THE IMPORTANCE OF INFORMAL SEED SECTOR AND ITS RELATION WITH THE LEGISLATIVE FRAMEWORK

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SUMMARY

This paper considers strengths and weaknesses of the informal and formal seed as a basis for seed sector development. The informal seed sector is defined as the total of farmers' seed production, selection and seed exchange activities. Farmers play an important role in seed supply but they are generally not considered as a partner in the seed sector. Seed produced by farmers is still the most important seed source in the majority of developing countries. The efforts to replace farmers' seed for seed supplied by the formal sector as a component of agricultural development has only been partially successful. Recognition of complementarity of the formal and informal seed sector offers opportunities to improve seed supply by supporting farmers' seed production. The legislative framework can significantly limit these possibilities for support, depending its conditions. In such situations, re-orientation of this framework to improve seed supply needs to be considered.

1. INFORMAL SEED SECTOR

1.1 Importance

Definition. The informal seed sector is usually defined as the total of seed production activities of farmers, mostly small-scale farmers. In contrast, the formal sector refers to seed production activities by the public and commercial sector. Synonyms used for informal seed sector are 'local' or 'farmers' seed system(s)'. A clear-cut distinction between the informal and formal seed system does not exist in the situations where public or private institutions are engaged in the production of uncertified, unlabeled or registered seed lots.

Context. Farmers' produced, selected and stored seed is still the predominant source of seed in the world. This is particularly the case in developing countries, but also in European countries farmers' own saved seed is widely used (Table 1).

Specialisation of seed production and the development of a public and commercial seed sector was triggered by the increased understanding of genetics and plant breeding. Seed production programmes in developing countries have largely been the instruments for the diffusion of products from crop improvement programmes, and were based on the successful model of countries like Germany, the Netherlands, and United States. While plant breeding programmes were relatively successful in developing countries, particularly in the more uniform high-potential agricultural areas (e.g. irrigated rice in SE Asia), large seed programmes as launched in the 1960' by international agencies such as FAO and the Worldbank, have not been successful in high nor low-potential areas. The majority of these programmes have been terminated, leaving farmers to rely largely again on locally produced seed, i.e. on-farm saved seed, seed exchanged with family, or other local farmers in the community.

Table 1. Areas sown with seeds supplied by the formal seed sector (public and private) in various crops and countries*.

Rice	**Formal**	**Informal**
Tanzania	1	99
Pakistan	6	94
Egypt	38	62
Turkey	28	72
Beans		
Malawi	4	96
Zambia	12	88
Honduras	2	98
Egypt (faba bean)	14	86
Maize		
Zambia	70	30
Mozambique	10	90
Pakistan	6	94
Egypt	36	64
Honduras	15	75
All crops (average)		
Netherland	75	25
Germany	50	50
Greece	10	90

* data from different reports and years

Characterisation of the informal seed sector. Farmers' seed production is in most cases integrated in the normal crop production. Seed is selected from the crop production after harvest or before planting. Practices such as selection of heads or ears from the field before harvest,

separate storage of seed, etc., reflect more specialised seed production practices. Farmers' practices of seed (re-)production, selection and storage are at the same time the basic components of local crop development and variety maintenance.

In local seed re-production there is a strong interaction between the genetic make up of the planted varieties, the farmers' practices (use of inputs in the production, seed selection and storage) and the occurrence of droughts, low soil fertility, diseases, etc. Depending on the crop (its breeding mechanism) and the presence of wild relatives, mutations, introgression and hybridisation are significant elements of local crop development as well. Exchange of seed among farmers in a community and introduction of seed from elsewhere adds to the dynamics of the local system. The combination of farmers' practices and environment represents a system of local plant genetic resource management in which seed production is fully integrated with local crop development. This system also represents a system of farmers' utilisation and maintenance of crop genetic diversity, *In situ* conservation can be seen as an outcome of this system.

Local seed production is shaped by a wide range of interacting human and environmental factors. Since the environment in which farmers in developing countries operate is usually extremely variable, heterogeneous and complex, the local seed production systems are also showing important location and crop specific characteristics. The informal seed sector can be seen as the total of local seed systems. It is a mozaic of farmers' systems that vary between communities, between households in a community. Seed systems can even vary considerably between crops on a single farm. The seed system of self-pollinating and vegetatively propagated crops like rice and potato shows other characteristics than, for example, that of maize. The seed system may even vary between varieties grown by a single household, for example when modern and local maize varieties are planted.

To improve seed supply in local seed systems, an understanding of the complexity and variation is needed. For analysis and identification of problems of local seed system the three following components are distinguished:

- seeds
- varieties
- seed exchange

1.2 Seeds

Context. Data on area planted with seed supplied by the formal seed sector sources (public and private enterprises) show similar tendencies in many of the developing countries (Table 1).

Typically, the private seed sector supplies seed for cross-pollinated cash and food crops like maize, vegetables, cotton, and providing a fair share of the seed needed for the total area planted. This refers to the category of crops for which farmers can pay inputs and that are characterised by a breeding system or other seed technology for which specialisation is economically profitable The advantages of secialisation are often related with the use of hybrid seed, specialised storage or seed health problems. For most self-pollinating food crops (cereals, legumes) the public sector that is the major formal seed sector source, supplying usually only a small share of the annually planted seed. Conventionally, this situation has been explained as a problems like: seed does not reach the farmers, farmers' reluctance of using improved seeds or too high seed costs for farmers.

Seed quality

Seed quality of farmers' saved seed is many cases not a problem. Farmers' seed production is based experimentation and experience that farmers acquired over a long period of time. Their practices are often well adapted to local conditions. A study on local bean seed quality by showed that in 11 of the 13 reviewed cases farmers seed quality was at least as good as seed from the formal sector. A similar study on cereal seed quality in an number of countries in Western Asia and Northern Africa showed similar results. This does however not mean that there are no problems with the quality of farmers' seed. Moreover, seed quality does not give any indication about availability and farmers' access to seed.

Local seed quality problems can be due to sub-optimal seed production, selection and storage practices. Sub-optimal practices and conditions potentially affect all aspects of seed quality; i.e. health, vigour, purity and genetic quality. The availability of inputs for crop production and storage facilities are important limitations for farmers in producing quality seeds, particularly in wamer climates where pest and disease pressure are high. Problems with seed quality may however very from place to place, depending the crop, the environmental conditions and farmers' knowledge.

Not all farmers are equally good seed producers. In many communities there are seed-selection experts – often women. Improved seed selection practices can increase seed quality aspects and are also shown to be effective in variety maintenance. Seed selection in genetically heterogenous local varieties can in particular situations increase the yield potential of the material. It can however also narrow the genetic basis of local varieties, which may have a negative effect if the adaptation of the material is based on being genetically heterogeneous. Seed selection may give moderate yield increases which not in all situations justifies the labor invested.

Knowledge on pests and diseases that affect seed quality is important as well. This is often a problem in areas where new pests and diseases recently appeared or where they increased importance because of changing farming systems. For instance, the introduction of irrigation is often related with increase pest and disease incidences as new crops are introduced and cropping patterns change and intensify. Knowledge about pest and diseases, and practices like roguing and selection can significantly improve on-farm seed production.

Possibility to invest in crop inputs and storage construction can also affect quality. Potato is an example of a crop with potentially many problems of on farm seed tuber production. Apart from management of virus infections, seed tubers require cool storage. In warmer climates this may ask considerable investment in storage constructions (diffuse light storage, refridgerated storage). Rice is an example of a crop that is relatively easy for on-farm seed production and storage. Cross-pollinating crops are always asking attention because of possible genetic degeneration, with O.P. (open pollinated) varieties asking for another approach than hybrid varieties.

Seed availability and seed sources

Farmers have a range of optional seed sources. In many cases farmers prefer their own on-farm produced and saved seed: it is seed of known quality, it is timely available and economically attractive to use the seed saved from last harvest.

Table 2. Sources of seed by farm size and wealth class in Bangladesh (wheat) and Zaire (beans)*

Bangladesh	Small	Medium	Large
Informal			
on-farm	37	47	65
off-farm	35	24	10
Formal	25	30	

Zaire	Poor	Medium	Rich
on-farm	49	64	100
off-farm (informal & formal)	60	53	17

* % of farms/farmers per category

Off-farm seed sources are used by farmers for different reasons. From the farmers' point of view, the formal seed sector is only one of the off-farm seed sources. Other optional sources are: relatives, neighbours, and other farmers in the community, local (grain) markets, and middle men. The characters of the different seed sources vary (Table 3), and the 'attractiveness' of a source depends very much on the reason for the farmer to recur to an off-farm seed source. Reasons for farmers to use off-farm seed are: loss of seed due to crop failure, the incapability to save seed because of low-yields, need to replace seed because of degeneration or disease contamination, and to obtain new varieties.

Studies have learned that poverty is strongly related with increased use of off-farm seed sources (Table 2). Poor households are often not capable to save seeds for next planting since their crop production is often below the subsistence level. Limited availability capital, the reliance on off-farm labor employment contribute importantly to reduced crop yields and buffering capacity of poor farmer households, and the urgency to sell all grain and seed for cash. Farmers who produce a household surplus are more likely to be able to save seed. Wealthier farmers in the village are important sources of local seed, although their seed is not necessarily easy accessible.

Table 3. Characteristics of seed sources in relation to the demand for seed

Seed sources	characteristics	source for planting material	source for new varieties
On farm	known quality, cheap, readily available	+++	- - -
neighbours, friends & relatives (in the community)	no cash involved, readily available,	++	+
local market	unreliable quality, last seed resource	--	- - -
middle men	non cash arrangments/loans, unreliable quality	+, -	-, +
neighbours, friends & relatives (outside the community)	non cash arrangement, resources needed for traveling	+	+++
Stores & commercial enterprises	cash for seed and traveling	+	++
Seed agencies public seed sector	unreliable availability and quality unknown	-	+++

Poor farmers often have to rely on what-ever seed they can access to before planting time. Relatives of poor families most often are in the same social under-class, suffering similar economic limitation. Access to seed from richer farmers in the community can be very restricted for the poor, for which reason the poor often rely on local grain markets and middlemen, paying uneconomical prices or interests for seed of unknown quality and origin. Poor farmers are often trapped in a vicious circle of seed insecurity. A study on bean seed supply in Malawi indicated

that the link between food shortage and land scarcity, was coupled with the fact that the poorest households were mostly women-headed households. They depended on the market for their bean seed supply as they are not part of the social network of those farmers who have usually a surplus production. Women-headed households, landless, refugees or displaced, ethnic minorities are frequently among the poorest and most seed insecure in rural communities

1.3 Varieties

Context. The data on areas planted with seed from the formal sectors vs farmers' seed does not necessarily correspond with the use of modern vs. local varieties. In the case of self pollinating and vegetatively propagated crops, e.g. rice, wheat, barley, beans, sweet potato, cassave, areas planted with improved varieties can be considerably larger than what is yearly distributed as planting material by public and commercial sector (table 4). These data also show clearly that the situations vary strongly between crops, between and within countries (irrigated and upland rice in SE Asia, maize in Zimbabwe vs. maize in Mexico, beans in Costa Rica). However, data learn that in many countries extensive areas are planted with local varieties, i.e. varieties of which the formal sector usually does not supply seed.

The formal sector has been relatively successful in developing and diffusing improved varieties of the major food crops in the more uniform, high potential areas. Typically, in the low potential environments that are characterised by variable soil and climate conditions and remote markets, improved varieties have been less successful. Farmers in these areas still plant important areas of local varieties. Local varieties are generally characterised as varieties that correspond to farmers' preferences and posses good adaptation to local stress conditions. The adaptation is a result of their genetic (within variety) diversity and the local crop development over time.

Table 4. Percent area planted to modern varieties of rice, wheat, and maize in developing countries (Byerlee, 1994)

	Rice (1983)	Wheat (1990)	Maize (1990)
Sub Saharan Africa	15	52	43
West Asia/North Africa	11	42	53
Asia (excl China)	48	88	45
China	95	70	90
Latin America	28	82	46
All developing countries	59	70	57

Studies on the use of varieties also show that farmers manage important portfolios of varieties and that introduction of improved varieties in more variable environments have often increased the number of varieties on farm. Farmers in the Andes tend to grow local varieties for their home consumption and improved varieties for the market. Farmers need crop genetic diversity to cope with the variable soil and climatic conditions. Also, a farmer-household has a need for a range of crops and crop varieties to fulfill the needs of consumption, market and others uses. For this reason, small-scale farmer households tend to grow a portfolio of crops and varieties.

1.4 Seed exchange and diffusion

Farmers' seed systems rely on traditional social networks and mechanisms for exchange of seeds and varieties. Gift, barter, traditional labor payment or endowments in the form of seeds exchange are important mechanisms via which farmers obtain seed of new varieties or fresh seeds to replace degenerated materials. There are numerous examples of varieties that were widely diffused via farmer-to-farmer exchange, such as the rice variety Mahsuri that became the third variety in India. Because of its local diffusion and demand for seed, this variety was eventually officially released.

Most seed exchange takes place within the community, between members within the same social class and etnic group. While farmers-to-farmer exchange has shown to be very effective and fast, bounderies of social and ethnic class form important barriers for the diffusion of new materials. Also larger distances and mountain ranges can form barriers for informal seed exchange. Varieties used in valleys that are not linked by commercial and social contacts can be isolated from each other in terms of seed flows.

The general characteristics and examples show that problems for farmers in seed supply vary between crops and regions. The problems may relate to seed quality, to the varieties that are available, the accessibility of the materials, or a combination of these aspects. It is not unusual to find that problems vary within communities for households that differ in economic status, ethnic background, age-groups, women vs. men headed households. This situation means that the formal seed sector is facing a farmer demand for seeds and varieties that is very diverse in the type of varieties that they need, and variable in the volumes of seed they require over time. When crop yields were good, the demand for seed is usually much smaller as more farmers are able to save seed. A bag of seed of a new variety is satisfying a farmers' demand for experimentation and multiplication; thereafter (s)he may only want to have new seed if the seed was lost.

Summarising and in general, analysis of local seed systems shows that:

- In many situations farmers have sub-optimal seed quality (genetic and non-genetic)
- Causes for sub-optimal seed quality very strongly between crops, conditions, within and between communities
- Demands and need for quality seed from the formal sector vary strongly between places and over time
- Farmers use more genetic diversity than provided by the formal sector
- Poor farmers are often notoriously 'seed insecure', which keeps them in the vicious circle of poverty.

2. FORMAL SEED SECTOR

The formal seed sector was set-up and organised with the principal goal to do diffuse quality seed of improved varieties developed by the formal breeding programmes. As mentioned earlier, the formal sector has been relatively successful in crop improvement for the more uniform high potential areas, whereas they were less successful in marginal, more variable low potential areas. This is partly explained by the non-adapted character of the improved varieties to farmers' preferences and production environments. In general, plant breeders had a lack of understanding what farmers in these areas needed, breeding programmes developed only few, genetically uniform products for on-farm testing, and evaluation and selection of new materials was on-station where conditions are distinct from those on-farm in the target environment. The conventional mandate of seed programmes is to supply seeds of improved varieties, i.e. the products of the breeding programmes.

Seed programmes were bound to fail in the situations where improved varieties were unattractive for farmers. In addition, seed programmes were handicapped by the often good quality of farmers' seed. Seed programmes have over-estimated farmers' interest to purchase seed, particularly for self-pollinating and vegetatively propagated crops. Remoteness and accessibility of agricultural production areas further increased the difficulties for timely supply of quality seed from the formal seed sector. In addition, the diversity of varieties, the variability in seed demands are difficult to cope with by large-scale, centralised formal breeding and seed programmes. Structural adjustment and the increasingly limited funding for public agricultural sector has further increased the need to rethinking about the role of the formal seed sector.

3. COMPLEMENTARITY OF FORMAL AND INFORMAL SEED SYSTEM

An analysis of strengths and weaknesses of both the informal and formal sector shows important complementarity and opportunities for strengthening the informal sector.

Weaknesses can be identified in the areas of seed technology, introduction of new materials and genes and in seed diffusion barriers. (see table 5). The weaknesses are at the same time opportunities to improve the informal seed sector, particularly since they are the points on which the formal sector does have a comparative advantage. The weaknesses and opportunities do, however, not occur in all situations, or do not occur in the same form or combination; weaknesses and opportunities vary with crop, conditions and community. The opportunities can be considered as a basket of options that may or may not be relevant select from for implementation at the local farmers' level.

The recognition of complementarity opens up possibilities to define and structure a formal seed sector that effectively operates to meet the seed-needs of local farmers. Building on the strengths of the farmers' seed system and considering farmers as important supply-ers of seed offers the formal sector opportunities to focus on the key-activities of national seed supply for which they have expertise and are well equipped.

Table 5. Complementarity of weaknesses and strengths of Informal and Formal Seed Sector

	Informal seed sector (Farmers' seed supply)	Formal seed sector (Public and private seed agents)
Seed technology		
- seed technology	-	+++
- local adaptation seed technology	+++	±
- Timely supply	+++	-
- Costs /efficiency	+,-	- -, +
Varieties		
- seed of local varieties	++	- -
- seed of modern varieties	-	+++
- access exotic genes	- - -	+++
- recombination of genes	-	+++
- adaptation of gene combinations	+++	- -
- maintaining/supplying diversity	++	- -
Seed diffusion		
- local (within localities/regions)	++	-
- inter-regional/continental	±	+++
- equity of access	-	+±
Knowledge		
- local conditions	++±	- -
- modern technology	- -	++

4. SUPPORT TO THE INFORMAL SEED SECTOR

Improving on-farm seed production

Collaboration with key-farmers or target-groups (women, poorest) to improve local seed production practices can address field practices like roguing and rotation, fertilisation, crop protection, seed harvesting, selection and storage. These practices contribute to improved 'maintenance breeding' of local varieties. Improving the seed quality of local varieties is a relevant support to in situ conservation as well: local varieties are more competitive with improved varieties when quality and availability of seed increased

Seed production specialisation

Organisation of farmers or community-groups in cooperatives, small enterprises or growers associations can be stimulated when local seed production is successfully improved. Commercial specialisation is, however, difficult when employment of special expertise or resources does not produce significantly better performing seed for which a better price can be obtained. This is the case for many self-pollinating crops that are relatively easy to store, do not have important disease or storage problems. Successes so far are based on maize, potatoes, or situations in which farmers have a direct and exclusive access to a continuous flow of new improved varieties (beans in Colombia, flow of CIAT-varieties)

Demonstration trials for introduction of new varieties

Seed of new varieties, quality seed and practices that improve seed quality can be effectively introduced to farmer communities via demonstration and evaluation trials. The trials may be on-station, with the organisation of field days on which farmers are invited to see and comment on the materials planted. The demonstration plots may also be planted at strategic places in the community, for example along the public road on the land of a farmer, or in the school garden. Individual on-farm trials, with farmers cross-visiting each other is another way to raise farmers' interest, stimulate their keenness to experiment and to exchange information. The incorporation of lost or disappeared local varieties in such trials can be important, as well as the inclusion of treatments showing the effect of improved seed quality. For introduction of improved adapted materials, Participatory Plant Breeding (PPB), i.e. the selection of materials from segregating populations of improved materials may be considered as well, but requires important commitment of partners and expertise on plant breeding.

Seed kits

The distribution of large numbers of relatively small samples of seed from improved varieties, sometimes with information on the seeds and with fertiliser inputs, are used as a way to insert new varieties and quality seed into local seed systems, assuming further diffusion via farmer-to-farmer exchange.

Community seed banks

Community seed banks can support the storage of seed reserves. At the same time, seed banks may contribute to improve production practices and (communal) storage. Potentially community seed banks may improve access to seeds for the poorest farmers and be an entry point for farmer organisation and capacity building. Seed banks can also be organised to serve as local germplasm collections to improve farmers access to genetic diversity. Organisation of community seed banking may, however, be complicated.

Seed fairs and diversity competitions

Local seed fairs have become important tools in stimulating local exchange of seeds and are functional in raising awareness among farmers of the relevance of crop genetic diversity.

Seed relief and rehabilitation.

Local seed systems are generally considered to be a more stable and reliable seed source for farmers than the formal seed sector. The formal seed sector tends to be the first one to collapse in situations of acute stress (hurricanes, war, etc.). However, natural and man-made disasters exert pressure on the informal seed sector as well: local seed becomes scarce, prices soar, the poorest being the first without access to seed. Experiences from Africa and Central America show that farmers' seed systems may be recovering slowly, involving considerable distress. On the other hand, seed relief can be a threat to restoration of the local seed system and to maintaining traditional risk-coping strategies of farmers, increasing their dependency on external seed sources. Outside support requires careful assesment of the type of genetic materials needed (crops and type of crop varieties), the amounts of seed distributed, and the form in which the seed is distributed (i.e. to whom; for free, vouchers, or other acquisition; mobilising local seed sources or importing seed lots from elsewhere; considering possible trade-offs between food and seed relief and dependencies vs. local coping strategies). Genebanks can play an important role in the re-introduction of lost local materials, with NGOs or other agencies being intermediary seed multipliers and distributors.

Distinction between the activities that support the local seed system, local crop development or *in-situ* conservation are hardly possible. Genebanks, plant breeding or seed programmes,

extension services or development oriented NGOs are potentially engaged in these activities. Albeit with different underlying perspective (.e. conservation, crop development, seed supply or general community development) these activities contribute to the strengthening of the local system of plant genetic resource management.

Activities that directly support farmers have a strong local focus. They make use of participatory methodologies, and count with variation in space, time and stakeholders. Another question is how to organise support from an institutional perspective such that continuity of integration of the formal and informal sector is guaranteed beyond short-term project money. Two actors can take up this integrating role: extension services and development-oriented NGOs. At this moment, however, extension services are hardly functional in most developing countries and NGO funding is mostly short term and not reliable.

5. RELATIONS OF SUPPORT TO THE INFORMAL SEED SECTOR WITH THE LEGISLATIVE FRAMEWORK

Supporting farmers in on-farm seed production suggests a role for both the farmers and the formal sector in seed supply. When multiplication and variety maintenance is taken care of by the informal seed sector, the formal sector can concentrate on key-activities, such as the production of breeder and foundation seed, maintaining parental material, production of strategic amounts of quality seed and diffusion to reliable seed multipliers).

The question arises who will support the farmers and address the capacity building at the community level.

Legislative framework

The legislative framework is a point of concern when discussion the possibilities for Seed Sector development. Seed and variety legislation is in many countries subject to change, often with in-transparent rules in force at this moment. In general, the threat of biotechnology, the associated tendency of appropriation of genetic resources (intellectual property rights, patenting), and obligation of the WTO-members to install a national legislation that protects intellectual property rights are dominating discussions. Such legislation is a potential threat for the availability/access of sufficient and suitable genetic diversity for farmers, both in the North and the South. However,

also at this moment the legislative framework in many countries indirectly limits farmers' access to improved materials and seeds.

1. *Variety registration and release* are in many cases complex, time-consuming and intransparent processes. This leads to long time spans needed for a successful variety from a breeding programme to be officially registered and released, which means foregone production for farmers and the national food production.

2. *Variety performance testing* on which variety registration and release are based is often done under conditions which are quite different from the farmers' conditions. Testing sites may not sufficiently decentralised, not represent the farmers conditions and situated in relatively favourable agro-ecological zones. Because of fertiliser use and management practices results of variety-performance testing may also be irrelevant for the farmers conditions. Criteria on which varieties validated (VCU, Value for Cultivation and Use) tend to be much narrower as compared to characteristics that are important for farmers, and concentrate on yield superiority as compared to other varieties. Requirements of Distinctness, Uniformity and Stability are implying a genetic uniformity that is not relevant for farmers' conditions, or even undesirable. They are in the majority of the cases a limitation for the registration of local varieties. In addition, in many variety release protocols the requirement exists that varieties have to perform well in all testing sites. These practices lead to the release of relative few varieties that do not necessarily reflect the need and preferences of farmers. They also lead to discarding varieties that may have performed well in test trials for example in a part of the country where drought stress normally prevails, but are low yielding in the trials in the rest of the country
3. *Seed certification* can be required for all commercial seed transactions, usually for particular crops only. In the first place, for seed to be certified, it must be of a registered variety. The certification often involves standards that are too high or irrelevant for on-farm conditions, making seed unnecessary expensive. Furthermore, seed certification agencies in the majority of the countries do not have the capacity nor the budget to certify all seed need for planting. The unrealistic responsibility turns seed certification agencies in inefficient and ineffective organisations.
4. At this moment *plant variety protection* (PVP), i.e. a form of intellectual property right and acknowledged *sui generis* system by TRIPs, are implemented in a number of countries around the world (UPOV). In the 1978-version of the UPOV-system, the use of seed of protected varieties is allowed for research and plant breeding. Also farmers' own on farm produced and saved seed is exempted from the protection. However, in the new proposed form of UPOV (UPOV '91) these exemptions need to specifically defined. PVP needs more

detailed description than what is at this moment required for variety registration, signifying an additional task for the formal system. If variety registration and PVP can be combined into one system, the expenses of variety registration easily increase, which further discourages increased availability of crop diversity to farmers.

These legislative conditions are important considerations for agencies supporting on-farm seed production and farmers themselves. They imply that seed production on-farm by cooperative groups or small enterprises can only be legally supported if the varieties are registered and plant breeders rights are acknowledged (i.e. getting permission, paying royalties), and seed certification or labelling is according the seed law requirements. The regulations form a major problem for seed production of local varieties: these varieties are usually difficult to register as long as narrow DUS criteria are utilised. Activities supporting farmers' own on-farm seed production, may be illegal when patented or otherwise protected varieties are involved. Seed enterprises would meet similar problems. In addition they may have to pursue look for seed certification – which may be difficult considering the capacity of seed certification agencies and may conflict with interests of the public sector.

Other aspects of the seed policy framework can also seriously affect the role participation of farmers and farmer-based groups as potential and recognised seed sector suppliers. Possibilities to import of seeds from abroad, joint ventures with the use of parental material from abroad for local hybridisation, credit possibilities, tax benefits etc. also need attention in a policy that aims to stimulate seed sector development

6. CONDITIONS FAVOURING INFORMAL SEED SECTOR DEVELOPMENT

There does not exist a ready made format for a legislative framework that fits all crops and countries. Some key-elements can however be defined. National variety and seed regulation should accommodate the interests of all seed sector players, including the producers as well as the clients. Rather than a limiting set of protocols and rules, it can be a tool to stimulate seed sector development when used appropriately. A good functioning seed sector means that, above all, the needs of farmers are adequately addressed. Accomodation of the informal seed sector as a seed supplier is therefore necessary in the majority of the developing countries. Analysis of the variety and seed use by farmers and identification of limitations at the community level can provide the arguments for changing the seed policy and legislation into one that is supportive to informal seed sector development. This may involve more relaxed rules of variety testing and

registration under which local varieties and genetically heterogeneous PPB products can be registered may contribute to the development of alternative seed sources.

To address the needs of farmers, a first requirement is that farmers are considered more seriously as stakeholder, both as client and producer. This means it is important to strengthening farmers' capacity in seed production and ensuring access to appropriate levels of crop genetic diversity. It is also important that farmers are able to let themselves heard in cases that seed laws are violated by seed suppliers or to demand better varieties. This implies capacity development at the farmers' level, involving farmers in variety and seed regulating comittees, and the availability and access to information on varieties and seeds. With developing the farmers position in the seed sector, opportunities for seed enterprises may open up. In a sector where multiple seed sources exist and farmers have a realistic choice of where to obtain seed, aspects like brand-recognition and maintaining a reputation become important mechanisms in seed sector organisation. Finally as the seed sector develops, the public seed sector may step back, sharing responsibilities with the other seed sector players (involving farmers and companies in variety testing), and concentrating on tasks that are of importance for national food security. This involves breeding and basic seed production, particularly of the self-pollinating food crops that are unattractive for commercial enterprises. It will continue to be an important responsibility to shape the conditions that favour seed sector development. Such responsibility needs to be based on a National Seed Policy with a vision on the direction of seed sector development.

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