Export Policy" in 2018, which is aimed at doubling the agricultural exports and integrate Indian farmers and agricultural products to global value chains. There is little space there to co-develop farmer-managed seed systems. There is however space that can be carved out in the state-level organic farming policies that are slowly emerging from different states in India, such as in Gujarat, Himachal Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Kerala and Sikkim.

3.4.2 SEED PRODUCTION

A key element for farmer-managed seed systems is local seed production by farmers. A supportive policy environment for seed production by Small Holder Farmers is fundamental for the continuance of farmer-managed seed systems. There are several government programmes on seed production in both countries, but not all are supportive of seed production by farmers themselves. Programmes that are being implemented even if they do engage farmers in seed production, do not insist on farmers' seeds.

Amongst the several seed programmes designed by the Central Government in India, the one most relevant for farmer-managed seed systems is the seed village scheme. This is designed to upgrade the quality of farmer-saved seed, which is about 80-85% of the total seed used for crop production. Financial assistance is provided for distribution of foundation/certified seed at 50% cost of the seed of crops for production of certified/quality seeds only and for training on seed production as well as technology for the farmers[65]. The seed produced in these seed villages are preserved locally till the next sowing season. The scheme encourages farmers to develop storage capacity of appropriate quality, through providing assistance for making/procuring of bins for storing of seed produced on their farms. While the aim is to capacitate farmers in seed production, preservation and distribution is laudable, but there are two fundamental issues:

- one, the scheme seeks to replace farm-saved seed;
- two, while the guidelines state that the crop varieties normally grown in these seed villages will be decided in consultation with the farmers, but it prescribes that it should preferably be the same crop for all the farmers.

During the Green Revolution in India, new state infrastructure was built for seed production. The National Seeds Corporation (NSC) of India was set up in 1963, with support from USAID and the Rockefeller Foundation. NSC is a company owned by the GoI under the control of the Ministry of Agriculture and Farmers Welfare. It undertakes production of foundation and certified seeds, through contract growers and state agricultural universities. Under a Central Government Scheme there are clear guidelines for 'assistance for boosting seed production in the private sector'[66]. NSC is the nodal agency for the implementation of this scheme, which gives seed businesses subsidies and loans for seed processing and seed storage. NSC not only caters for the domestic market, but also produces seed for export to countries like Sri Lanka. State level seed corporations also function in different states in India. All these public sector seed corporations undertake publicity and extension education to promote certified seeds. There is not much promotion of farmers' seeds.

Seed production through the state in Tanzania is generally undertaken by the Agricultural Seed Agency (ASA) based in Morogoro. It is a semi-autonomous body set up under the Tanzanian Ministry of Agriculture in 2006. Its main functions are to:

1. produce and distribute agricultural seeds;
2. promote private sector participation in seed production.

Its production priorities are determined by executive policy. For instance, after announcement of the ASDP II, ASA is on a 'campaign to revamp production'[67]. According to the Prime Minister's directive to implement ASDP II, focus is on production of palm oil. This is with an eye on the increasing global demand for palm oil. ASA enters into partnerships with private companies to increase seed production. The Agency also leases out its land to big companies (those producing above 3,000 mt seed/year) on a long-term basis (with contracts ranging from 5 and more years), charging about 80,000 TZS (almost 35 US-Dollar) per hectare per year[68]. For example, the Clinton Development Initiative entered into an agreement in ASA for 20 years in 2013, to lease land for seed production at ASA's Dabaga seed farm in Iringa, located in Tanzania's SAGCOT[69]. The Clinton Foundation presents this as 'a successful commercial farm and an effective and impactful smallholder farmer out-reach'[70]. ASA also engages farmers for seed production through the quality declared seed approach, but the seeds are of 'improved' varieties not farmers' own seeds[71]. When interviewing farmers in Tanzania, the standard reply to the question on what support will be most helpful for farmer-managed seed systems, is that there must be land for seed production of farmers' seeds.

The Tanzanian government is more focused on seed production by the large commercial seed sector. The shortfall in seed supplies gives them a justification to promote seed businesses. This also creates ground for governments to enter into PPPs like the one supported by the Clinton Foundation's Quality Seed Access Partnership in collaboration with Monsanto (today Bayer)[72]. This in part explains the challenge where farmer-managed seed systems are not seen as part of the solution for the problem of inadequate seed supply. The ESAFF-INSARD seed study report makes the point that the seed needs of farmers in Tanzania, both in terms of quantity and (crop) species remains unmet. The study states as fact that 90% of farmers in the country use farm-saved seed even now[73]. The failure to recognise farmer-managed seed systems is a loss of opportunity to deal with the new challenges ahead, such as growing population, ecological challenges and changing climate.

In Tanzania, the only seed production that the state permits farmers to do is through the quality declared seed system. This in itself is not about promoting farmer-managed seed systems. And even amongst farmers in Tanzania, not all agree on what the aims of quality declared seed ought to be. Some farmers have seen firsthand how quality declared seed training to farmers can bring positive changes in terms of meeting seed standards. This in turn led to some farmers educating their neighbors. However, they are still not content with mere local production; they see a potential for farmers to be organised in quality declared seed groups for seed production for export to other African countries.

Small Holder Farmers need a supportive policy environment for seed production and marketing their produce.
Source: Shalini Bhutani

3.4.3 SEED TECHNOLOGIES

RESEARCH, DEVELOPMENT & DISSEMINATION

Farmers' seeds are at the centre of farmer-managed seed systems. Governments and technology providers promote new seed technologies according to the prevailing view of agriculture. They are also chosen with inherent biases for a certain system. The dominant view is that innovation happens either in the public sector institutes or by the large seed corporations in their private laboratories. There are two stages of the technologies to consider:

- one, the research and development (R&D) agenda for seed technologies;
- two, the processes and programmes by which the technologies once developed are deployed and disseminated amongst farmers.

In farmer-managed seed systems, farmers locally do the development of new varieties. The farmer's field is an open seed R&D station as it were. Constant observation, selection and exchange of planting materials makes it possible for on-farm innovation.

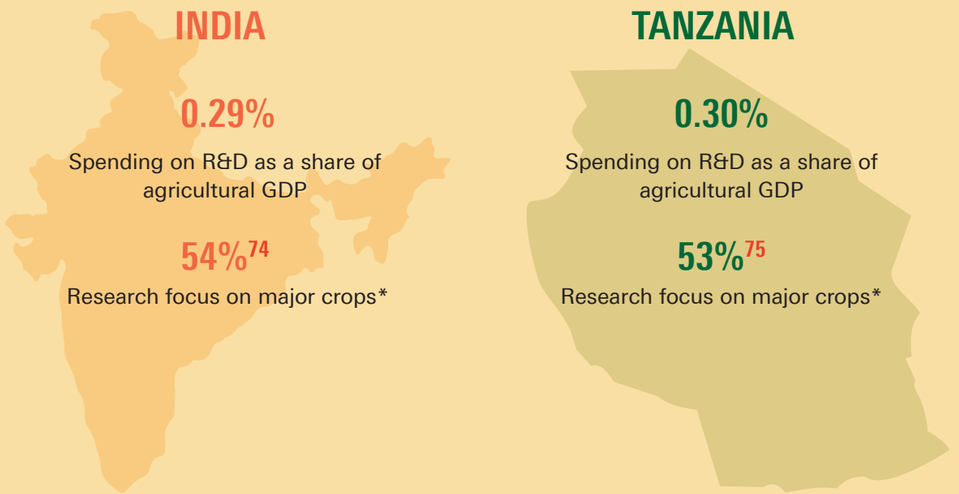
That is why it is absolutely critical that governments do not outlaw the exchange and sharing of seeds amongst Small Holder Farmers.

A country's formally recognized venue for R&D on seed technologies is the public sector. Therefore, an important aspect of choice of new technologies is how the public R&D priorities are set and how it entails public resources. This has two further aspects:

- on the one hand, resource allocation for R&D in the country; and
- on the other hand, costs to the public for certain technologies acquired from outside sources.

The agricultural R&D indicators of both countries as of 2014 are insightful; they point to the fact that India and Tanzania spend well below the UN recommended 1 % target to allocate at least 1% of agricultural gross domestic product (AgGDP) to public agricultural R&D.

FIGURE 6: AGRICULTURAL R&D INDICATORS FOR INDIA AND TANZANIA



*Major crops include those that are the focus of at least 5 percent of all crop researchers; these are rice, wheat, pulses, fruits, vegetables and other oil-bearing crops.
Source: IFPRI & NAARM's Agricultural Science and Technology Indicators (ASTI) Factsheets, 2016

The public sector, i.e. the National Agricultural Research and Extension Services (NARES), if it is not developing and disseminating new technologies, becomes the venue for brokering technologies from other sources. With the so-called Green Revolution in Asia, particularly India in the 1960s, seed technologies were introduced into local public sector varieties that were distributed to farmers through the formal seed supply system. However, early on, those like Ladejinsky (1973) who believed in the Green Revolution, pointed to problems with quality seed and acknowledged other failures. India's Green Revolution is an example of how the public sector played a key role in technology adoption, even though the Green Revolution is not simply a case of successful deployment of seed technology through the dissemination of high-yielding varieties of rice and wheat. The Vice Chancellor of the Punjab Agriculture University (PAU) reminds us that rice and wheat were not traditional crops in the state[76].

And apart from the seed technologies there were a host of other policy measures undertaken to create a conducive environment for the application of that technology. Farmer-managed seed systems have never got that degree of policy support. The ESAFF-INSARD study (2014) focused primarily on developing the case for farmer involvement in agricultural R&D.

The use of hybrid seed technology, which means seeds produced by crossing two different parents, is seen as a motif of modern agriculture. But since the hybrid vigour is lost in subsequent generations, the farmers are forced to buy seeds in the next season. Yet there are government programmes such as Bringing Green Revolution to Eastern India (BGREI), which is a sub-scheme of the National Agriculture Development Programme (Rashtriya Krishi Vikas Yojana). BGREI aims to intensify paddy and wheat cultivation in seven states in Eastern India. Dovetailed with India's National Food Security Mission that promotes high-yielding varieties/hybrid seeds, these programmes work as a subsidy and readymade channel for companies selling such seeds.

Likewise, Tanzania's Ministry of Agriculture had a National Agricultural Input Voucher Scheme (NAIVS) since 2008/9 for hybrid maize seeds and later paddy. Under the scheme, selected farmers were provided with both improved seeds and (non-organic) fertilisers. The general impression of most of those interviewed in Tanzania is that, there were no resource allocation by the government for 'improving' farmers' seeds. Researchers go by donor-driven priorities in research. PELUM says that it would instead like Tanzania's researchers to prioritise partnering with Small Holder Farmers to improve the purity of farmer seeds.

Extension services also play an important support-role in technology adoption. While those in Tanzania say there is enough staff, there is little or no fuel to travel the distances to reach all farmers. Also, as the seed technologies and farming practices change, there are no new trainings or capacity building for farmers to make best use of them. Tanzania has more extension staff per 1,000 farmers than India. Under a grant from AGRA, Tanzania's Agriculture ministry had enlisted as many as 4,000 agro-dealers[77]. The role of public sector researchers, scientists and extension workers needs to be revisited from the point of view of the needs of farmer-managed seed systems.

GENETICALLY MODIFIED SEEDS

Currently, a 'gene revolution' is being attempted in Africa and Asia through the application of modern biotechnology and new technologies in plant breeding. Both this and the Green Revolution have been equally critiqued, including from the ecological and the social dimensions (Shiva, 1991). India's 'gene revolution' and its impact on farmer-managed seed systems is another important case study to be shared. India has a much longer history of use of GM seeds with the first approval by GEAC in 2002. According to the International Service for the Acquisition of Agri-Biotech Applications (ISAAA), India as of 2017 has the fifth largest area in the world under GM crops amounting to 11.4 million hectares[78]. However, only one GM crop since then has been officially approved for commercial planting, i.e. Monsanto's Bt cotton that is claimed to be insect-resistant. Many Small Holder Farmers, who buy and grow this GM cotton, have been confronted with loss caused by insect infestation that has become resistant to the GM technology.

This has been the case with the pink bollworm infestation in Bt cotton in India in 2017-2018 cotton seasons. In its bold move, India's most affected state, the government of Maharashtra imposed fines on Monsanto (Bayer) and other seed companies for the loss to farmers in the state in cotton cultivation. Ultimately the proponents of this Bt cotton, blame the farmers for not understanding insect-resistant technology, indulging in irresponsible use of agri-chemicals and not maintaining adequate refugia. Illegal variants of GM crops can make matters worse as they become a convenient alibi for the seed companies marketing genuine Bt to argue that the fault is not in their technology.

The biosafety regulatory regime in India does need to be updated. Public interest litigation on this issue is pending before the Supreme Court of India[79]. Therein, petitioners have demanded that an independent risk assessment body be set up for the regulation of GM crops. Until that happens, civil society continues to be very watchful. Popular protests in India have kept

GM food crops from being approved. Bt brinjal and Bt mustard are in the pipeline, but have not been granted permission by GEAC for planting. Dow-DuPont (today Corteva Agrisience) will conduct the final field trial of its GM maize only when India's regulatory system is ready to permit cultivation of such food crops[80].

A key point that emerges from the debates on GM seeds in India is about the faults in the decision-making processes. Citizens have been asking for more transparency and consultations on the issue. The most notable example of public hearings on the subject are the ones organised by the Environment Minister through January-February 2010 in 7 cities in India, to be able to take a decision on Bt brinjal[81]. Tanzania is on the brink of taking decisions on whether to use GM seeds or not. It is likely that its first GM crop could be a food crop, which makes it all the more urgent that wider public debates be held.

Trials for a drought-tolerant, insect-resistant GM maize hybrid developed by the Water Efficient Maize for Africa (WEMA) project have started in Tanzania. African Agricultural Technology Foundation (AATF-Africa) leads the WEMA Project for sub-Saharan Africa (SSA). Bill and Melinda Gates Foundation (BMGF), USAID and the Howard G Buffet Foundation are the funding partners of AATF. Monsanto (today Bayer) is the project partner who brings in the drought-tolerant and insect-resitant technologies. The work is carried out in a PPP mode, with AATF working with Tanzania Agricultural Research Institute (TARI) and private seed companies to move this in Tanzania. Laboratory tests for this GM maize were conducted at Mikocheni ARI in Dar es Salaam and the field trials were done at the TARI farm in Makutupora[82].

AATF has received $1.8 billion from the African Development Bank to promote maize hybrids in SSA and Tanzania[83]. So there are large resources being made available for such new technologies in seed. But the same is not true for farmer-managed seed systems.

Corn is perhaps one of the most widely grown crops amongst farmers in Tanzania. As per the USDA, Tanzania does not have a policy on co-existence of GM and conventional crops. Once GM crops are released for commercialisation, there will likely be challenges in managing co-existence with non-GM crops[84].

Another concern with respect to the promotion of GM crops is that they require isolation distances from a biosafety point of view. This is determined by crop type, like 200m for maize. Small Holder Farmers might not have such plot sizes to abide by biosafety protocols. This puts even the neighbouring farmers (who may choose to be GM-free) at risk of genetic contamination.

Tanzania has a National Biosafety Framework, 2004. However, during the course of the research of this study, it was discovered that the biosafety regulations have been weakened by policy-makers to create an environment conducive for the research community to operate. This meant that the researchers would not be responsible for any negative effects that might arise as a result of their work. It is most likely that proponents of GMOs will resist biosafety regulations in order to prepare the ground for the commercialisation of GM crops in Tanzania in this compromised environment.

Choosing GM means putting farmers' seed and farm at the risk of genetic contamination. It also implies continued use of agricultural chemicals, which pollute the soil and water. Most importantly, it implies choosing corporate seeds over farmer innovation and this goes against farmer-managed seed systems.

INTELLECTUAL PROPERTY

Adoption of seed technologies today invariably comes with intellectual property rights issues. There has been a process of acculturation of intellectual property rights by the public sector with respect to innovation. Both in India and Tanzania, the public sector charges money for the seed technologies it develops. In India the ICAR (Indian Council of Agricultural Research) developed comprehensive guidelines for Intellectual Property Management and Technology Transfer/Commercialisation in 2006. As per the guidelines, ICAR provides commercial licences for the seed/planting material of registered and protected ICAR varieties to different cate-gories of interested parties, as a means for the Small Holder Farmers to access their technologies. To accelerate the dissemination of its innovative technologies (including plant varieties), particularly in competition with other technology providers, such as agri-TNCs and strong public sector in other countries (such as USA), the GoI through its Department of Agricultural Research and Education (DARE) set up its own commercial company, Agrinnovate India Limited (AgIn) in 2011[85]. AgIn developed its own guidelines on technology commercialisation. To accommodate these developments, the ICAR guidelines have been revised in 2018 and harmonised with the AgIn Guidelines[86].

Likewise, in Tanzania royalties for public sector seed technologies are charged as per the Ministerial Circular on Licensing of Protected Varieties of Plants, 2011 (which was later amended in 2017). The government can undertake elaborate processes to provide protection for its own innovations, not so with respect to farmers' innovations. And if the public sector is embracing intellectual property rights, it will not understand why Small Holder Farmers want to stay out of the IP system. A deeper problem is that, as public sector research institutes begin to see the commercialisation of their products and services as a source of regular funds, the R&D agenda changes to accommodate the market, rather than Small Holder Farmers.

3.4.4 STATE AGENCIES

In the context of the discussion on seed quality, the role of two other institutes, i.e. Tanzania Official Seed Certification Institute (TOSCI) and Telangana State Seed and Organic Certification Authority (TSSCA) in India, were examined more closely as part of this study. TOSCI in Morogoro, functions under Tanzania's Ministry of Agriculture (MoA) and was set up under the Seed Act of 2003, substituting TOSCA which was established by the previous Seed Act of 1973. The head of TOSCI mentioned that the role of TOSCI is understood thus: every seed (in the market) has to get past the TOSCI gate[87].

TOSCI claims that with farmers who are producing under quality declared seed, almost 100% of the process is in the farmers 'control. The farmers have been given training for seed production under quality declared seed. They can follow a D.I.Y. (do it yourself) approach, and declare germination test results. Thus, even if the farmer produces it, it is considered to be a quality seed. However, there is no system in Tanzania or in India that regulates the quality of farm-saved seed.

The southern state of Telangana can be regarded as the headquarters of the seed industry in India and is also a global seed hub in the making. Among other donors, the German government has also committed support to develop Telangana as a Global Seed Valley[88]. A 100-acre seed park is being set up in Medak district of Telangana for the purpose. India's key domestic seed company – Nuziveedu Seeds Limited (NSL) will anchor the park. In such a setting, the role of the TSSCA becomes all the more important. The Director of TSSCA not only oversees seed quality issues in the state, but other neighbouring states in the South and is also the President of the International Seed Advisory Council (ISAC)[89]. ISAC coordinates various seed certification agencies across the globe to improve production of seed. The Telangana state government has seed supply agreements with other countries in Africa – Egypt and Sudan, and in Asia – Philippines[90].

The Director of TSSCA firmly believes that while seed certification is voluntary, there should be same standards for everyone. And while the private seed industry has the resources for compliance, the public sector usually marks their seed with the 'TLS' label. The latter does not want to pay the cost of certification because they believe that there should not be a differentiated standard for farmer-managed seed sys-tems. And given the significance of Telangana in the global seed sector, the Principal Secretary of Agriculture, Telangana State, has called upon farmers to follow international standards for producing quality seeds[91]. Engaging farmers in seed production in the state are being seen as an industrial project[92]. This

Bayer-Monsanto had to pay fines for farmers losses in BT cotton cultivation.

Women harvesting rice in Senegal [c. 1974] UN Photo/Ray Witlin.

is being done as an export-oriented activity. In order to increase the availability of certified seeds to the farmers locally too, the GoI has proposed to set up 500 seed production and seed processing units at Gram Panchayat Level[93].

There is little scope to argue for support for farmers' seeds and their local seed systems within this frame. Yet ironically, there are good initiatives by farmers' groups in Telangana to set up alternative seed production and marketing systems (as discussed in the section on People's Initiatives).

3.4.5 ORGANIC AGRICULTURE

Farmer-managed seed systems are sometimes organic in nature, in that they do not use external inputs like agricultural chemicals. Some Small Holder Farmers in India were spared the chemicals of the Green Revolution era, because they were in remote areas. Amongst others, who suffered the ill effects of input-intensive farming, many have consciously opted to transition to organic. Organic agriculture also does not permit the use of GMOs.

There are several civil society initiatives on organic or natural farming in India. In fact, India today has the maximum number of organic farmers in the world. The Organic Farming Association of India (OFAI), set up in 2002, brings many of them together under the biggest national network of organic farmers. OFAI members can either pursue PGS or Third Party Appraisal (TPA) for its organic certification and labeling scheme[94]. PGS is simpler and cheaper because it has been designed with Small Holder Farmers groups in mind. TPA is for isolated farmers or farmers living in remote areas who are unable to form a local group.

It is worthwhile to explore how and how far the state-supported promotion of organic agriculture and related seed policies can or cannot strengthen farmer-managed seed systems. Interestingly, the Ministry of Commerce and Industry in India has been promoting organic production since 2001. This is with an eye on exports, while farmer-managed seed systems focus on local production and local consumption. The Ministry's National Programme on Organic Production (NPOP) is carried out through the Agricultural and Processed Food Products Export Development Authority (APEDA).

India's Ministry of Agriculture and Farmers' Welfare also promotes organic farming. Under the National Mission for Sustainable Agriculture (NMSA), an Operational Manual for Domestic Organic Certification of 2015, was brought out[95]. Therein, the limitations of PGS-India certification are recognized as being only for farmers or communities that can organise and perform as a group within the village or in close-by villages with continuous territory. Individual farmers or group of farmers having less than 5 members are not covered under this PGS.

The choice local groups have over seed makes this a space worth developing to facilitate farmers' varieties. According to the Operational Manual, seeds used should be well adapted to the soil, climatic conditions, suitable for organic management, resistant to pests and diseases and preferably of organic origin. In case organic seeds are not available then, chemically untreated conventional materials shall be used. The use of GM seeds, pollen, transgenic plants or planting material is not allowed.

The Prime Minister's Office in India announced a national scheme for organic farming in 2015, i.e. Paramparagat Krishi Vikas Yojana (PKVY), a traditional agriculture development scheme. As per the Minister of Agriculture and Farmers' Welfare, the mission of the Prime Minister is to ensure a successful "Organic Farming Revolution" in India in line with the Green Revolution, so that the farming community could benefit from it[96]. Under this scheme, 200,000 hectares of land in India are to be made suitable for organic farming to benefit 500,000 farmers. Launched under the NMSA, the objective of PKVY is to produce agricultural products free from chemicals and pesticides residues by adopting eco-friendly, low-cost technologies. While the scheme recognises traditional knowledge and practices of farmers, farmers' seeds are not being promoted under the scheme. The manual for district level does not envisage local seed production by farmers[97], instead, it talks of subsidies for procurement of organic seed. The challenge is to get farmers' seeds into the scheme. The funding pattern under the scheme is in the ratio of 60:40 by the Central and State Governments respectively. Several state governments in India like Sikkim have come out with their own state-level organic policies, while others like Andhra Pradesh and Himachal Pradesh have initiated zero budget natural farming (ZBNF)[98]. This type of organic farming is done by letting crops grow naturally without any agricultural inputs, thus reducing the cost of production. Many of the states like Kerala and Madhya Pradesh did so in response to people's demand for the same.

In Tanzania, organisations like TOAM play a key role in taking the idea of organic agriculture to Small Holder Farmers. TOAM also plays the role of facilitator, attempting to simplify the process for both small individual producers and farmers in a producer group[99]. Amongst the challenges to promote farmer-managed seed systems under organic farming in Tanzania is that certified organic farmers have to use government-approved seed. The national law requires seed treatment, but the rules for organics require that there should be no seed treatment with any chemicals. All Tanzanian organic producers have to conform to the East Africa Organic Products Standard (EAOPS) adopted by EAC in 2007[100]. In fact TOAM was part of the Regional Standards Technical Working Group that developed this standard. According to EAOPS, if local seeds are not available, then growers can use hybrids[101]. Compliance with the strict standards of organic production and marketing also entails costs, which Small Holder Farmers can often times not afford.

So while both countries have organic farming policies and plans, that does not mean that through them the challenges for farmer-managed seed systems are automatically addressed. However, the same can be made more sensitive to farmer-managed seed systems, by either recognizing their standards or by incorporating them in the official policy. Nonetheless, there is a wider context of export-oriented agriculture that organic farming policies and programmes in India and Tanzania have to contend with. There are varying motivations for Small Holder Farmers to turn to organic seeds. A true farmer-managed seed systems would focus more on localised organic cultivation and prioritise direct producer-consumer connections, rather than adding 'food miles' to the organic produce. This would require marketing avenues closer to home.

3.4.6 FARMERS' MARKETING

Seed production by Small Holder Farmers is promoted in India by re-organising farmers in (producer) companies. Producer companies are essentially legal entities formed by primary producers, such as local farmers, fisher folk and livestock keepers. India has previously been through a phase of farmer co-operatives; the state has since been withdrawing support for that. The farmer co-operatives pool together to market their produce, such as milk, cotton and sugarcane. Farmer organisations (FOs) also become the means for industry to reach their products to Small Holder Farmers. Since the time of the Green Revolution, co-operatives like Indian Farmers Fertiliser Cooperative Limited (IFFCO) at the national level have been used for the distribution of fertilisers to farmers.

Farmer Producer Organisations (FPOs) have begun to be officially supported since 2003. The Government of India issued the Policy and Process Guidelines for FPOs in 2013[102]. The Companies Act in India was amended in 2003 to include specific provisions for FPOs[103]. The key emphasis of the policy is collectivisation of small and marginal farmers to secure income and shared profits. The intent is to leverage their collective production and marketing power. There are studies to show that these FPOs still face market disadvantages (Singh & Singh 2014).

State governments are directed to establish as many FPOs and make it easy for them to get the necessary licenses to trade in seeds and other inputs like fertilisers and pesticides. The government encourages FPOs to be producers of certified seeds. For example, the State Government of Chhattisgarh in Central India undertakes procurement of certified seeds through FPOs. Many institutions under the Central Government are tasked with providing different kinds of support to FPOs; these include the Food Corporation of India (FCI), Small Farmers' Agribusiness Consortium (SFAC), National Agricultural Cooperative Marketing Federation of India (NAFED) and National Bank for Agriculture and Rural Development (NABARD). For example, NABARD provides working capital loans to FPOs to be able to do bulk procurement of raw materials, such as seeds[104]. NABARD had supported around 4,000 FPOs in the country by Mach 2018. Its target is to promote 5,000 more FPOs until 2020[105].

Tanzania too has the experience of different kinds of FOs. As case studies from Africa undertaken by KIT (2006) establish, these FOs can be of different kinds:

1. 'old' commodity-based FOs created with support from parastatals;
2. 'new' market-oriented FOs with collaborations to integrate in the value chain;
3. service-system-oriented network type FOs that promote community-based Small Holder Farmers (for e.g. MVIWATA).

The last category comes closest to farmer-managed seed systems, wherein self-reliance is emphasised. Moreover, it is the social capital they represent in the possibility of collective action for change. While FPOs allow farmer members to both take joint decisions and decentralise seed activities guaranteeing better outreach to farmers, it does not mean that every FPO dealing with seeds is per se promoting farmer-managed seed systems. But there are many NGOs in India that have been able to organise Small Holder Farmers into FPOs to market local seeds. Some of these initiatives are presented in the section on people's initiatives.

26. https://viacampesina.org/en/keep-agriculture-out-of-free-trade-statement-from-the-international-forum-on-free-trade-and-agriculture/
27. The other members from Africa of the 75-member UPOV are Kenya since 1999, Tunisia since 2003, Morocco since 2006 and the 19-member ARIPO (Tanzania is a member) from 2014.
28. http://www.upov.int/edocs/mdocs/upov/en/c_46/c_46_15.pdf
29. http://www.upov.int/edocs/gendocs/en/tz/tz001.pdf
30. ACB (2016), Changing Seed and Plant Variety Protection Laws in Tanzania: implications for Farmer-Managed Seed Systems and Smallholder Farmers, Johannesburg
31. OECD is an intergovernmental economic organisation with 36 member countries, mostly advances and emerging economies.
32. OCED Seed Schemes 2018 http://www.oecd.org/tad/code/oecd-seed-schemes.pdf
33. The Cartagena Protocol on Biosafety to the Convention on Biological Diversity is an international agreement on biosafety as a supplement to the CBD since 2003. The protocol seeks to protect biological diversity from the potential risks posed by genetically modified organisms resulting from modern biotechnology. https://bch.cbd.int/protocol/background/
34. Government of India Press Release 30th May 2018 http://pib.nic.in/newsite/PrintRelease.aspx?relid=179635
35. The Council comprises 47 members, 33 of which voted in favor of the Declaration. The African coun-tries that said 'yes' include Angola, Burundi, Cote d'Ivoire, Egypt, Ethiopia, Kenya, Nigeria, Rwanda, Senegal, South Africa, Togo and Tunisia.
36. https://digitallibrary.un.org/record/1656160 3
37. https://seednet.gov.in/PDFFILES/saarc-seedbank.pdf
38. http://saarc-sec.org/assets/responsive_filemanager/source/Files%20for%20Areas%20of%20Cooperation/ARD/07_SAARC%20Seed%20Bank_dir.doc
39. RCEP members comprise ASEAN + 6: Ten ASEAN econo-mies - Brunei, Burma, Cambodia, Indone-sia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam + Six additional countries - Australia, China, India, Japan, Korea and New Zealand.
40. https://viacampesina.org/en/indian-farmers-re-ject-rcep-trade-agreement-plan-major-national-level-agita-tions/
41. http://news.bbc.co.uk/2/hi/africa/908008.stm
42. https://www.fanrpan.org/archive/documents/d01457/has-sp_policy_study_20121122.pdf
43. The other EAC member countries are Burundi, Kenya, Rwan-da, South Africa and Uganda.
44. Pillars of EAC Regional Integration https://www.eac.int/integration-pillars
45. http://documents.worldbank.org/curated/en/805851468027640564/pdf/907010BRI0IF-C00Ag0EAC0Project0Brief.pdf
46. https://www.accesstoseeds.org/index/eastern-africa/kenya-seed-co/
47. Tanzania's rice exports to Kenya, Rwanda to increase. http://www.theeastafrican.co.ke/business/Tanzania-rice-exports-to-Kenya-Rwanda-to-increase/2560-4293312-a11g7gz/index.html
48. http://eatproject.org/docs/tanzania_seedCLIR.pdf
49. www.comesa.int COMESA was formed in 1994 and its secre-tariat is in Lusaka, Zambia.
50. http://www.comesa.int/download/11730/
51. https://allafrica.com/stories/201808250081.html
52. http://afsta.org/reload/wp-content/uploads/2018/03/Shar-ma-EAC-AFSTA-Feb-18-COMESA-presentation.pdf
53. COMESA Pre-Summit Newsletter 2018 http://www.comesa.int/summit2018/wp-content/uploads/2018/07/180704_Pre-summit-Newsletter-2018_web.pdf
54. https://www.syngentafoundation.org/sites/g/files/zhg576/f/seeds_policy_kenya_case_study_sept15.pdf
55. https://agra.org/the-gains-and-misses-in-consolidating-eac-blocs-maize-granary/
56. http://www.aripo.org/resources/laws-protocols/mem-ber-states-copyright-legislation-5#
57. Open Letter to the DG of ARIPO by AFSA, ACB and PELUM 11th April 2017 http://www.apbrebes.org/files/seeds/Final%20Letter%20to%20ARIPO%20April%202017%20%28003%29.pdf
58. https://www.rockefellerfoundation.org/blog/wish-agricul-ture-sector-africa/
59. The full text can be accessed here http://www.saflii.org/tz/legis/num_act/sa200368.pdf
60. http://www.prsindia.org/uploads/media/1167468389/scr1167813175_Standing_Committee_Report_on_the_Seeds_Bill__2004.pdf
61. https://cagj.org/2018/06/putting-agriculture-first-without-farm-ers-and-land-reflections-on-tanzanias-road-to-green-revolution/
62. https://www.pwc.in/assets/pdfs/publications/2016/india-afri-ca-partnership-in-agriculture-current-and-future-prospects.pdf
63. http://www.tzdpg.or.tz/fileadmin/documents/external/nation-al_development_frameworks/ASDP2_Final_Document_20_May._2016__after_edit__1_.pdf
64. http://www.thecitizen.co.tz/News/-Agra-applauds-Tanzania-for-ASDP-II-launch/1840340-4631436-dt51e3/index.html
65. https://seednet.gov.in/Material/Prog-Schemes.htm#ii)%20Seed%20Village%20Scheme%20:
66. http://www.indiaseeds.com/central%20scheme/not250416.pdf
67. https://www.ippmedia.com/en/features/agriculture-seed-agen-cy-embarks-campaign-revamp-production
68. As shared by the Acting CEO, ASA in an interview with the author in December 2017.
69. Tanzania: U.S. -Based NGO Set to Produce Improved Seeds: https://allafrica.com/stories/201406190857.html
70. https://stories.clintonfoundation.org/notes-from-the-field-tanza-nia-99575d844804
71. https://africasoilhealth.cabi.org/2017/03/20/asa-in-tanzania-seeds-of-success/
72. https://www.clintonfoundation.org/clinton-global-initiative/commitments/quality-seeds-access-partnership-africa
73. ESAFF / INSARD (2013), Seed and Agricultural Research Processes in Tanzania. http://esaff.org/images/insard_seeds_and_agriculture_research_processes_in_tanzania.pdf
74. https://www.asti.cgiar.org/sites/default/files/pdf/factsheets/India-Factsheet.pdf
75. https://www.asti.cgiar.org/sites/default/files/pdf/Tanzania-Fact-sheet-2018.pdf
76. In an interview with the author, February 2018
77. http://eatproject.org/docs/tanzania_seedCLIR.pdf
78. ISAAA Briefs 53, Global Status of Commercialised Biotech/GM Crops in 2017 http://www.isaaa.org/resources/publications/briefs/53/download/isaaa-brief-53-2017.pdf
79. Aruna Rodrigues & Others versus Union of India & Others, Writ Petition (Civil) No. 260 of 2005
80. http://timesofindia.indiatimes.com/articleshow/66352676.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
81. http://www.moef.nic.in/downloads/public-information/Annex_BT.pdf
82. https://www.ippmedia.com/en/news/new-push-pipeline-accep-tance-gmo-seeds
83. http://www.thecitizen.co.tz/News/Business/-Foundation-re-ceives-Sh4-billion-grant-to-promote-maize-hybrids/1840414-4763272-14sdut1/index.html
84. USDA GAIN Report 20 November 2017 https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Agricultural%20Biotechnology%20Annual_Dar%20es%20Salaam_Tanza-nia_11-24-2017.pdf
85. http://www.agrinnovateindia.co.in/
86. https://icar.org.in/sites/default/files/ICAR%20Guidelines%20for%20IPM%20and%20Technology%20Transfer_2018.pdf
87. In an interview with the author, December 2017
88. https://www.thehindu.com/news/cities/Hyderabad/german-support-for-ts-seed-valley-project/article24274082.ece
89. https://telanganatoday.com/keshavulu-appointed-as-isac-presi-dent
90. Hyderabad to house national seed testing centre: https://telan-ganatoday.com/hyderabad-house-national-seed-testing-centre
91. http://www.thehansindia.com/posts/index/Andhra-Pradesh/2017-09-27/Need-for-quality-seeds-stressed/329308
92. http://www.thehansindia.com/posts/index/Telanga-na/2018-01-21/Seed-park-to-spring-up-on-200-acre-in-Me-dak/353237
93. http://agriculture.gov.in/Admin_MOAFW/Data/January2018.pdf
94. http://ofai.org/organisation/organic-certification-and-label-ing-scheme/
95. https://pgsindia-ncof.gov.in/pdf_file/PGS-India%20Operation-al%20Manual.pdf
96. MoA&FW's Press Release, 21 March 2018 http://pib.nic.in/newsite/PrintRelease.aspx?relid=177758
97. PKVY Manual for District-Level Functionaries, 2017 https://darpg.gov.in/sites/default/files/Paramparagat%20Krishi%20Vikas%20Yojana.pdf
98. This term refers to the set of farming practices that is currently spreading in India, which are based on the principle that crops should be grown naturally without any inputs. This in turn cuts down the input costs for Small Holder Farmers, hence the term 'zero budget'. The practice has developed in reaction to the ex-tensive use of agricultural chemicals. While zero budget natural farming basically evolved from individual and group efforts of people themselves, some of the state governments in India are beginning to promote it as well.
99. See its '12 Steps to Becoming an Organic Farmer' http://www.kilimohai.org/kilimohai/steps-to-organic-farming/?L=0
100. East Africa Organic Products Standard 2007 http://www.kilimo-hai.org/fileadmin/02_documents/Standards/East_African_Organic_products_standard.pdf
101. Clause 5.8 on Seeds, seedlings and planting materials
102. http://sfacindia.com/UploadFile/Statistics/Farmer%20Produc-er%20Organizations%20Scheme.pdf
103. Sections 25 and 581(C) of the Indian Companies Act, 1956
104. NABARD's FAQs on FPOs, 2015 https://www.nabard.org/demo/auth/writereaddata/File/FARMER%20PRODUCER%20ORGANISATIONS.pdf
105. NABARD Press Release, July 2018 https://www.nabard.org/PressReleases-article.aspx?id=25&cid=554&NID=40

4. ACTORS AND STRATEGIES

4.1 CORPORATE POWER AND HOW TO TACKLE IT

Farmer-managed seed systems are a direct competition to industrial seeds. If farmers are able to save and exchange their local seeds, there is no need for them to rely on seed companies for seed and planting materials. For instance, in Kikombo in Tanzania because the practice of exchanging sorghum and millet seeds is alive amongst farmers, there are no seed dealers in the village.

The seed industry has been able to consolidate itself in both the Asian and African regions. For example, in the Asian region apart from government seed agencies the Asia and Pacific Seed Association (APSA) has all the major seed companies, like Monsanto (Bayer), amongst its members. It has developed a position paper on intellectual property rights for its members, which clearly urges them to lobby their host governments to move to UPOV 1991 standards of intellectual property rights[106]. The Asia seed trade is expected to be worth USD 92 billion by 2020, with China and India as the top two seed exporting countries[107].

Likewise, the African Seed Trade Association (AFSTA) has been active in the African region since 2000. AFSTA has been organising the seed companies in the region. It has a specific position paper on the informal seed system, which was adopted in its General Assembly in 2008[108]. Therein it clearly states that the goal must be to develop a formal seed sector instead, reducing the reliance of African farmers on the informal seed system. The industry argues that this 'transition should be as short as possible'[109]. As a matter of strategy, seed companies and the government enter into public-private partnerships (PPPs) in the area of seed, as in other areas of agriculture. WEMA is one such example.

The first assault on farmer-managed seed systems by seed companies is not direct, but insidiously through lobbying governments for changes in seed laws, so as to restrict the sale of seed by farmers. The other ways in which corporates extend their power is through intellectual property rights protection over their seed technologies. Pro-intellectual property rights changes in seed laws are applauded by the likes of the World Bank encouraging governments to continue on that path. The Enabling the Business of Agriculture (EBA), 2016 report of the World Bank ranked Tanzania as a 'top performing country' for having such 'good practices in place'[110].

Seed producers in Tanzania, both from the public sector and the private sector, have come together to form Tanzania Seed Trade Association (TASTA). TASTA in turn is part of AFSTA. The author approached TASTA for interviews, but they refused to given any insights or information.

TABLE 5: TANZANIA SEED TRADE ASSOCIATION (TASTA) MEMBER LIST

Cereal Seeds Only
Bytrade (Tanzania) Ltd
Fica Seeds (2002) Ltd
Krishna Seed Co Ltd
Highland Seed Growers Ltd
Mount Meru Seeds Ltd
Mbegu Technologies Incorp
Tanseed International Ltd
Suba Agro Vet (Satec)
Seed Co
Zenobia Seed Co Ltd

Vegetable & French Bean Seed
Pop Vriend (T)Ltd

Barley Seed
Tanzania Breweries Ltd

Agro - Inputs
Tanganyika Farmers Association (TFA)

Cereals & Vegetable Seeds
EA Seed Co Ltd
Kibo Seed Co Ltd
Monsanto (T)Ltd
Pannar Seed (Tanzania) Ltd

Vegetable Seeds Only
Alpha Seed Co Ltd
Multiflower Ltd
Hygrotech International
East West Seed

Export Vegetable Breeder Seed
Enza Zaden (Africa) Ltd
Rij Zwaan-Q-Sem Afrisem

Export French Bean Seed
Circle H Ranch
Fil Ltd C/O
Marnico Ltd

Rotian Seed Co Ltd
Sluis Brothers (Ea) Ltd
Selous Farming
Suba Agro Vet (Satec)
Agricultural Seed Agency (ASA)
Northern Seed Co Ltd
Brac Tanzania

Most farmers interviewed in Tanzania were not aware of the names of the companies that sell seeds. There is not enough publicly available information on which companies are Tanzanian and Kenyan or even other neighbouring countries. For example, despite the presence of a production location and breeding station of the Dutch company, Rijk Zwaan in Arusha, not many farmers in the region could tell that the vegetable seeds sold in the market belonged to that company. A simple colour coding, flag or label on seed packets could help farmers identify the country of origin of the product. But that is if they want to or are having to turn into consumers for seed companies.

With frequent mergers and acquisitions in the seed industry, some that are opaque to the world, it is not always easy for farmers to know the actors in the sector. India's leading agri-biotech company, Maharashtra Hybrid Seeds Company Limited (MAHYCO) acquired a controlling stake in the Zimbabwe-based, Quton Seed Company (Pvt) Limited (Quton) in 2014[111]. Quton is the largest cotton seed company in Africa and is currently present in Zimbabwe, Malawi and Tanzania. In the words of Mr Raju Barwale, Managing Director, MAHYCO, *"(t)his acquisition enables us to place ourselves strongly in the African region..."*[112]. While these changes happen at the back-end, they might not always be visible to the end consumer of seed products.

This is also the case with the mega mergers in the agriculture sector. The Bayer-Monsanto merger came under investigation before regulatory authorities in India. The Competition Commission of India (CCI) initiated enquiry proceedings against the Bayer's deal with Monsanto. It is only in the course of the submissions before the CCI in that matter that it came to be known that Monsanto's cotton business in India was being sold to a local company (of ex-employees of seed MNCs) Tierra Agrotech Private Ltd. Where there are such seed MNCs merging, it is as important to regulate them to avoid monopolistic behavior, as it is to regulate their seed products. If this is not done, the seed pricing can make these basic farm inputs expensive for farmers or push them into debt if they do choose to buy these products. This is another reason to promote farmer-managed seed systems.

Also, the relationship between foreign seed companies and domestic companies can be a difficult one. An example of this is the legal battle in India that ensued between the MNCs and the domestic seed companies that are sub-licensees of GM Bt cottonseed technology from the MNCs. This arose from a dispute between Monsanto in India and the Indian companies, with NSL in lead, who refused to pay the high rate of royalty that Monsanto demanded. The matter reached the courts with Monsanto asserting its patent claims on the Bt technology as a basis for its demand for royalties. On the other hand, the domestic seed companies insisted that since patents on plants are not allowed in India, the MNC cannot even hold such a patent in the country. The matter came before the Delhi High Court, where the judges agreed with the domestic seed companies. Monsanto has taken the matter in appeal to the Supreme Court of India and the verdict is still pending.

How and how much the state must intervene in public interest is always an important question to consider. For instance, when the Agriculture Ministry in India sought to impose a cap on the royalties that seed MNCs could collect through issuing the Licensing and Formats for GM Technology Agreement Guidelines, 2016, the guidelines had to be withdrawn due to pressure from the MNCs. The experiences in India lead to the conclusion that apart from laws that directly relate to seeds and farmers, there are other legal frameworks that are equally relevant to construct a supportive environment for farmer-managed seed systems; these include:

4.2 PUBLIC CONSERVATION AND MAKING IT USEFUL TO SMALL HOLDER FARMERS

There are two aspects of 'saving' seed for farmer-managed seed systems. One is having the freedom to put aside some seed from the harvest to be used in the next planting season. The other aspect of saving is that of conservation. There are two ways to undertake conservation work, one, *in situ* – on the site and two, *ex situ* off-site. According to the definitions in CBD (Article 2),

in situ means: conditions where genetic resources exist within ecosystems and natural habitats and in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties;

and ex situ conservation means: the conservation of components of biological diversity outside their natural habitats.

For the two approaches to support farmer-managed seed systems, both must be complementary to each other. But seed and agro-biodiversity conservation on the site where Small Holder Farmers are doing their farming is of priority.

In its national report to the Secretariat of the CBD, the Tanzanian Department of Environment (2014) acknowledged the loss of seed diversity.

The Department gave reference to the 2009 Country Report on the State of Plant Genetic Resources for Food and Agriculture by the then Ministry of Agriculture, Food Security and Cooperatives (MAFSC). The potential role of the Ministry in promoting diverse seeds needs to be recognized.

There are environmental challenges to farmer-managed seed systems and farming in general with the use of agri-chemicals and industrial pollutants. As per USAID (2016) data, Tanzania is amongst the top users of pesticides in SSA given its well-developed cash crops sector.

State agencies like National Plant Genetic Resources Centre of Tanzania and the National Bureau of Plant Genetic Resources in India do undertake seed conservation, but *ex situ* conservation is the major part of their work. The National Bureau of Plant Genetic Resources in India holding 4,36,000 accessions is amongst the largest gene banks in the world. Meanwhile, infrastructure needs for *ex situ* conservation is a matter of concern in Tanzania. There are times when there is not enough electricity to run the cold storage for seeds. The viability of the plant genetic resources stored in them is then questionable. Within the Seed Treaty, there are not only ongoing processes for strengthening the capacity of governments to implement farmers' rights, but also to develop Draft Voluntary Guidelines for the National Level Conservation and Sustainable Use of Farmers' varieties/Landraces[113].

1. Constitutional Provisions

The provisions that work in favor of Small Holder Farmers must be identified and invoked. In India, local groups constantly refer to agriculture being a state subject (as against being a subject that the centre has power on) to safeguard local decision-making on seed. Likewise, countries like Bolivia, Ecuador, Egypt, Mali and Nepal have food sovereignty enshrined in their constitutions. This creates a constitutionally protected space for seed sovereignty.

2. Competition Law

A strong anti-competitive law and its enforcement to keep corporate power in check is critical as seed MNCs become bigger and stronger.

3. Right to Information Law

The right of citizens to have access to information in areas as basic as seed and food is essential. It is also important in general for transparency and accountability. For instance, in India the RTI Act and the option to seek information on decisions made by relevant government agencies on seed technologies has been very valuable in galvanising public debate.

4. Essential Commodities Law

A law that empowers the state to take necessary action when the availability of essential goods, such as seed products, are either threatened or in short supply, makes it a legal imperative to react in times of seed shortages.

5. Consumer Protection Law

For farmers who are bona fide seed consumers or buy other seed-related products from the market, it is important to have the protection of the law in case of fake or spurious products.

Not all local varieties grown by farmers have even been collected and documented. This puts orphan/ neglected crops at a risk of extinction.

The staff of National Plant Genetic Resources Centre of Tanzania reiterates that there must be a strategic plan to check genetic erosion. Small Holder Farmers do not have the capacity to save all indigenous varieties. Therefore, the need to have many more informal non-centralised *in situ* collections of seed.

Centralised collections also create a concentration of power over the plant genetic resources. Many Small Holder Farmers they ask how they can repatriate from these collections some of their local varieties that they have lost. Seed savers are wary of depositing samples of their seeds and planting materials in these public gene banks. They fear 'biopiracy' by public breeders. In any case, in Tanzania farmers' seeds cannot be grown without going through and being released by the public sector. The case of farmer-breeder Dadaji Khobragade in India is also a case in point. His paddy variety was used as base material by a state agriculture university to develop and release its own variety. The fact that Dadaji's variety had been granted plant variety protection did not help[114]. There are concerns about the process of collection from Small Holder Farmers itself. Farmers in both countries lament that researchers come and collect either information or the physical material from them, but they get nothing in return.

There is realisation amongst CSOs, NGOs and farmers' organisations with regard to the importance of people's knowledge on seeds. But in the absence of any policy there is little in terms of state support to revive and keep alive farmers' knowledge.

There is a range of crops that are grown traditionally, for instance millet, sorghum, sesame, groundnut and bambara nut in Tanzania. But not all are of interest to the mainstream, which is one reason, that majority of farmers use farm-saved seed. This was confirmed in conversation with farmers in Kikombo. The market will not offer varieties of these. Maize and sunflower are more prevalent now. Conservor farmers need state support.

In India, conservation is also supported through awards instituted under the PPV&FR Act for individual farmers and farming communities. The awardees are acknowledged as plant genome saviours[115]. Though reward/recognition is for a farmer who is engaged in conservation of genetic resources of land races and wild relatives of economic plants and their improvement through selection and preservation, it is subject to the fact that the material selected and preserved has been used as donors of genes in varieties registerable under the PPV&FR Act, 2001. Farmers whose applications are shortlisted for reward/recognition are mandatorily required to deposit specified quantity of seeds or propagating material with the PPV&FR Authority. So the awards are also a means to get interesting plant genetic resources into the formal collection maintained in National Bureau of Plant Genetic Resources in India.

Yet there are inadequate budget allocations with government for 'improving' farmers' seeds. The research on certain varieties is carried out as per donor-driven priorities. As explained by Dr Lourance Mapunda, who is a seed scientist at National Plant Genetic Resources Centre of Tanzania, it is not the seed that is of interest, but the genes in it. The head of the National Plant Genetic Resources Centre of Tanzania argues for a specific legislation on plant genetic resources in Tanzania. This is required to be able to deal with requests for access to plant genetic resources by the seed industry. There have been occasions when a foreign seed company has sought samples from their collection, but has refused to sign the Standard Material Transfer Agreement (SMTA) (that they use in the absence of any national sample agreement).

In the absence of an ABS law there is also no system to effect benefit sharing with farmers, if and when their varieties are used to develop seed products. Channeling back benefits, whether monetary or non-monetary, to seed keepers and Small Holder Farmers also motivates them and provides them with the necessary support to continue the important work of in situ conservation.

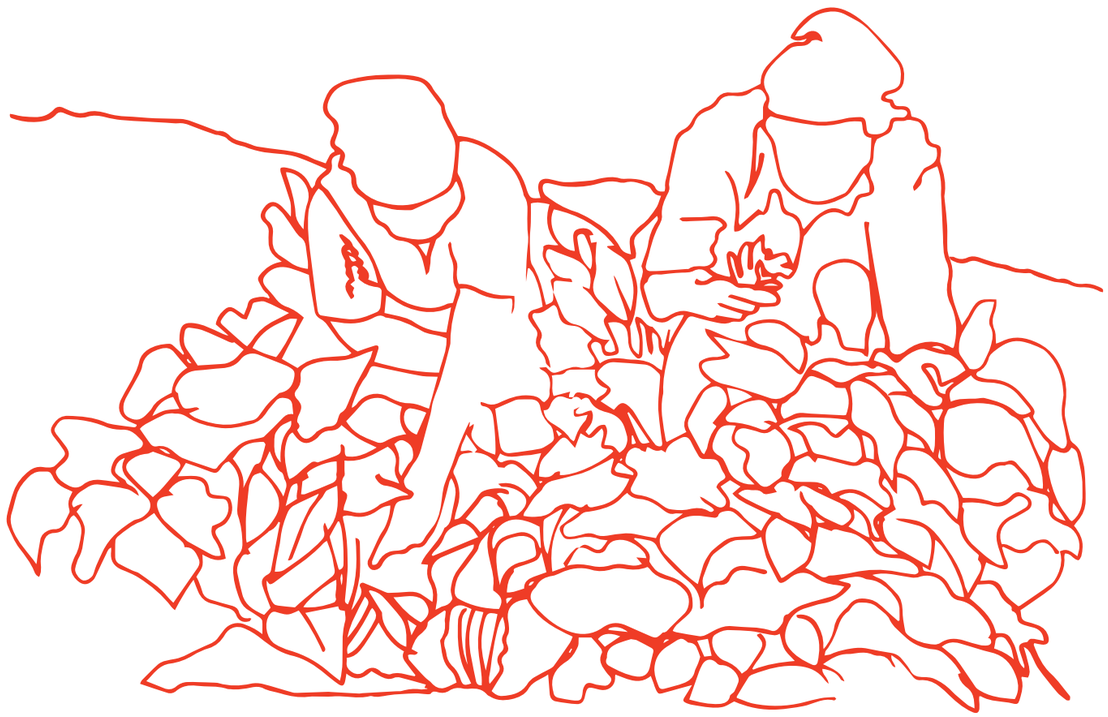
Since Tanzania is a member of both the CBD and the Seed Treaty there is expectation that some domestic law will be developed to address the twin issues of conservation and access to the conserved plant genetic resources.

Tanzania began the process of domesticating the Seed Treaty in 2007 when the country initiated the development of a legal framework for Plant Genetic Resources for Food and Agriculture; unfortunately that process is now at a standstill. The draft document has been stalled at the cabinet level for a lengthy period of time and it seems that there is no rush by the government to adopt the Treaty.

4.3 PEOPLE'S INITIATIVES TO SUPPORT FARMER-MANAGED SEED SYSTEMS

There are several popular initiatives both in India and Tanzania to safeguard local seeds and with it to empower and organise Small Holder Farmers. Ironically, in the two states of India where the seed industry has a stronghold – Karnataka and Telangana, efforts by people and NGOs to develop and support farmer-managed seed systems are amongst the strongest. With the field visit in Telangana it was apparent that there are three broad categories of farmer-managed seed systems that are emerging in the state:

1. community-based model as developed by Vijayram; where the emphasis is on the conservation and multiplication of traditional varieties to (re)popularise them amongst farmers;
2. community-managed seed systems (like WASSAN's)[116], where an existing government programme is used, to both bring farmers together and avail subsidies;
3. NGO-facilitated seed initiatives that are market-based, as by Centre for Sustainable Agriculture (CSA) and its partners, where farmers are organised into cooperatives and farmer-run enterprises are supported to market their produce.



Text Box 5: Women and Seed

Women are as much part of farmer-managed seed systems as any other farmers. Many initiatives by CSOs and CBOs have focused on providing support to women and their roles in seed keeping. The well-known example from India is that of the Deccan Development Society in Medak District of Telangana, which gives visibility to the Dalit women sanghams who have revived their lost millet varieties. Their collective efforts have not only brought together women in their state, but also led to the formation of the All India Millet Sisters Network, which has also received a national award from the Government of India[117]. Likewise, many other seed networks seek to give visibility to the gender dimension of seeds. There is also an all India advocacy network namely Mahila Kisan Adhikar Manch (Women Farmers' Rights Forum) created by civil society in April 2014[118].

In Tanzania, a lot more needs to be done to put women at the centre of seed keeping. However, there are ongoing efforts; one such being run by Sustainable Agriculture Tanzania (SAT). Another dynamic example of what women can do is Elinuru Moses in Arusha. She demonstrates how in a kitchen garden traditional seeds can be revived. She takes a more holistic view of farmer-managed seed systems, stressing the needs for not only seeds, but also trees. She feels there must be policies for laying stress on local foods and access to local lands. On Tanzania's future she only sees it if the government seriously implements a programme on tree planting, recognising the linkages between trees, rain and farming. Her key message to other farmers is that the knowledge of local seeds and traditional foods should be of primary importance. Knowledge and awareness has to be passed onto the younger generation of both girls and boys.

Seed has to be sown in the ground, thus, no discussion on seed is complete without talking about where one can plant it. In both countries, a common challenge on this front is the lack of fully recognized land rights for women, when their legal titles are uncertain, their say on how land is used, is limited.

In the Indian state of Punjab, which is known to be the heart of the Green Revolution there are many initiatives that came out of chemical agriculture. Turning to organic farming opens the space to talk about desi beej (traditional seeds). For a generation that is now confronted with the ill effects of agri chemicals, there is another generation that is turning to organic production. The Kheti Virasat (Agriculture Heritage) Mission (KVM), a movement for sustainable agriculture in Punjab, has facilitated young seed keepers. The Indian Seed Sovereignty Alliance has mobilised seed savers across the country. It organises seed exchanges and also provides trainings to capacitate a new generation of seed keepers.

An input-intensive agriculture in order to get more and more yields is often justified as being important to feed a growing population. However, there is a growing realisation amongst people and policymakers that overdependence on vast monocultures of wheat and paddy through chemical-intensive farming (as prescribed by the Green Revolution) is a flawed national food security policy. This erroneous approach is making Punjab's agriculture unsustainable and creating a hurdle in the growth of organic farming, says Umendra Dutt of KVM[119]. A Punjab State Farmers and Farm Workers Commission (PSFFWC) has been set up by the Punjab Government. This was done through the passing of a law on the subject[120]. The Commission has come out with a Draft Farmers' Policy[121], which explicitly states that 'the challenges of today are the consequences of the successes of the past'. Green Revolution technologies developed to provide solutions and it subsequently ended up creating problems that are being attempted to be solved, through another wave of seed technologies. This is a reflection on how amongst other effects of the Green Revolution, groundwater depletion and soil contamination has resulted, while farmers' incomes need to be increased and their social and ecological security has to be addressed. As a result of this, a standalone policy on seeds to be developed in consultation with all the relevant stakeholders.

There are also individual farmers who having faced problems with pesticides, gave up chemical agriculture and started using the local seeds. This experience-based change by farmers is most evident by the fact that for growing their own food, many farming families do not use seeds that require chemicals. The organic farmer Jagtar Singh has turned to organic on his 8-acre land in Punjab. Explaining the impact of dependency created by the Green Revolution on external sources for seed in Punjab, he says that it has made farmers mentally sterile. Also the corruption in the seed supply system means that the development of informal organic markets is not welcomed. Seed companies want their seeds promoted through the extension services. Therefore, the agriculture officers do not always encourage popular initiatives.

OPEN SOURCE SEED

In reaction to intellectual property rights on seed, another initiative is catching root, i.e. the open source seed (OSS) initiative. The OSS initiative is one to take forward the ethos of sharing (seeds and knowledge). It disallows anyone in the seed network to either seek intellectual property rights on seed or use patented seed. This has been put to use in India through the *Apna Beej* (Our Seed) network[122]. Discussions on this are still at the early stages in East Africa. A forum on OSS has also been organised in Tanzania[123]. The idea of such a system is that farmers and breeders be legally supported in their free choice in seed selection and actively engaged in knowledge and innovation (Hivos, 2018).

While there are similar efforts in Tanzania to mobilise Small Holder Farmers, there is still so much more to do in terms of organising people around the seed issues. Mount Meru Sustainable Land Ltd (MESULA) is an initiative located in Arusha, North Tanzania, where it is working with Small Holder Farmers in the Mt Meru area. The MESULA team gives training to farmers on how to transition to organic farming and how to prepare for it.

COMMUNITY SEED BANKS

Community seed banks have been initiated with the first one being the one in Mbeya, Tanzania since 2004. This seed bank has been able to distribute local seed varieties to 24 farmers outside their own groups. The seed also brings people together; there is a shared desire to maintain traditional varieties. PELUM also organises seed fairs at the district level, as they did in September 2017. The rationale for all these initiatives is that an farmer-managed seed system is most suited to local needs. There are huge gaps in capacity in the state to gauge the seed demand and match the supply. Data collection and then aggregating the data for the state machinery to provide seed at the right time and place is inadequate. Thus, it makes sense to develop local seed solutions. The state analysis must incorprate the local seed initiatives that already exist. Linking farmer-managed seed systems in shared agro-ecological zones in the country could provide support to Small Holder Farmers.

There is a new generation of small local seed companies that have emerged in both countries that are more responsive to the seed needs of Small Holder Farmers and some are also comprised of farmers themselves.

In Tanzania, peoples knowledge on seeds is not legally recognized. Source: Shalini Bhutani

FARMER-FRIENDLY SEED ENTERPRISES INDIA

1. Prakrit OP Seed Company

The most recent initiative to set up an 'alternative' seed company, which does not build its business plan on selling hybrids, is one called 'Prakrit' (which means 'natural' in Hindi). It was started to mainly re-introduce open pollinated varieties in such crops, like vegetables, which have become either 100% hybrid or GMO-oriented in the conventional seed market with more than 80% market share held by MNCs. Sujit Chakraborty, amongst the founders of this company is a strong proponent for dehybridisation. He explains that the letters 'OP' in the name of the new company, stands for both open pollinated and organically produced, and are representative of the philosophy of the enterprise. Prakrit sources planting material both from the informal network maintaining indigenous varieties in the country and the ICAR's Indian Institute of Vegetable Research (IIVR) for publicly bred varieties and government-notified seed[124].

2. Sahaj Aharam Producer Company Limited

This is a federation of farmer producer companies from the South Indian states of Andhra Pradesh (AP), Telangana and Maharashtra. All the seed producers are Small Holder Farmers. They produce seed of local varieties organically; with PGS certification from the GoI's NCOF. This producer company is also supported by the NGO – Centre for Sustainable Agriculture (CSA) based in Hyderabad, India particularly for direct marketing to both rural and urban consumers. CSA also subscribes to OSS[125].

3. Sahaja Samrudha and its companies

An NGO named Sahaja Samrudha has been instrumental in not only doing seed conservation work in Karnataka, but it has also helped to form and register the 'Desi Seed Producer Company Limited' under the Companies Act of India. This producer company of Small Holder Farmers sells organic seed under the brand name 'Sahaja Seeds'. The NGO has also helped to found the Sahaja Samrudha Organic Producer Company Limited (SSOPCL) in 2010 by 10 organic farmers in the state of Karnataka to market organic produce.

FARMER-FRIENDLY SEED ENTERPRISES IN TANZANIA:

1) John Julius - Temnar Company Limited

John is an individual farmer-seed producer in the South of Tanzania. The area is a bit isolated from the rest of the country (the seed industry is primarily in the North in and around Arusha). He has been

working to fill the gap in seed supply to farmers who do not have access to quality seeds. His company – Temnar Company Limited, focuses on oilseeds, such as sesame, peanuts and sunflowers. The company buys seeds (sesame and groundnut) from the ARI or (sunflower basic seed) from ASA. He engages farmers and outgrowers for seed multiplication.

2) Zosem of Zolssa Seed Multiplication

Eastern and Southern African Farmers' Forum has supported a self-help group called Zosem in Central Tanzania. They undertake seed production.

3) Zyatagwa Group

This is a group of 28 farmers formed in 2007 and led by Mr Amasha Mwashiuya of Mbozi. They are promoting their local maize landrace namely Ibandawe. As mentioned in Eastern and Southern African Farmers' Forum 's Director's Report 2016: It is working with an ARI in Uyole, South Tanzania to purify Ibandawe, while ensuring ownership of Small Holder Farmers over local seeds[126].

FARMERS' MOBILISATION

No initiatives to support farmer-managed seed systems and farm-saved seed have been possible without mobilising farmers themselves. People in India have used various creative methods to facilitate discussions amongst Small Holder Farmers on seed-related issues and alternative visions for food and farming. The holding of farmer juries or community assemblies has been an effective tool. *Prajateerpu*, a citizen's jury on the food and farming futures for Andhra Pradesh, designed as a six-day exercise in deliberative and inclusive democracy involving Small Holder Farmers was held in 2001 in a village in a district of Andhra Pradesh. Through this process Small Holder Farmers envisioned a localised seed and food system as most appropriate and sustainable. The jury verdict outrightly rejected GM seeds as having no place in such a vision. Likewise, when the second Green Revolution was being pushed in parts of Eastern India, people organised a farmers' jury in the city of Bhubanewswar in the Eastern state of Odisha in 2012 on the future of Agricultural Development & Improvement of Livelihoods in Eastern India, in the context of BGREI[127]. The Kisan Swaraj Sammelan (Farmer Sovereignty Gathering) is held with periodicity in India. The 4th such gathering with small farmers and seed savers from 21 states of India was held in Gujarat. It is organised by the Alliance for Holistic and Sustainable Agriculture (AHSA) a pan-India people's initiative formed in 2010[128].

In the last two years, India has witnessed unprecedented protests by farmers across India. While these go unreported in the mainstream media, they are well covered in the vernacular press and alternative media. Over 200 farmers organisations from across India have come together under the aegis of All India Kisan Sangharsh (*kisan* meaning farmer and *sangharsh* meaning struggle in Hindi) Coordination Committee (AIKSCC). They have mobilised across the political spectrum with the realisation of the common threats faced by their farmers. Outside the Parliament of India they held a "Raitha Mukthi Samsat", a parallel Parliament, in New Delhi on 20th November 2017 to highlight the plight of the farming community. They have since collectively drafted two legislative bills,

- One on debt relief and freedom from indebtedness; and
- a second on right to guaranteed remunerative support price.

Farmers are mobilising for these to be passed in the Parliament of India. So far, 21 political parties have extended their support to the two bills[129]. There are also several farmer marches that are periodically taking place in the capital New Delhi to alert the Central Government and seek redress for the current agricultural crisis in the country. While not all focus on seeds as a standalone issue, it is clear that the current model of food and agriculture is unsustainable and the Small Holder Farmers are the worst affected.

SOLIDARITY WILL WIN

New solidarities are also being formed around farming and seeds. For example, the Mazdoor Kisan Sangharsh Rally (Workers and Farmers Struggle Rally) held in September 2018 in New Delhi vowed to carry forward their collective struggle against what they consider anti-worker/farmer governments at the Centre[130]. The notable point is that there is a wider people's process in place to build a public debate on the issue and that the matter is not simply disregarded as an issue to be dealt by farmers alone. This was also the key message from the 200 km Farmers' Long March in India's wealthiest state of Maharashtra in March 2018[131]. A much larger convergence of movements in a large democratic long march of the Dispossessed in November 2018 brought farmers and several others from across India to demand for a special three-week session of the Parliament of India to debate the agrarian crises and possible solutions. A participatory process inviting all to contribute and support is now underway[132]. So, while agriculture and seeds are local issues that entail practical work at that level, they also have to be made political for advocacy.

What works well in most of the people's initiatives is when people come together. The issue of seeds is a particular one on which any self-help group or a farming community cannot work alone on because it requires mobilisation and motivation to effect change. Another important issue is that, unless the seed work is rooted in the ground and embedded in communities and their cultures it will not resonate. This can only be attained with awareness and experience-sharing amongst farmers. The challenge is similar in both countries, i.e. how does those seeking support for farmer-managed seed systems utilise existing government programmes, such as quality declared seed in Tanzania to promote local farmers' seeds? This issue is not simply about popularising or re-introducing farmers' seeds into the seed supply system, but a much more broader and long-term struggle to get due recognition for Small Holder Farmers and their seeds. There will be areas of seed work where no government policy or programme currently exists. Ordinary citizens, NGOs, CSOs and local self-help groups play a vital role in filling some of the gaps.

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5. CONCLUSIONS

5.1 KEY FINDINGS – PROMOTING FARMER-MANAGED SEED SYSTEMS IS THE WAY FORWARD

1. There are a wide variety of farmer-managed seed systems in both India and Tanzania and there is no one model that could be seen as an ideal farmer-managed seed systems that can be said to exist in either country. But it can be understood as one, which gives primacy to Small Holder Farmers and their seeds, wherein at all stages the farmers are in control. They are all not known by the same term. The nomenclatures farmer-managed seed systems in Tanzania and CMSS in India are given by those who are referring to them from the outside. When referring to themselves and their seed systems, most Small Holder Farmers simply call it apna beej/yetu mbegu (our seed) or desi beej/jadi mbegu (traditional seed). In any farmer-managed seed systems as long as the Small Holder Farmers have an active choice, the decisions ought to be theirs and supported by the state. No matter what form and shape farmer-managed seed systems take, be it community farming, farmer cooperatives, FPOs, etc. the bottom line is that farmers' freedom to save, exchange, share and sell seeds must remain for the continuance of farmer-managed seed systems.

The diversity of farmer-managed seed systems is their strength. This aspect is in sharp contrast to the many monocultures that the mainstream seed systems embody. Also, farmer-managed seed systems can be more agile and flexible as compared to larger widespread systems. If and when confronted with a challenge their dynamic nature can make adaptation easier. The multi/inter cropping also guarantees agro-biodiversity, which works as an insurance against disease and disasters. This is precisely for their immediate local contexts, where farmer-managed seed systems have the potential to address local problems. Though there may not be one opinion amongst Small Holder Farmers regarding whose seeds ought to be used. Nonetheless, the study finds that farmer-managed seed systems remains the key source of seed for Small Holder Farmers in both countries.

2. There is a sense of connectedness and timelessness amongst Small Holder Farmers with respect to local seeds. While their social and cultural significance is important, local seeds are also responding to the particular needs of their areas. It also implies that knowledge systems on seeds have stood the test of time. Seed is about both resources and people. While seed is brought under focus, the seed savers and their knowledge cannot be ignored. This is not only about the physical planting material but the well-being of Small Holder Farmers as well. There is generally a lack of due attention to gender dimensions. Women seed savers, their knowledge of seeds and breeds, are not adequately nurtured. There are also many indigenous people, local communities and other marginalised groups in both countries, who have their unique seed practices, just like the traditional forest dwellers and adivasi farmers in India. Yet their indigeneity is not even acknowledged by either government. Giving visibility to the seed issue, does not mean those working on seed are to be made visible too.

In fact the green and gene revolutions in India's agriculture render farmers' innovation invisible. And perhaps the key learning from India's experience is that despite the official adoption of seed technologies from the public sector and now seed MNCs, farmer-managed seed systems have survived. Not only that, farm-saved seed continues to be the key source of planting materials for Small Holder Farmers and remain relevant locally. Industrial agriculture usually first goes to irrigated areas. Thus for rainfed areas farmer-managed seed systems stay more relevant. Farmers interviewed in both countries believed that climate-adaptive local varieties could also work better with the changing rainfall patterns. In both countries, the formal sector fulfills a much lesser percentage of the seed need. This signifies the resilience of farmer-managed seed systems. Meanwhile, with the policy push to 'modernise' peasant agriculture, local farmer-managed seed systems could be further destroyed if their importance is not continually emphasised.

Seed fairs are key to strengthen Farmer-managed seed systems. Source: Shalini Bhutani

3. Yet respect and recognition of farmer-managed seed systems by the state does not come automatically. Currently, both countries provide for it in varying degrees, with India being a shade better in terms of laws and policies. From the conservation, production, processing and distribution to post-production stage, farmer-managed seed systems do need a supportive environment. Getting that support is not merely a practical problem, but a political one. While the legal and policy support for farmer-managed seed systems in both countries is inadequate, there is no law in either Tanzania or India that stops farmers from saving, sharing and exchanging their own farm-saved seed. This message is reaffirmed by this study.

But the terrain for seed sales by Small Holder Farmers is slowly becoming uncertain. Farmers in India produce and sell their own seed informally. These are sometimes sold under any label or sold with 'TLS' or at times they are contracted to produce it. There have been instances in India where corrupt seed inspectors have wrongly intercepted farmers carrying their own seed without any documentation. Meanwhile, in Tanzania sale by Small Holder Farmers is done under the radar with traditional varieties or through quality declared seed with public-bred varieties.

4. As the seed industry expands and seeks new frontiers, it will require tighter implementation of seed and intellectual property rights laws that restrict farmers' sales. The industry has a focus on regional capitals and global markets. Governments also want big farmers and not too many small farmers with fragmented farms. Tanzania's seed sector is going through the early growth stage, with seed laws and policies still evolving (FICCI, 2016). This might be both a problem and a blessing for farmer-managed seed systems, where there is still space to develop local seed systems.

Yet the growing corporate power in agriculture in general and in the seed sec-tor in particular is a challenge in both countries. In Tanzania, seed companies supply only 10-25% of the maize and vegetable seeds and to shift from 25% to 100% it will take years. In India, the penetration of the seed industry is comparatively more. Seed MNCs in generally have been able to establish themselves in both countries. The US MNC Monsanto Inc. (now Bayer) has a particular stronghold on seed in both countries. The corporate practices of this MNC in India, particularly with respect to biotech seeds and intellectual property can provide valuable learn-ings for Tanzania.

5. Governments rightly argue that they need to regulate industrial seed. Seed quality becomes a justification for governments wanting to also regulate farmer-managed seed systems. Fake seeds in circulation are a real and urgent problem in both countries. There are also few legal and other remedies

for Small Holder Farmers in case of non-performance of seeds. Yet the propaganda for certified seed has pushed farmers to shift from local seeds to those produced by seed companies. Farmer-managed seed systems should however be regulated through different policies, respecting the seed sovereignty of Small Holder Farmers. There are a number of popular initiatives to ensure quality even in seed produced by farmers, through more decentralised, community-based certification that can be put to use or devel-oped to respond to various contexts.

6. Farmer-managed seed systems cannot run on its own, without a strong public sector. The National Agricultural Research and Extension Services (NARES) have to provide support. The public sector seems to have a commanding position in Tanzania, as it leverages its varieties to seed companies. While India might have a much larger NARES, in terms of new seed technologies, there is a growing dependency on seed companies. The research priorities of the public sector are generally not supportive of farmer-managed seed systems. Not all traditional varieties can be brought back into use. However, collaborative research with farmers and scientists can yield good results. The seed MNCs will not have any R&D focus on orphan or neglected crops and that is where the public sector has an important role to play. Likewise, state seed corporations are often seen as competitors by seed MNCs. In fact, USAID recommends that ASA must withdraw from seed production.

With regard to ex situ conservation, Small Holder Farmers cannot physically store all potentially useful germplasm. The role of the public sector in safekeeping is critical. Currently, ex situ conservation of plant genetic resources is neither adequate nor appropriate. It can in fact create loss of control over planting material by farmers. India has a strong set-up of national gene banks, including the National Bureau of Plant Genetic Resources Centre at New Delhi. Likewise, in Tanzania, the National Plant Genetic Resources Centre in Arusha has an important role to support the conservation of orphan/neglected varieties that are of interest to farmers. Yet, legal issues of access from such national collections are yet to be sorted out.

7. In India, a biodiversity framework opens up policy space or farmer-managed seed systems. Such space is currently missing in Tanzania. Under the Biological Diversty Act in India the documentation of farmers' varieties is underway. Seed conservation is an important dimension for the furtherance of farmer-managed seed systems. Many more local household and community seed banks are required; there are limitations of capacity and resources. In India, there is at least an official recognition of the value of seed conservation by farmers themselves. The CBD-compliant biodiversity framework in India creates the institutional structure and the policy space for local-level conservation work to be undertaken. The Agriculture Ministry gives out awards to Small Holder Farmers annually. These elements are conspicuous by their absence in Tanzania.

Benefit sharing has largely been absent in both countries. In India despite provisions for the same in not only the Protection of Plant Variety and Farmers Right Act, 2001 and the Biological Diversity Act, 2002 there are few examples in which farmers have been acknowledged or recompensed for the use of their varieties and planting materials. The fight for benefit sharing is between seed companies themselves; be it the case of Monsanto versus Nuziveedu, or Daftari Agro versus Ankur Seeds. While this situation has to be corrected in India, a framework for ABS is completely absent in Tanzania.

8. Both countries have some form of seed production by farmers that is supported by the state. Quality declared seed may be a good entry point in Tanzania to get state support for local seed production. Local groups see this as a way to organise seed production in a non-centralised way, with the added benefit of capacity building of farmers. However, not all farmers in a ward or district can turn to quality declared seed production, as who will then be left as a potential buyer of the seed. The continuance of the quality declared seed system is also dependent on donor contributions. This raises the question of sustainability.

For sustainable agriculture, in India the need for a shift to green agriculture, agroecology and biodiverse farming is slowly but surely being spoken of in official circles. Organic farming in India, both versions, i.e. popular and official, have opened up doors for farmer-managed seed systems with its principle of farming with care even though organic policies do not by themselves promote farmer-managed seed systems. In fact, as TOAM experience shows, an organic farmer has to use approved seeds from the official seed supply system. The national law requires seed treatment, but organic standards say no to seed treatment.

9. New seed technologies such as the application of modern biotechnology pose a challenge to sustainable seed systems in both countries. This is particularly the case in the absence of appropriate biosafety regimes. GM seeds can put at risk both farmer-managed seed systems and the organic supply chain. India's experience with one GM crop, i.e. Bt cotton seed from 2002-2018, provides valuable insights to governments and Small Holder Farmers alike on the range of challenges modern biotechnology can pose to farmers' seed and their

Farmer-managed seed systems need a strong public sector. Source: Benjamin Luig

seed systems. The adoption of biotechnology in cotton has also been at the cost of the local cotton varieties. The fact that India has kept GM food crops on hold should be a reason to reconsider them in Tanzania as well.

10. Generally with laws related to seed, there is either a lack of awareness or legal illiteracy that comes in the way of Small Holder Farmers effectively engaging in the deliberations. A role of NGOs/CSOs in both accessing drafts of laws, translating them to make them more accessible to farmers, is critical. While there is lack of legal awareness, the general perception amongst farmers also is that one does not get much from the legislature. Anyhow, the legal landscape on seeds is changing and will continue to change. Laws other than those directly related to seeds also need to be understood and strengthened in support of farmer-managed seed systems.

11. Centralising tendencies in law and policy-making have to be recognized. These are spurred by the international treaties and regional agreements that both countries are part of. Though agriculture is a state subject in India's Constitutional scheme; the centre largely makes the laws and policies that impact seed. Farmer-managed seed systems also continue to be marginalised in dominant top-down development strategies by both countries' governments. As a counter to that, civil society in India has helped to organise farmers' juries and rural assemblies. Where people's initiatives have worked they have been supported by local and district-level administration. Tanzania may want to explore the Constitutional safeguards that Small Holder Farmers can invoke for the continuance of their seed practices. Meanwhile, the bio-cultural customary practices of Small Holder Farmers around seed that comprise 'soft law' need to be respected and recognized.

12. A specific area of law and policy relevant to farmer-managed seed systems' in both India and Tanzania is that of intellectual property. Both countries have plant variety protection laws in place, though they are differently oriented to Small Holder Farmers. Governments give justification that a plant variety protection law is to attract breeders and with them, the best varieties to the country. However, this is based on a mainstream view of agri-business, not a farmer-friendly model of seed innovation. The list of varieties registered under plant breeder rights laws is more of interest to the seed companies. The list of farmers' varieties registered in India shows the ones the system is still interested in. Registering farmers' varieties is an attempt of pre-emptive inteleectual property protection, before the seed industry can take any claim to have developed those varieties. On either side of the Indian Ocean the results of having a plant breeder rights system are yet to be seen because the plant variety protection laws do not really support farmers' innovation. For there is no

evidence of FVs being introduced into the official seed supply system in a plant variety protection regime.

A concrete lesson from India is the positions that it has taken at many international fora. It has firmly stood its ground against any strong intellectual property regime for plants and seeds. It has also stayed out of the UPOV Convention despite pressures from developed countries and the seed MNCs to become a member. This has given it much more domestic policy space for farmers' seed freedoms. India also subscribes to the Multilateral Environment Agreements CBD and the global Seed Treaty, which is not the case with Tanzania. As newer threats to farmer-managed seed systems emerge from a new generation of 'WTO-plus' free trade agreements, new solidarities on the South-South axis are urgently needed. Finally, it must be noted from the Indian experience that there are innumerable farmers' struggles and civil society actions locally and at the international level. There is fertile ground to sow the seeds of cooperation between the two countries.

5.2 RECOMMENDATIONS

The purpose of this study was primarily to inform the various proponents of farmer-managed seed systems. Accordingly the following recommendations are targeted at the various actors from Small Holder Farmers organisations and civil society. While there is much to be done in both India and Tanzania for farmer-managed seed systems, but from this comparative study there are concrete lessons as summarised in the previous subchapter 5.1, that can be the basis for specific advocacy areas as discussed below.

CONCEPTUAL CLARITY

There has to be clarity on the principles on which a farmer-managed seed systems must be based. Farming communities must be facilitated to cull these out through state-supported processes. Working concepts of seed sovereignty and agroecology have to be socialised. There have been various initiatives by CSO/NGOs to articulate positions on key concepts. Inclusive deliberative processes involving Small Holder Farmers have to be invested in. Most groups active on the seed issue in India have brought out position papers, declarations and statements on the seed work they undertake. The Seed Stakeholder Forum process in Tazania could consider articulating its own seed policy for farmer-managed seed systems along with Small Holder Farmers. While it will remain critical work to articulate what Small Holder Farmers stand for, it is equally important to clearly convey what goes against farmer-managed seed systems. A list of non-negotiable seed freedoms of Small Holder Farmers must be clearly articulated. There is a wealth of ideas from amongst ethnic communities in Tanzania who can offer another refreshing perspective on how to envision our relationship with seed.

LOCAL ACTION

The ground level work on seeds is of primacy and there is no shortcut to that. For no amount of advocacy work will suffice if there are no living instances of farmer-managed seed systems. This entails engaging all those involved in seed work, yet sidelined. Organising seed savers is a continuing endeavor in India. There are several working examples of farmers' seed banks and seed fairs/festivals/exhibitions, etc. organised in India. The many real stories of Small Holder Farmers who made the transition to organic/natural farming after suffering the Green Revolution, or those who stopped using GM seeds for the problems they posed are worth showcasing. Farmers' exchanges between India and Tanzania could be coordinated. The making of people's biodiversity registers at the local level in India has been a way to transmit seed knowledge within communities. The documentation of existing local seeds and biocultural practices around them make for a good starting point. Organisations like TOAM could also help build the rural-urban linkages.

PUBLIC REBUILDING

Seeds are a public asset and need to stay so for the wellbeing of society in general and communities organised around seed. The public sector has to hold seeds in public trust and be responsive to the smallest seed saver. Only a strong public sector can be an effective countervailing force to the ever-growing power of seed MNCs. The public at large too has to be involved in the work of seeds. Research & development budgets for seeds must be made open. Public resources must be made available to study the overall performance of farmers' varieties in relevant contexts. There is also need for comparative research on soil fertility linked to different agricultural systems. Such researchable issues from the viewpoint of Small Holder Farmers need to be collated to draw attention to gaps between what the public sector delivers and the real needs of Small Holder Farmers on the ground. The role of public sector researchers, scientists and extension workers has to be oriented to the needs of farmer-managed seed systems. A public debate to set research priorities and review outcomes must be institutionalised. To be able to access planting material from public collections, whether a gene bank or agricultural research institutes, applications for access to varieties that have been lost can be initiated. The idea of benefit sharing must be further developed with public institutions that too do not wish to be shortchanged through unregulated access by seed companies and private researchers.

NATIONAL ADVOCACY

Farmer-managed seed systems need legal and policy support. There must be policies to organise and incentivise Small Holder Farmers for sustainable seed production. But Small Holder Farmers and local seed keepers also have to be capacitated to be able to participate in the decision-making processes. The Seed Stakeholder Forum in Tanzania is already asking that policy makers should include the Seed Stakeholder Forum in drafting of future amendments to seed laws and instruments as part of a participatory review process. Farmers' policies need to be articulated. There is much work to be done to get an unequivocal statement of support and a clear plan of action for farmer-managed seed systems from governments, both at the centre and in the local administration. Yet unlike regulating every element of a seed enterprise, the many farmer-managed seed systems have to be given space and support to self-develop. The message must be made to reach policy makers that the seed industry will never be able to make enough seed to reach all Small Holder Farmers. The spaces in existing laws, some of which have been identified in this study must be used to push for farmer-managed seed systems. The comparative analysis of plant variety protection laws must be used to develop an intellectual property rights policy that also allows for "non-intellectual property rights" options for Small Holder Farmers. There must be an institutional architecture in the state to reign in intellectual property abuses in the seed sector. Apart from specific seed legislation; attention has to be given to other laws. Tanzania must develop a biodiversity framework, drawing from India's experience with the Biodiversity Act and its rules. Laws in both countries must address the gaps in accountability of seed companies, particularly multinational corporations. The Fair Competition Commission, Tanzania and Competition Commission of India could be encouraged to share experiences on not only the mega mergers, but also the cases of abuse of dominant positions in the market by seed corporations.

INTERNATIONAL SOLIDARITY

There are some common threats to seed sovereignty and farmers' freedoms that are posed by international law and global players, such as the seed MNCs. While there is work to be done at home to make national governments more responsive to domestic situation as against international rules; but there is also need for alliances at international fora. South-South solidarities need to be forged across borders, just as seed MNCs work across borders. The popular pushback cannot be attempted alone. This is particularly true of global trade rules like the WTO and its TRIPS Agreement. The Indian Government has attempted to regroup countries on the issue of intellectual property rights and 'biopiracy'; it organised a meeting to that effect in Geneva – the headquarters of WTO and UPOV in June 2018.

The work of implementation of farmers' rights and the guidance it offers to national governments under the Seed Treaty must be supported. The work for compliance with the Seed Treaty must be initiated. News of the adoption of the United Nations' peasant declaration must be sent to all relevant officials in the government for information and action on seed rights. Another space that has opened up recently and can be used, is the discussions around agroecology both at the FAO and at the UN Committee on World Food Security (CFS). This is urgent work needed to confront intellectual property rights in the seed sector. There has to be two-way learning on the impacts of UPOV-styled plant variety protection between the two countries. The global open source seed systems-movement is something to plug into. While Tanzania has already become a member of the UPOV Convention, a call for an impact study could be made. There is an urgent need to build solidarity on global rules that go against farmer-managed seed systems

ANNEX 1. LIST OF INDIVIDUALS INTERVIEWED AND STAKEHOLDER GROUPS AND/OR COMMUNITIES CONSULTED

INTERVIEWEES

TANZANIA:
Aithan Chaula, Seed Inspector
Michael Farrelly, ex-TOAM now with AFSA
Ms Joyce Mosile, Plant Breeder Rightss Unit, MALF
Sabina Nafisa, ACB
Mr Twalib Njohole, MALF
Mr Elirehema Swai, ARI

FARMERS:
Stephamo Chifwaguzi
Miza Mikael Chiwanga
Yuliana Gunzu
Amasha Joseph
John Kutusha
Lucy Leoma
James C Maligana
Dickson Matotangi
Aidan Mbavu
Peter Njombi

ARUSHA FARMERS:
Asia Fuyaha
Elinuru Moses
Nunu Mungure
Peter Urio

FARMER ORGANISATIONS:
Bernard Baha, TALA
Nickson Elly, MVIWATA
Prof Joseph Hella, SUA
William Hemisy, Acting Head of Gene Bank
Thomas Lasier, MVIWATA
Charles Levi, Ex-Acting CEO of ASA
Donita Senzia & Rehema, PELUM
Dr January Mafuru & plant breeders, ARI Seliani
Lourance Mapunda, National Plant Genetic Resources Centre of Tanzania
Janet Maro, Sustainable Agriculture Tanzania (SAT)
Richard Mbunda, University of Dar es Salaam
Dr Margaret Mollel, National Plant Genetic Resources Centre of Tanzania
Joe Mzinga, ESAFF
Patrick S N Ngwediagi, TOSCI & Vice-Chair, Administrative and Legal Committee (CAJ), UPOV

SEED BUSINESSES:
John Juliu
Steven Loy, Mount Meru Sustainable Land Ltd (MESULA),
Dr Mbwaga, Agriseed Co.
Tanzania Seed Trade Association – contacted, but unwilling to respond

INDIA:
PUNJAB, AMRITSAR:
Jagtar Singh
JALANDHAR:
Sher Singh Chahal
Lakhwinder Singh, Hoshiarpur
Tarsem Singh, Hoshiarpur

KHETI VIRASAT MISSION:
Raspinder Singh
Shipra Sehgal

LUDHIANA:
Harpreet Singh
Gurmeet Singh
Gurmiter Singh

PUNJAB AGRICULTURE UNIVERSITY:
Vice Chancellor
Director (Seed)
Director of Research
K S Thind, Additional Director Research (Crop Improvement)
T P Singh, Breeder Seed Production
Devinder Sharma, Forum for Biotechnology and Food Security
Ajayvir Jakhar, Chair, Punjab State Farmers' & Farmworkers' Commission

HYDERABAD, TELANGANA:
Dr Ramanjaneyulu & other staff, Centre for Sustainable Agriculture
Dr Keshavulu, TSSCA

ANNEX 2. ARTICLE 19 OF THE UNITED NATIONS DECLARATION ON THE RIGHTS OF PEASANTS AND OTHER PEOPLE WORKING IN RURAL AREAS

1. Peasants and other people working in rural areas have the right to seeds, in accordance with article 28 of the present Declaration, including:

   (a) The right to the protection of traditional knowledge relevant to plant genetic resources for food and agriculture;

   (b) The right to equitably participate in sharing the benefits arising from the utilization of plant genetic resources for food and agriculture;

   (c) The right to participate in the making of decisions on matters relating to the conservation and sustainable use of plant genetic resources for food and agriculture;

   (d) The right to save, use, exchange and sell their farm-saved seed or propagating material.

2. Peasants and other people working in rural areas have the right to maintain, control, protect and develop their own seeds and traditional knowledge.

3. States shall take measures to respect, protect and fulfil the right to seeds of peasants and other people working in rural areas.

4. States shall ensure that seeds of sufficient quality and quantity are available to peasants at the most suitable time for planting, and at an affordable price.

5. States shall recognize the rights of peasants to rely either on their own seeds or on other locally available seeds of their choice, and to decide on the crops and species that they wish to grow.

6. States shall take appropriate measures to support peasant seed systems, and promote the use of peasant seeds and agro-biodiversity.

7. States shall take appropriate measures to ensure that agricultural research and development integrates the needs of peasants and other people working in rural areas, and to ensure their active participation in the definition of priorities and the undertaking of research and development, taking into account their experience, and increase investment in research and the development of orphan crops and seeds that respond to the needs of peasants and other people working in rural areas.

8. States shall ensure that seed policies, plant variety protection and other intellectual property laws, certification schemes and seed marketing laws respect and take into account the rights, needs and realities of peasants and other people working in rural areas.

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Front cover photograph: United Nations Photo/Ray Witlin © 1974.

LIST OF ACRONYMS AND ABBREVIATIONS

AATF	African Agricultural Technology Foundation
ACB	African Centre For Biodiversity
AFSTA	African Seed Association
AGRA	Alliance For A Green Revolution In Africa
AP	Andhra Pradesh
APSA	Asia And Pacific Seed Association
ARIs	Agricultural Research Institutes
ASA	Agricultural Seed Agency
ASARECA	Association For Strengthening Agricultural Research In Eastern And Central Africa
BGREI	Bringing Green Revolution To Eastern India
BMGF	Bill And Melinda Gates Foundation
COMESA	Common Market For Eastern And Southern Africa
CSO	Civil Society Organisation
EAC	East African Community
EAOPS	East Africa Organic Products Standards
ESAFF	Eastern And Southern African Farmers' Forum
FMSS	Farmer-Managed Seed Systems
FOS	Farmer Organisations
FPOs	Farmer Producer Organisations
FR	Farmers' Rights
FSS	Farm-Saved Seed
GBMR	Genetic Or Biological Material Or Resource
GOI	Government Of India
GOT	Government Of Tanzania
GR	Green Revolution
INSARD	Including Smallholders In Agricultural Research For Development
IP	Intellectual Property
IPR	Intellectual Property Rights
ITPGRFA	International Treaty On Plant Genetic Resources For Food And Agriculture
KVM	Kheti Virasat Mission
MAFSC	Ministry Of Agriculture, Food Security And Cooperatives
MALF	Ministry Of Agriculture Livestock And Fisheries
MESULA	Mount Meru Sustainable Land Ltd
MNCS	Multinational Corporations
MOA&FW	Ministry Of Agriculture And Farmers' Welfare
MOEF&CC	Ministry Of Environment, Forest And Climate Change
MVIWATA	(Swahili) National Network Of Small-Scale Farmers Groups In Tanzania
NABARD	National Bank For Agriculture And Rural Development
NAIVS	National Agricultural Input Voucher Scheme
NBPGR	National Bureau Of Plant Genetic Resources
NCOF	National Centre Of Organic Farming
NGO	Non-Governmental Organisation
NMSA	National Mission On Sustainable Agriculture
NPGRC	National Plant Genetic Resources Centre Of Tanzania
NSC	National Seeds Corporation Of India
PBR	Plant Breeder Rights
PGS	Participatory Guarantee Scheme
PKVY	Paramparagat Krishi Vikas Yojana (Government Of India's Traditional Agriculture Development Scheme)
PPPs	Public-Private Partnerships
PPV&FR	Protection Of Plant Varieties And Farmers' Rights
PVJ	(India's) Plant Variety Journal
PVP	Plant Variety Protection
QDS	Quality Declared Seed
REC	Regional Economic Communities
RLS	Rosa Luxemburg Stiftung
SAARC	South Asian Association For Regional Cooperation
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SHFs	Smallholder Farmers
SSA	Sub-Saharan Africa
SSF	Seed Stakeholder Forum
TABIO	Tanzania Alliance For Biodiversity
TAFSIP	Tanzania Agriculture And Food Security Investment Plan
TLS	Truthfully Labeled Seed
TOAM	Tanzania Organic Agriculture Movement
TPA	Third Party Appraisal
UPOV	International Union For The Protection Of New Varieties Of Plants
URT	United Republic Of Tanzania
WTO	World Trade Organisation
ZBNF	Zero Budget Natural Farming

GLOSSARY

COMMUNITY-MANAGED SEED SYSTEM(S) (CMSS)

This term is used to refer to seed systems where farmers as a community manage it locally. It is more in use in India, as against the term Farmer-Managed Seed Systems.

FARMER-MANAGED SEED SYSTEM(S) (FMSS)

The general term used in Africa to refer to the informal seed systems run and managed by Small Holder Farmers.

FOOD SOVEREIGNTY (FS)

Sovereignty implies freedom to take one's own decisions. Food sovereignty is an idea developed by the international peasant movement, which essentially conveys the right of people to define their own food and farm systems.

INTELLECTUAL PROPERTY RIGHT (IPR)

Law gives these rights to persons, whether natural or legal (companies) for their creations. IPR laws are meant to grant rights on creations of intellect and thereby encourage innovation. The IPRs are vis-à-vis the protected invention for a fixed term period, like 20 years for patent or 15 years for plant variety protection. During that time the IPR-holder produces, markets and sells the said IPR-protected product (in this case seed technology) or licenses out the same to collect royalties. Typically all IPRs use the state machinery to provide not only the right, but also remedies for violations called infringements.

NOVELTY, DISTINCTIVENESS, UNIFORMITY AND STABILITY (NDUS)

This acronym signifies collectively the four criteria prescribed by the UPOV Convention that must be satisfied for grant of IPR to a new plant variety. N stands for novelty, D for distinctiveness, U for uniformity and S for stability.

OPEN SOURCE SEED SYSTEMS (OSS)

This system and its many variants have been developed by seed savers and plant breeders who believe that there should not be any private rights on seed and planting materials. The idea of openness attempts to counter the closing up of access to farmers and researchers to varieties and planting material protected by intellectual property laws, such as those of patents and plant variety protection.

PLANT VARIETY PROTECTION (PVP)

This is a specific type of IPR granted by law to plant varieties. The word protection refers to protection of the economic rights of the breeder.

TOAM - www.kilimohai.org
RLS South Asia - www.rosalux.in
RLS East Africa - www.rosalux.co.tz
RLS Southern Africa - www.rosalux.co.za