Federal Ministry
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Farmers' Seed Systems

The challenge of linking formal and informal seed systems

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Table of contents

Abbreviations

CBD	Convention on Biological Diversity
FSS	Formal seed system
IPR	Intellectual property rights
ISS	Informal seed system
ITPGRFA	The International Treaty on Plant Genetic Resources for Food and Agriculture
UPOV	Union international pour la protection des obtentions végétales
HRIA	Human right impact assessment
PVP	Plant variety protection
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
ISSD	Integrated Seed Sector Development
PGR	Plant genetic resources
PPB	Participatory plant breeding
PVS	Participatory variety selection

1. Seed systems – an overview

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Introduction

Seeds are key to development. They are first and foremost the source of all food and agricultural production. Seeds are genetic resources and carry plant genetic diversity. The capacity to cope with adverse conditions, may it be short term/seasonal or long term, as for example due to climate change, is based on these properties of seeds (Louwaars & de Boef 2012: 40). Seeds are valuable assets not only for farmers but for the global society. Seed systems – the interrelated set of breeding, management, replacement and distribution of seeds (Thiele 1999: 84) – serve as a means to attain food and nutrition security, income generation and the preservation of genetic heritage. Hence, efforts towards a world without hunger must inevitably target seed systems.

Humans have been exploiting the wide genetic diversity since the earliest domestication of crops for food, fibre and fodder some 10,000 years ago. Natural selection and human management of wild plants allowed the development of a wide range of crops and varieties with higher yields which made it possible for an increasing human population to live on smaller areas of land. The sowing, harvesting and sharing of seeds was and remains crucial to human development. Additionally, traditional on-farm seed saving has been responsible for the establishment and conservation of diverse plant genetic materials and a large gene pool.

Scientifically supported breeding only started in the 20th century. Advances were first made by hybridisation and selection; later a range of other technologies such as genetic enhancement by genetic transformation, tissue culture, mutagenesis, and a range of marker aided selection methodologies were applied (Pretty 2010: 26). Efforts in plant breeding led to huge effects on yield and quality, yet only for the relatively small number of crops, which were targeted by those efforts. Crop improvements on major staple and cash crops such as maize, wheat, rice and cotton went hand in hand with the establishment of a commercialised market for improved seeds and corresponding inputs such as fertilisers and pesticides. As a result, in many regions of the world increasing productivity allowed farmers to overcome food insecurity and to develop towards an income generating and market oriented agriculture. However, the dependence on external inputs rose, too. Today crop research is increasingly privatised and the protection of intellectual property rights on plant genetic resources (PGR) by plant variety protection or patenting is being pursued.

Scientifically supported breeding and the aligned commercialisation of the seed market contributed to a divide of the seed sector into two major seed systems: a formal seed system (FSS) and an informal one (ISS). The categorisation formal/informal refers to each systems' seed production practices, distribution networks, institutional framework and the way inputs are generally accessed. The two systems are also characterised by differences in availability, quantity, quality and affordability of seeds (physical access to the right seed at the right time for the right price). To the largest extent FSS and ISS remain uncoupled. The missing integration is disadvantageous for both spheres of the seed sector as will be outlined in the following section.

Formal and informal seed systems in a nutshell

Public seed sector programmes in the 1970 and 80s targeted the development of FSS and hence the dissemination of certified seed of improved varieties, assuming the ISS would gradually disappear. In the 1990s, in many countries public sector involvement in the FSS was withdrawn and privatisation and liberalisation promoted. But the informal seed system has remained dominant (see Louwaars & de Boef 2012: 39).

Farming and cropping systems vary along agro-ecologies and in their objectives: livelihood, food supply, and/or income generation. The structures of the seed system vary accordingly (ibid: 42). The majority of

small-scale and subsistence oriented farmers do rely on ISS operating in low potential areas where complex environmental stresses challenge agricultural production. In developing countries, it is estimated that 80 per cent of all seeds planted are provided by ISS (Duttfield 2007). ISS are organised according to the principles of agricultural development (food security). FSS on the contrary are predominantly embedded into large-scale, high-input agricultural production schemes with advanced mechanisation in which the principles of the market are the paradigm (Louwaars & de Boef 2012: 42).

Formal seed systems

The FSS is characterised by off-farm (*ex-situ*) seed conservation strategies namely gene banks supported by academic research and corporate breeding. Consequently, the system is very knowledge and technology intensive and has a high degree of specialisation. Target oriented breeding is placing emphasis on **d**istinct, **u**niform and **s**table varieties (DUS characteristics). Hybrid breeds, making advantage of heterosis [1], are very common in FSS. Aligned certification schemes reduce the risk of diseases transmission, guaranteeing a reliable germination, seed purity and uniformity. Various international regulatory frameworks protect the intellectual property rights (IPR) of breeders in order to stimulate innovation and recoup investment.

FSS focus on main commodities and their high yielding varieties. This facilitates production in large schemes and helps to meet consumer demands with regard to product prices and quality. Contract and/or export oriented farming are based on FSS. Commercial seed multiplication allows for the production of a large quantity of seeds, supported by distribution and marketing capabilities. Actors in FSS operate all the way from local to global levels.

Farmers relying on FSS depend on a highly centralised and oligopolised seed market. Resowing of seeds in FSS is economically not feasible (potential of disease transmission, loss of heterosis effect, lacking facilities for seed treatment and storage) and hampered due to strong IPRs. In addition, the separation of production, multiplication and the use of seeds in FSS lead to a loss of traditional knowledge and skills of farmers. As the activities of the seed industry concentrate on a low number of species and varieties genetic diversity is constantly reduced. FSS aligned farming systems are characterised by homogenous cropping. As a result, ecosystem services are severely reduced and the resilience of agroecological systems is at risk. Negative externalities [2], as for instance adverse effects due to the use and production of the fertilisers and pesticides required by high performance seeds are not included in the cost of production. FSS are embedded in formal institutions, i.e. existing legislations and policy schemes supporting commercial seed systems and input-reliant agriculture.

Informal seed systems

By contrast, in ISS, farmers have no or little access to formal institutions and mostly operate far from the effective implementation of policies and laws. Often, farmers lack financial resources for buying seeds and inputs. As a result, some 80 per cent of farmers in the developing countries depend on the harvest season to select seeds. They have few opportunities to benefit from decades of crop improvement that took place around the world in FSS (Access to Seeds Index 2014). This is remarkable given that small-scale farmers provide 80 per cent of the food consumed in the developing world (Walpole et al. 2013: 10).

Seeds used in ISS are produced, stored and re-used on farms. Seed management has a strong local and decentralised character: basic breeding, artisanal

[1] The increase in such characteristics as size, growth rate, fertility, and yield of a hybrid organism over those of its parents is called heterosis. Plant and animal breeders exploit heterosis by mating two different pure-bred lines that have certain desirable traits. The first-generation offspring generally show, in greater measure, the desired characteristics of both parents. This vigour decreases in the second generation and if the hybrids are mated together (Encyclopædia Britannica Online 2014b).

[2] Externalities refer to an economic concept describing positive or negative effects (cost or benefits) of one's action to a third party where the third party did not choose to get affected. In the case of negative externalities, the party causing the undesired effect is not compensating for it. A typical example of negative externalities is pollution. Chemical residues in water due to the use of pesticides in irrigated rice production must be considered as a negative externality for instance. Downstream users suffer as the polluted water poses a health risk to them and decrease the productivity of their farming and fishing, but they have no way of charging upstream rice farmers for polluting the water. Negative externalities call for interventions by governments or other entities (see Buchanan & Stubblebine 1962).

multiplication, selection and storing of seeds take place on farm or at community level on a small-scale and are frequently done by women. Storage facilities are often poorly developed, and seed production techniques are rather simple. The transfer of knowledge is based on informal channels.

Seeds used in ISS are characterised by a wide diversity at variety and crop levels. Formal certification and quality control mechanisms are largely absent in ISS. Crop improvement is done through recurrent variety selection and by the integration of new varieties into local gene pools via crossing or physical mixing and is based on farmers' preferences and/or natural selection (mass selection)[3]. Another strategy for crop improvement is the occasional purchase of certified seeds from FSS-agents.

Important drivers for farmers' crop conservation strategies in ISS are natural conditions, a desire to maintain diversity, and poor access to FSS channels. ISS farmers usually draw on a relatively high number of landraces which are better adapted locally and more resilient, but usually low yielding. This poses a major challenge for farmers in ISS: saving a certain amount of seeds from a low quantity of seeds harvested is especially tough when livelihoods are weak (IAASTD 2009: 27). The exchange and distribution of seeds are dependent upon geographical boundaries, cultural systems and social networks. In case of seed shortages due to economic, social or natural shocks, small and remote located communities are vulnerable with regard to seed supply. Lacking access to a sufficient amount of good quality seeds can be considered as the seed dimension in the cycle of poverty. But blaming ISS for this would not grasp the complexity of the seed sector as a whole. ISS for most farmers in developing countries are a source of economic independence and resilience in the face of threats, such as pests, diseases or climate change (de Schuetter 2009: 2).

[3] Mass selection (sometimes referred to as phenotypic selection): Seeds are collected from desirable appearing individuals in a population, and the next generation is sown from the stock of mixed seed. Criteria for selection are the appearance of each individual. An alternative approach is to eliminate undesirable types by destroying them in the field. Both approaches lead to the same result: seeds of the better plants become the planting stock for the next season (see Encyclopædia Britannica Online 2014a).

Linking FSS and ISS will allow making use of each system's strengths, leverage synergies and help to meet future challenges.

Challenges for designing pro-poor seed policies

ISS and FSS have different approaches with regard to breeding, management, replacement and distribution of seed. Actors involved in each system differ and so do their capabilities. However, both systems face common challenges which have to be taken into account when designing pro-poor seed policies.

Climate change

Regardless of being part of ISS or of FSS most farming systems are struggling with the adverse effects that **climate change** has on natural resources. Technology and innovation are costly and often have limited ability to substitute the natural capacity of plants to cope with changing conditions. New crop and varietal diversity is required to meet these challenges. Improving the linkages between ex-situ and in-situ conservation strategies therefore plays a crucial role. Overall, it is expected that interdependencies among seed systems will increase in order to access a wider range of plant genetic diversity.

Increasing food demands

'Seed is a technology transfer agent and hence crucial for increasing productivity and production' (Louwaars & De Boef 2012: 41). But seed development requires genetic diversity and institutional settings that facilitate on-farm and off-farm diversity enhancements (IAASTD 2009: 40). Reducing plant genetic diversity puts food security at risk. This is particularly alarming in the face of an **increasing demand for food due to growing populations**. The ability to feed the world in the future is inevitably linked with the state of (agro)biodiversity. Plant diversity serves as the basis for the development of new varieties to meet upcoming challenges.

Natural resource scarcity and environmental degradation

Agricultural production is based on the use of natural resources. But **natural resources are becoming scarce**. Irrespective of technological limits to productivity increases, growing populations and competing uses such as the demand for bioenergy or urbanisation are pushing agriculture to areas with low production potential. Seed enhancement has first and foremost concentrated on requirements of FSS aligned farming systems. The global shift of farming land towards marginal areas poses new challenges. ISS and FSS face a growing demand for varieties enabling agriculture under unfavourable conditions. Low input varieties are urgently needed. In addition, due to environmental degradation, many **ecosystems continuously lose their function/or ability to serve as a sink for pollution and to provide other ecosystem services**. All farmers rely on a healthy ecosystem to produce enough food and fodder to meet growing demands. Sustainable food production that requires a minimum of inputs, accounts for few negative externalities and produces sufficient yields can only be based on plant improvements for which plant genetic diversity is essential.

Rural transition

For centuries, plant genetic diversity has been developed and protected by farmers. Nowadays, the maintenance of plant genetic diversity lies in the hands of traditional small-scale farmers who continue to cultivate a broad range of crop species and landraces. Medium and large-scale farmers on the contrary focus on the major 12 species characterised by a limited diversity (Declaration of Bern 2014: 7). Who will cultivate plant genetic diversity in the future? **Rapid rural transition that takes place in developing countries is a threat to vital ISS**. As we have seen in the past decreases in the total number of farmers and an increase in large-scale farming tend to result in low levels of agrobiodiversity.

Obligation to protect intellectual property rights on plant genetic resources

Intellectual property rights (IPR) on plant genetic resources for agriculture were developed to protect the achievements of breeders. Mainly two forms of protection exist: plant variety protection (PVP) (protecting the variety as such) and patenting (protecting plants with innovative features, e.g. new gene, traits, breeding process). For developing countries the issue became relevant with the founding of the World Trade Organisation (WTO) in 1995. WTO members automatically became part of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), which, among others, declares that '[...] members shall provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof' (Article 27 (3)).

There are several international agreements that address the protection of plant genetic resources, in particular:

- UPOV Convention (Union international pour la protection des obtentions végétales)
- CBD Convention (Convention on Biological Diversity)
- ITPGRFA/The International Seed Treaty (International Treaty on Plant Genetic Resources for Food and Agriculture)

Albeit with different priorities, all of them tackle the question of **how to govern access to and the benefits of genetic resources.** The obligation to protect plant genetic resources through IPR, in particular as required by UPOV, generated considerable concerns. A related issue of controversy concerns farmers' rights. Farmers' rights entail the right to reuse - resow, exchange, sell - seeds from own harvests. The most recent act of UPOV (1991) hampers the free reuse of protected seeds. As a result, small-scale farmers' strategy of occasionally purchasing certified varieties and then resowing subsequent growing cycles might be constrained by the obligation to pay royalty fees. The granted privileges of plant breeders and patent holders through the tool of IPR may put farmers' seed systems at jeopardy.

The need for tailored seed policies

Seed is not an ordinary input: The rich diversity of agricultural crop species (agrobiodiversity), which is crucial for long and short term food security, is largely the product of breeding work by farmers.

Without the maintenance of a large gene pool, informal crop improvement and formal breeding will run out of basic inputs. As a result, meeting future challenges with regard to food supply and ecosystem stability will become impossible (GIZ 2013:2). Seeds do have an overarching relevance. Genetic diversity is a resource that is renewable and exhaustible at the same time. As the basic prerequisite for all seed properties, genetic diversity is an asset continuously produced by countless users and nature itself. This is why seeds are not an ordinary product, such as other inputs in agricultural production.

Holistic approach needed: The seed sector is complex and diverse. Sustainable seed sector development must make use of a holistic approach and combine seed policies with other relevant measures, such as the provision of infrastructure (Brandi, Ladenburger & Pegels 2010: 32). Seed is a potential commodity with a huge capacity to stimulate local and economic development and entrepreneurship (Leuwaars & de Boef 2012: 41). Capacity development and the provision of infrastructure such as storage facilities could offer an opportunity for small-scale farmers. Improving the access of farmers to seeds will generate a leverage effect on rural livelihoods

Facing the IPR-challenge: By nature and for the sake of equal access and benefit sharing genetic diversity has to be a global public good. But the obligation to obtain plant variety protection is pushing plant genetic diversity to increasingly becoming a club or restricted good. Following the freedom of choice principle, the conclusion of free trade agreements should not be linked to an obligation to join UPOV (as the only alternative to breeders' rights protection). Rather, farmers' rights must be recognised and strengthened.

Equal access and benefit sharing: Access to plant genetic diversity and related benefits are not equally shared. Due to rural market failures and challenging IPR-schemes farmers in developing countries are largely excluded from accessing and benefitting from these assets. This is posing a threat to the realisation of their human right to food as argued by de Schuetter (de Schuetter 2009: 2). Hence, an urgent need for pro-poor policies is to bring seeds back on the agenda again.

Putting the farmers back in the centre: In rural worlds (see OECD 2006) FSS are serving the needs of large-scale and well-off traditional agricultural farmers. But for small-scale farmers, where surplus is little or for subsistence farmers, who struggle for survival and where food is the first priority, ISS are the major source for seeds. Seed policy approaches are dominantly focussing on FSS often without involving either ISS or civil society, for example, farmers' associations. Pro-poor seed policies must consequently put those in the centre who feed us.

2. Farmers' seed systems

Integrated seed sector development (ISSD) approach and informal seed systems

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Quality seed is a key input for agriculture with an immediate effect on agricultural production and productivity. Integrated Seed Sector Development (ISSD) is an inclusive approach that recognises and builds upon a diversity of seed systems in the seed sector. At Centre for Development Innovation (CDI), Wageningen UR and at Royal Tropical Institute (KIT), we use the ISSD approach to guide us in the design and implementation of seed sector interventions that are coherent with farmers' agricultural practices. We do this with the main objective of enhancing farmers' access to quality seed of superior varieties, and contribute to food security and economic development.

To work with the ISSD approach we need to understand and acknowledge the coexistence of the seed sector's multiple seed systems. Seed systems can be characterised on the basis of the domains in which they operate (public, private, informal, formal, mixed); the type of crops involved (food crops, cash crops); the type of varieties used (landrace, improved, exotic, hybrid); the type of seed quality assurance mechanisms operational (informal, quality declared seed, certified); and the seed dissemination mechanisms active (local exchange, agro-input distribution schemes, agro-dealers).

We can generalise from the diversity of seed systems, three clusters, namely: informal seed systems; formal seed systems; and intermediary systems that are on their way towards formalised regulation. Examples of informal seed systems are the farmer-saved and community-based seed systems. Formal seed systems include public and private seed companies, which may operate at national and at international levels. Relief seed and local seed business are systems operating in the intermediary cluster.

As explained above, ISSD is an inclusive approach which aims at developing all three clusters of seed. Despite all past public and private efforts in seed sector development, informal seed systems continue to dominate in most developing countries, supplying more than 80 per cent of the total seed used by farmers which include farmer-saved seed, farmer-to-farmer exchange, community-based seed systems and informal grain (seed) markets. Informal seed systems are key for smallholder farmers in relation to food security and in promoting resilience in the face of increasing uncertainty.

In the ISSD approach we are trying to strengthen the informal seed system through empowerment and by promoting autonomy of small-holders farmers in achieving their seed security with specific emphasis on the role of female farmers and the strengthening of local institutions. Facilitating interactions and complementarity between informal and formal seed systems is another strategy. In this latter strategy, farmers and formal sector professionals may be linked in various ways through different components of the seed chain. For example in genetic resource management the systems may be linked by promoting participatory community practices such as organisation of seed fair, community seed banking, understanding types of social seed networks and the role of nodal farmers in seed supply at the community level. In variety development, professional breeders and farmers may interact through Participatory crop improvement such as participatory plant breeding (PPB) and participatory variety selection (PVS). In seed production, farmers' seed management practices may be strengthened through seed extension and linkage to formal research and seed technology development centres. Sharing knowledge on seed disease-pest management and improvement in seed storage practices will contribute to maintaining quality seed at the household level. In seed dissemination, informal and formal systems may be linked through the establishment of local seed outlets in farmer communities. Understanding the role of village grain (seed) markets in fulfilling the seed need of farmers is important.

Guided by the ISSD approach, together with several development partners we are implementing seed programmes in Ethiopia and Uganda at the national level. In the ISSD Africa programme we are looking at various issues hampering the pluralistic and vibrant seed sector development in Africa. For more information about the ISSD approach and various on-going programmes please visit www.wageningen-ur.nl.

Resilient farmer seed systems: the multiple functions of community seed banks

Ronnie Vernooy
Bioversity International

Community-level seed saving initiatives have been around for about 30 years. They have taken various forms and names, including community gene bank, farmer seed house, seed hut, seed wealth centre, seed savers group, association or network, community seed reserve, seed library and community seed bank. Broadly speaking, community seed banks are locally governed and managed, mostly informal, institutions whose core function is that of collectively maintaining seeds for local use. Perhaps surprisingly, community seed banks have rarely been the subject of systematic scientific enquiry. Most of the writing about community seed banks has been empirical and can be found in grey literature or in reports or briefs of non-governmental organisations that assist farmers in conservation and the sustainable use of local crops and landraces.

Over time, community seed banks have assumed multiple functions and delivered a variety of services. Main functions include:

i. conservation of plant genetic resources,
ii. enhancement of access and availability of local crop diversity, and
iii. seed and food sovereignty.

When the conservation function is combined with either the second or/and the third function, community seed banks can be effective platforms of local collective action and empowerment for the conservation and sustainable use of plant genetic resources for food and agriculture and the strengthening of the resilience of farmers' seed systems. In recent years, several governments at national or state level (e.g., Bhutan, Bolivia, Brazil, Nepal, South Africa, countries in Central America) have started to explore strategies to integrate community seed banks as key elements in agrobiodiversity policies and frameworks.

Challenges and opportunities for scaling up: Sowing Diversity = Harvesting Security

Gigi Manicad
OxfamNovib

Without seeds we cannot grow our food. Seeds are the part of biodiversity that feed most people. Seeds are self-replicating and a resource which farmers can own and control to adapt to their needs. Seeds are unique in resource economics – for most grains and cereals, seeds are simultaneously the 'means of production' and also the 'end product' for consumption.

Worldwide, most smallholder farmers use their own farm-saved seeds (seeds harvested directly from farmers' fields). In Africa, this is as much as 80–90 per cent (Jarvis et al. 2000)[4]. The genes in the seeds largely determine how the crop will develop and adapt to the local ecosystem, pests and diseases, as well as determining the food's nutritional value, cooking time and distinct taste (Almekinders & Louwaars 1999).

Small farms play a major role in the global food system: There are 500 million small farms in developing countries, supporting almost 2 billion people – one third of humanity (IFAD 2013). Smallholder farmers grow 60–70 per cent of all food crops (ETC Group 2009). Most of these farmers live in poverty and have very little access to the formal seed system[5] comprising of public and private research and breeder companies, who largely do not cater to the needs of smallholder farmers. Most plant-breeding programmes do not consider women's preferenc-

[4] See especially chapter VII, Seed supply systems; data collection and analysis. See also CIAT 2006.

[5] A 'seed system' is 'an interrelated set of components including breeding, management, replacement and distribution of seed.' (Thiele 1999: 83-99).

es, or even recognise women as farmers. Smallholder farmers engage in a dynamic and flexible 'informal' seed system, actively exchanging seeds with each other. However, they face problems such as seed purity, health and degeneration, and unstable yields. They lack the continuous access to breeding materials, good quality seeds and markets which is necessary to adapt to ever changing agro-ecological and market conditions.

The SD=HS programme is a concerted global action that aims to work directly in 8 countries, involving about 60 organisations (CSO partners and allies, local communities, private sector, governments, research organisations, UN organisations and treaties). It will reach about 300,000 households or 1.2 million individuals, at least 50 per cent of whom are women. SD=HS monitors trends on new technologies, corporate behaviour, laws and legislations and the governing bodies that affect the global food system. For the policy engagement, we will work in about 10 to 20 countries and reach, via the South Centre, governments of the G77 + China.

This programme works with indigenous peoples and farming communities, with a strong focus on women's organisations in India, Senegal, Mali, Laos, Myanmar, Zimbabwe, Peru, and Vietnam. Target communities are those with pronounced seed insecurity, where genetic erosion is severe. Indigenous peoples and local farming communities are highly vulnerable to climate change, food insecurity and malnutrition, since they are highly dependent on biodiversity for their livelihoods and suffer from historical discrimination and continuing marginalisation. Climate change will exacerbate existing vulnerabilities of crop production to droughts, floods, acidity and salinity of soils, and pest and disease infestations. The programme will build on the position and agency of women as managers of biodiversity in household and community food security, and their knowledge on food sources and nutrition.

Overall objective: To uphold, strengthen and mainstream the rights and technical capacities of indigenous peoples and smallholder farmers, and to influence local to global policies and institutions on access to and sustainable use of plant genetic resources for food and nutrition security under conditions of climate change.

- Scaling Up Models is strengthening the adaptive capacities of indigenous peoples and smallholder farmers in seed conservation, access and sustainable use by scaling up innovative and engendered models of biodiversity management (Pillar 1).
- Farmer Seed Enterprises are enhancing the livelihoods and seed security of indigenous peoples and smallholder farmers by producing and marketing good quality and diversity of seeds through public-private partnerships (Pillar 2).
- Women, Seeds and Nutrition is empowering women as catalysts for biodiversity-based diets (Pillar 3).
- Governance and Knowledge Systems is strengthening the capacities and knowledge base of developing countries and their indigenous peoples and smallholder farmers to secure national and global legislation and policies for the full implementation of Farmers' Rights and the Right to Food (Pillar 4).

We, The SD=HS programme, primarily aim to scale up people's capacity to organise, learn and act to continuously innovate at the technical level and to simultaneously engage in necessary policy changes. The aims is to scale up the capacities of women and men farmers to conduct on-farm research to conserve and improve crop varieties and to produce seeds by improving their practical and observational skills, strengthening their experimentation techniques and engaging them in policy making.

The programme will work at the following scales starting from systems-based community approaches to biodiversity adaptation strategy PGR-level, farm-level and landscape level.

- Horizontal scales: scaling out spatially in both favourable and unfavourable areas in response to changing market opportunities across geographical boundaries, including through repatriation of seed varieties to relevant agro-ecological food zones and through thematic expansion of PGR management in the context of climate change adaptation.
- Vertical scales: the formation of a critical mass of multiple stakeholders to influence policy reforms from local to national and international levels.
- Temporal scales: Meteorological data ranging from 10-60 years will be used to understand and

compare people's perception of how their climate is changing, how this affects their agriculture and food production and how best to respond and adapt. Data that includes people's knowledge of and access to biodiversity strategies over generations will also be used to ecosystems as a starting point to convert the process of developing climate change models and scenarios into a more participatory joint analysis with the communities and climatologists.
- Scaling-down: Currently climate change models and scenarios focus on regional and country levels. Scaling down means moving climate change models and scenarios from regional to localised scenarios. The programme is involved in pioneering work in Vietnam and Peru.

The programme adapts IFAD's iterative and interactive triad of innovation-learning-scaling-up. We will adapt organisational learning systems, systems that enable those working in and with other organisations to build shared visions, develop coherent thinking and team learning, and master skills and ideas (Senge 1990). The South-South linking and learning cooperation involves CSO partners in the 8 countries.

The programme's entry point is biodiversity, specifically Plant Genetic Resources for Food and Agriculture (PGRFA) as a natural asset for livelihoods and food security; and working around issues of access, sustainable use and benefit sharing. The strategic vision is set on helping indigenous people and smallholder farmers, particularly women, to empower themselves to claim their Right to Food and Farmers' Rights.

The programme's exit strategy is geared towards sustainability by scaling-up people's capacity to organise, learn and act to continuously innovate and engage in corresponding policy changes. This involves a strengthening of the capacities to conduct on-farm research to conserve and enhance crop varieties/populations and produce seeds by improving practical skills, honing their observation skills, enriching their experimentation techniques, supporting their engagement in policy making and leveraging their possibilities to demand resources and services from their governments. Indigenous and local farming community organisations will be strengthened to enable them to demand continuous access to pre-breeding materials and to allow people to continuously adapt their PGRFA to changing environmental and economic conditions. Experience shows that this project design allows the project goals and achievements to remain intact and progress even after the programme has been completed. Effective participation in national and international policy development will help ensure indigenous peoples' and smallholder farmers' right to food. The strengthening of institutional linkages and the application of empowerment pedagogies should mean that the Farmer Field Schools and community seed banks set up in the project are self-sufficient beyond the programme period. The alignment of local and global policy should also contribute towards mainstreaming the objectives of the programme.

The project donors are: Sida, IFAD, and the Dutch government.

Seed Systems, farmers rights, IPR and their impact on food security

François Meienberg
Berne Declaration

Seed policies, including intellectual property rights on seeds, have a direct impact on the development of seed systems, the realisation of the right to food and farmers' rights. This has to be taken into account when drafting such laws and regulations.

This interconnectedness was described by the UN Special Rapporteur on the Right to Food, Olivier de Schutter in his 2009 report 'Seed policies and the right to food: enhancing agrobiodiversity and encouraging innovation'. It demonstrates how patents and breeders rights can endanger food security and biodiversity. De Schutter also reminded governments of their obligation to respect, protect and fulfil the right to food within the framework of their national seed legislation:

- 'States have an obligation to respect existing access to adequate food. The introduction of legislation or other measures which create obstacles to the reliance of farmers on informal seeds systems may violate this obligation, since it would deprive

farmers from a means of achieving their livelihood.'
- 'States have an obligation to protect the right to food. Thus they should regulate the activities of patent-holders and plant breeders, so as to prevent them from violating the right to food of the farmers depending on those inputs in order to be able to continue to farm.'
- 'States have an obligation to fulfil the right to food, by pro-actively strengthening people's access to and utilisation of resources and means to ensure their livelihoods.'

De Schutter points out the dangers, but also the opportunities of facing these risks:

Most countries have been led into adopting UPOV-compliant domestic legislation, without taking into account their own national needs or, differentiating between crops. States should prepare right-to-food impact assessments in order to ensure that the IPRs to be chosen will correspond to their development needs.

The oligopolistic structure of the input providers' market may result in poor farmers being deprived of access to seeds, which are productive resources essential for their livelihoods. The same market conditions could raise the price of food, thus making it less affordable for the poorest. States should consider using antitrust legislation.

One needs to restore an adequate balance between the right of plant breeders and the needs of farmers by strengthening the protection of farmers' rights under domestic and international law. This challenge can be met by actively involving farmers in the design and implementation of seed policies.

The obligation to promote farmers' rights is anchored in Art. 9 of the ITPGRFA. In addition Art. 6 of the treaty requires contracting parties to develop and maintain 'appropriate policy and legal measures that promote the sustainable use of plant genetic resources for food and agriculture'. This may include such measures as:

- '[...] pursuing fair agricultural policies that promote, as appropriate, the development and maintenance of diverse farming systems that enhance the sustainable use of agricultural biological diversity and other natural resources' (Art. 6.2.a)

But are these obligations regarding the realisation of the right to food and farmers' rights really respected when seed policies and more specifically IPR laws are drafted?

As mentioned by Olivier de Schutter a Human Rights Impact Assessment (HRIA) would be an important tool to guarantee that seed policies correspond with the development needs of the implementing countries. During its search for any right-to-food impact assessments regarding the possible impact of IPR on seeds, the Berne Declaration could find no such examples being undertaken by IPR implementing governments. This is even more startling, considering that the Committee on Economic, Social and Cultural Rights (CESCR) called on developed countries to 'undertake an impact assessment to determine the possible consequences of its foreign trade policies and agreements on the enjoyment by the population of the state party's partner countries, of their economic, social and cultural rights' (Concluding Observations to Switzerland. A similar statement was made to Germany). To date, however, no government has followed those recommendations in the area of IP in agriculture. As a result, opportunities for improving policy making for the benefit of society have been missed.

Therefore an international Group of NGOs (including the Berne Declaration) started a project for a HRIA on UPOV 91 (based on ex-ante case studies in Peru, Kenya and the Philippines). The HRIA was published in October 2014 in the Report 'Owning Seeds, Accessing Food' (Braunschweig et al. 2014) and reveals worrying results. The human rights impact assessment of plant variety protection laws based on the 1991 Act of the International Union for the Protection of New Varieties of Plants (UPOV 91) provides convincing evidence of the threat to the right to food of small-scale farmers. Their widespread practice of freely saving, replanting, exchanging and selling seeds clashes with the UPOV 91's provisions that restrict or even prohibit such practices in order to protect plant varieties designed by breeders. Consequently, plant variety protection based on UPOV 91 will make it harder for small-scale farmers to access improved seeds as shown by the case studies in Kenya, Peru and the Philippines presented in the research report. Access to seeds is a key feature of the right to food for resource-poor farmers.

The report warns governments that accelerated introduction of stringent plant variety protection based on UPOV 91 might threaten the right to food. Based on the findings, the report provides key recommendations to be urgently considered by governments. These include:

- to undertake a human rights impact assessment before drafting or amending a national plant variety protection law or before introducing intellectual property requirements in trade or investment agreements in the area of agriculture,
- to use the flexibility provided by the TRIPS Agreement to draft PVP laws and related measures that reflect the needs and interests of the most vulnerable groups such as small-scale farmers
- to promote implementation of other legal obligations such as realising farmers' rights, the protection of the rights of indigenous people and traditional knowledge,
- to ensure national PVP laws allow small-scale farmers to freely save, use, exchange and sell all farm-saved seeds/propagating material,
- to ensure that governments abide by a transparent and participatory process that includes all potentially affected stakeholders, especially small-scale farmers and public interest groups, when drafting, amending or implementing seed laws and related measures. Failing to do so risks the violation of the right to food of small-scale farmers and their families.

3. Workshop

The following section presents the results of the workshop which was held with some of the participants of the expert talk in the afternoon. The aim of the workshop was to get an overview of current activities in the field of farmers' seed systems and to explore options for further or new engagements. Additionally, the workshop served as a forum for bringing together different stakeholders in the field for future cooperation and collaboration. The overview of FSS and ISS, their missing links and the resulting implications presented at the expert talk in the morning served as a starting point for further discussions.

Seeds need more attention

All participants agreed that seeds need to receive much more attention as genetic resources are a basic prerequisite for resilient ecological and social systems. Currently international agendas for development hardly tackle the topic. Ongoing efforts by non-governmental organisations (NGOs) in the field have to be encompassed by further engagement of/ cooperation with governmental agencies. The prevailing mode of dealing with seeds is rather reactive than proactive, as a NGO-representative put it.

Two areas of priority were identified in the workshop:

a. The role of seeds for food security and poverty reduction
b. The challenge of international IPR-settings with regard to farmers' rights

The need to prioritise the seed issue is underlined by the German commitment to the UN Zero Hunger Challenge and illustrated by the special unit 'One World – No Hunger' which was launched by the German Federal Ministry for Economic Cooperation and Development (BMZ). Still, activities recognising the role of seeds for food security appear to be underfunded to the participants.

Participants unanimously agreed that there is a dire need for activities related to farmers' rights with regard to WTO-members' obligation to protect plant genetic resources. This frame for IPR-protection must be set out carefully in order to safeguard farmers' traditional rights to the use of seeds. Cooperation arrangements such as investments of the private sector in seed systems must be in accordance with development policy objectives.

Ongoing activities in the field and the stakeholders involved

A first workshop activity was to identify the stakeholders in the donor countries that are involved in activities aiming at the sustainable development of farmers' seeds systems. Major stakeholders are (federal) ministries and the corresponding agencies, NGOs and researchers.

Several NGOs recognise the issue as representatives of OxfamNovib, Bioversity International and Declaration of Bern emphasised. However the individual NGOs are working on different subjects within the field. They predominantly focus on ISS.

In Germany the competencies for seed related issues on a governmental level are allocated to different federal ministries and agencies. While the Federal Ministry for Economic Affairs and Energy (BMWi) deals with IPRs in a more general way, the Federal Ministry of Agriculture and Food (BMEL) and subordinated authorities are concerned with seed laws and IPRs as well as agrobiodiversity on the national level.

Seeds systems as a development issue are subject to technical and financial assistance. In Germany this task is divided between GIZ, working on behalf of BMZ, and the German development bank KfW (Kreditanstalt für Wiederaufbau). Capacities for seed related technical and financial assistance were scaled down in 2000 as a result of decreasing demands and changing priorities. This is why lately there were only few activities by GIZ and KfW in the seed sector.

Representatives of Wageningen University, Centre for Development Research, Bonn (ZEF) and Gießen University underlined the role of research and science in the field.

As an exception to the relatively rare activities on a governmental level Dr. Thomas Maier (BMEL) presented bilateral projects on capacity development for plant breeding and multiplication in Ethopia. The project is targeting small-scale farmers and is funded by BMEL and the private sector/KWS Saat AG, GIZ is the implementing party.

Requirements and conditions for pro-poor seed activities

In order to improve small-scale farmers' livelihoods activities have to focus on ISS. Participants agreed that an explicit commitment of all stakeholders to working towards strengthening ISS is urgently needed.

The seed sector is complex and ISS are even more so. They vary not only along countries but also across regions and communities. Consequently the demands of actors in the diverse settings vary. Therefore context-sensitive approaches were a wide and unanimous consensus among participants. This means clearly defining target groups, detecting actors' needs and formulating objectives in a participative manner are prerequisites to build sound initiatives.

Another issue discussed was the appropriate scale of measures. According to participants' experiences an effective outcome is reached when actions on a local level are concentrated on a certain segment of the seed system, as for instance storage or seed multiplication. As a first step a list of priority countries might be drawn up. Whether such a list should focus on small countries where ISS tend to be especially weak was discussed among participants.

Furthermore it was repeatedly emphasised that strengthening collaboration between stakeholders and making use of synergies are absolutely necessary for developing pro-poor seed policies. Donor cooperation should be improved not only between financial and technical assistance, the several ministries and agencies but also between non-governmental organisations and donors. Which role the private sector might play in improving ISS, was discussed controversially.

Options for Action

Throughout the workshop participants underlined the critical need to bring stakeholders together. **Establishing a forum** for the grouping of donor activities is required.

It was debated on which levels actions should be set up. Although there was a general agreement on the need for **combining research and action on the ground,** to appropriately tackle challenges related to the seed systems participants had different opinions on what tasks to prioritise. While some favoured certain activities on a research level, others advocated concentrating on the realisation of measures on the ground. 'Enough research is done - we should stick to pilot things', as one NGO-representative put it.

Participants clearly stated that activities have to be based on the results shown by **impact assessments of implemented seed policies and their effects on seed systems**. Attention should also be paid to another option for action which was brought up by a participant: According to her, there is lots of experience, which is not well documented yet. **Summarising past efforts and documenting best practices** will serve as a source for drafting further projects and cooperation. Furthermore **currently ongoing initiatives** should be **assessed** in order to identify potential partners and learn from their experiences.

Setting up a pro-poor seed programme will facilitate the allocation of means and serve as a framework for activities. The programme has to be in line with the CBD and define small-scale farmers as the target group. It aims at strengthening ISS. Participants' suggestions for the main content and approaches of such a programme can be clustered in three pillars:

The **first pillar** should focus **on the institutional settings**. Most of the countries, in which the majorities of farmers rely on ISS are challenged by the obligation for plant variety protection and farmers' rights to access and use seeds. Advisory services given to countries concerned have to be context specific and based on principles such as the safeguard of traditional use of seeds, the realisation of the human right to food and the protection of agrobiodiversity.

The **second pillar** should be dedicated to **capacity building of farmers.** Farmers acting in ISS often struggle to have access to sufficient and good quality seeds. A pro-poor seed programme should aim at the empowerment of small-scale farmers to improve the seeds that are available to them on a decentralised scale and in a participative manner. On-farm training on breeding must include the collection, identification, assessment, storing and multiplication of seeds. Efforts have to be encompassed by activities to create farmer-breeder networks in order to disseminate knowledge and seeds. Manifold successful initiatives in several countries like community seed banks, participatory plant breeding or local seed fairs may serve as examples for drafting activities.

Third pillar: A pro-poor seed programme should also **facilitate an open dialogue** in order to balance different interests in the seed sector and ISS in particular.

4. Annex

Programme

10:30 h	Welcome | Dr. Stephan Krall GIZ, Division 45 – Rural development and agricultural production
10:45 h	Integrating formal and informal seed systems – The Integrated Seed Sector Development (ISSD) Approach Abishkar Subedi, Wageningen University and Research Centre Download presentation (PDF, 3.79MB)
11:15 h	Resilient farmer seed systems: the multiple functions of community seedbanks Ronnie Vernooy, Bioversity International Download presentation (PDF, 2.34MB)
12:00 h	Break
12:30 h	Challenges and opportunities for scaling up: Sowing Diversity = Harvesting Security Gigi Manicad, OxfamNovib Download presentation (PDF, 3.51MB)
13:00 h	Seed Systems, farmers' rights, IPR and their impact on food security François Meienberg, Bern Declaration Download presentation (PDF, 447KB)
13:30 h	Discussion
14:00 h	End of expert talk
14:30 h	Workshop
16:00 h	End of workshop

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