

West Africa Seed and Planting Material

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This is the twelfth issue of 'West Africa Seed and Planting Material', the newsletter of the West Africa Seed and Planting Material Network (WASNET). WASNET addresses the needs and problems in the seed and planting material sectors in West African countries and brings together private and public seed actors from West African countries in a structure, which will encourage them to work together to strengthen national and regional seed industry development.

The WASNET newsletter is not only a tool through which the latest developments of the seed and planting materials sectors are communicated to seed and planting material staff in West Africa and beyond. It also aims to inform readers of what is going on in the seed and planting material sector in other networks or seed related associations in the world. Even more, the newsletter can be seen as a forum of discussion whereby readers and contributors are allowed and encouraged to pose and answer questions.

The last issues of the newsletter dealt mainly with the public and formal seed institutions in WASNET member countries. Emphasis in the current issue is shifted to the private seed and commercial channels of seed in sub-Saharan Africa. In this issue are some useful information on successes of plant breeding of the four most important food crops in Africa: cassava, yam, maize, and plantain/banana, as well as cowpea, the most important legume grown in Africa and soybean, the legume with the highest growth in the last decades in this continent.

This issue presents the minutes of the harmonization of seed rules and regulation meeting held on 29 March 2003 in Nairobi, Kenya, aside of the fourth annual Congress of African Seed Trade Association (AFSTA).

Many thanks to those who contributed to this issue. There was a feeling that the private sector is not well addressed by WASNET despite their 50% presence at the Steering Committee. To correct this feeling the IITA/GTZ/CSIR Seed Project (WASDU/WASNET) together with AFSTA (African Seed Trade Association) and ATRIP/IFDC (African Trade Investment Program/International Fertilizer Development Center) agreed to assist the private sector actors in their request to be organized.

To achieve this, some countries (Guinea, Niger, Mali, and Burkina Faso) were targeted for the organization (set up) of the National Seed Actors Association. In partnership with the private and public seed actors in these countries, the first official workshop of the National Seed Association was scheduled as follows:

Guinea (APIDIA)	14-15 April 2003 in Conakry
Niger (APPSN)	26-27 October 2003 in Niamey
Mali (ASSEMA)	30-31 October 2003 in Bamako
Burkina Faso (ANOSB)	03-04 November 2003 in Ouagadougou.

There is a need to organize the private sector in West African countries. In many countries, the private sector is not well developed and governments do not consider them as a voice to listen to. Associations are the best way through which the seed industry can make its voice heard.

Do not forget to send your comments on articles and contributions for the next issue of the newsletter

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Commercial Channels of Seed and Planting Materials in sub-Saharan Africa

Seed markets and regulations in sub-Saharan Africa

Joseph Elang

Introduction

Right from attaining independence, most governments in sub-Saharan African countries relied on agriculture as the lynchpin of their economic and social development.

The reasons were manifold: with about 70% of the active population, the agricultural sector ensures national food security, at least one third of foreign exchange earnings, and 15% of budget endowments. It accounts for almost 25% of the GDP in addition to its multifaceted benefits to the other sectors.

However, despite the great achievements and potentials of the agricultural sector in those countries, the seed market has never been developed or organized. Worst still, it is being constrained by the economic crisis plaguing the region since 1985.

As a matter of fact, farm products have become less competitive due to a number of adverse factors such as falling exchange rate, rising production costs, and cumbersome management procedures in public enterprises and administration. As a result, government had to embark on a string of measures, namely:

- Step by step liberalization of seed supplies.
- Privatization of production and marketing activities.
- Increased empowerment of seed farmers.
- Establishment of an attractive environment.
- Development of a regulatory and institutional framework.

With the HIPC (highly indebted poor countries) initiative, whose goal is poverty reduction, seed market organization has become an essential requirement. Agriculture, which undoubtedly offers a comparative advantage to most of these countries, should become a performing sector for it to play its three-pronged part as provider of food security, surplus incomes, and new jobs. For this to happen, there is need to step up agricultural modernization, by promoting the use of good quality seed as a matter of priority. Admittedly, seeds are of paramount importance in increasing yields through healthier and cost effective means. As reservoirs of the plant genetic potential, they also determine the highest effect of the other inputs. For this purpose, the seed market should be improved and organized with the adoption of flexible and attractive laws and regulations as in Cameroon. This will bring about a new breed of rural entrepreneurs in the subsector.

The seed market in sub-Saharan Africa

The seed market in SSA is characterized by some disparities and its growth is hindered by major constraints.

Although the market appears well organized for cash crops governed by the sector approach, it is still in an embryonic state regarding food crops, hence the low yields recorded by the sector.

On the one hand, countries like Nigeria and South Africa, two economically well advanced nations, have been able to raise their seed industries to the level of those in western countries. On the other hand, other countries like Chad and The Republic of Congo fully rely on imported seeds because their local seed infrastructures were destroyed by fratricidal wars. Between these two extremes are Cameroon, Côte d'Ivoire, Kenya, Zimbabwe, etc., which produce part of their seeds locally and also import part particularly during natural disasters like floods, drought, etc.

But if the production and marketing of cash crops are local, almost all the vegetable seed stock is imported from Europe where they grow in different ecologies, hence some problems of adaptation.

The history of the seed market in SSA

The development of the seed market in SSA went through three major stages: from 1960 to 1970, 1970 to 1985 and 1985 to the present time.

From 1960 to 1970

During the colonial era and until a few years afterwards (till 1970), the seed market had been run by multinationals most of which owned research stations; e.g. IRAT (Institute of Tropical Agricultural Research); IRCT (Cotton and Textile Research Institute); IRHO (Oil and Oilseed Research Institute); CFDT (Compagnie française de développement des fibres textiles), etc. Those companies, which mostly deal in cash crops (cocoa, coffee, cotton, oil palm, tobacco, etc.), would import foundation seeds from parent companies, multiply them through a network of contract growers, and distribute them first and foremost to their farmers. Generally, seeds like the other inputs were contributed and deducted at harvest. On the other hand, food crops were neglected, or were bartered or purchased from growers reputed for the good performance of the varieties they sell on the market.

From 1970 to 1985

This was the period when the majority of African countries attained national sovereignty. Conscious of the role of food security in the global development strategy, the various governments established state-owned companies with a seed component to cover research, production, multiplication, and distribution of food seeds. Thus, MIDEVIV (Mission de développement des cultures vivrières, fruitières et maraîchères autour des centres urbains) was born in Cameroon and was tasked with the development of some staple food crops, namely plantain, maize, peanut, fruit trees, etc. At the same time, ecologically oriented farms were created to multiply and distribute seeds through the technical services of the Ministry of Agriculture. However, it must be pointed out that economic activity, based on a heavily subsidized agriculture, was fully controlled by the government. It is also during this era that subsidiaries of foreign research companies were nationalized.

Despite the efforts made by the various governments, things did not turn out as expected; the situation was still characterized by substantial seed requirements, low quality seed, and a rudimentary seed industry.

From 1985 to the present time

1985/1986 marked the beginning of economic depression in sub-Saharan Africa. A combination of several adverse factors, namely the deterioration of the terms of trade, falling prices for major commodities, and rising production costs, as well as cumbersome management procedures plunged African countries into an unprecedentedly deep and lingering economic recession.

In order to do away with the crisis, the leaders had to put in place a string of adjustment measures, first internally and then with the support of the international financial community. Thus, the following moves were taken with regard to the seed sector:

- Liberalization of the seed trade;
- State withdrawal from seed production and marketing activities in favor of the private sector;
- Empowerment of seed growers;
- Attempts at seed trade organization.

This period was also marked by liberalization and state withdrawal, which initially, had a negative impact on farmers who felt abandoned. Seed markets were thus flooded with low-grade products from sellers who were but profit minded. The drawbacks in terms of yields, environment and health were tragic.

Present trends of seed trade in sub-Saharan Africa

Since the devaluation of the CFA franc and the advent of the HIPC initiative, the seed trade is obviously getting off the ground thanks to rekindled awareness of all the stakeholders of the sector. The seed trade is currently marked by the emergence of government-backed entrepreneurs whose ambition is to promote the seed sector. Almost breaking into

the trade, those neophytes get trained and organized to offer good quality product. The seed sector is gaining recognition and the division of labor is evolving with each actor trying to perform efficiently. The seed trade is chiefly dominated by the will of governments to develop the seed industry given its impact on poverty alleviation. Their major concern is also to organize and improve seed markets through the following actions:

- Creation of a conducive environment (funding structures, tax benefits on imported items, property, etc.).
- Establishment of an institutional and regulatory framework to make the various actors feel secure.
- Support to the various actors of the seed chain including technical government services and agricultural research.

Products

In sub-Saharan Africa, the seed trade covers two major categories: dry and wet seeds.

Dry seeds with moisture content below 10% comprise vegetable seeds imported mainly from EU countries, USA and Asia, cereals (particularly maize, sorghum, and millet) and leguminous seeds (peanut, bean, cowpea, Bambara nut) which are increasingly produced locally. But hybrid seeds are still imported from South Africa, Zimbabwe, and West Africa.

Wet seeds with more than 90% of moisture content are made up of Irish potato, seed yam, fruit tree, and oil palm plantlets. They are generally produced locally in specialized research centers.

As for the amounts produced, only a few estimates can be obtained in the absence of reliable statistical data. One can note in passing a rapid development of vegetable crops around urban areas as well as efforts made by some private operators and research centers to develop and multiply vegetable seeds; e.g. onion, okra, pepper, Irish potato, tomato, etc.

Considering the modest trans-border trade of seeds and planting materials, it can be argued that locally produced seeds are generally own-consumed.

As a general rule, and particularly in CEMAC (Economic and Monetary Community of Central Africa) countries, the following observations can be made:

1. Traditional seeds cover at least 80% of the market and improved seeds less than 20%.
2. Over 90% of legume and vegetable seeds are imported and 10% are produced locally.
3. Hybrid seeds account for 10–15% of the market and mainly consist of maize.
4. Millet and sorghum seeds top the list in terms of quantity and demand followed by maize.
5. The demand for onion, tomato, and pepper seeds is growing significantly.

The following data on the food market have been drawn from the scanty statistics available at CEMAC.

Onions are ranked first (2755 tonnes) followed by cassava and its byproducts (1381 tonnes), vegetable crops (1,039 tonnes), plantain (890 tonnes), tomato (708 tonnes), fruits (705 tonnes), peanuts (649 tonnes) cocoyams and taros (524 tonnes), dry bean (285 tonnes) and Irish potato (281 tonnes). In terms of cultivated areas, sorghum comes first (1.2 million ha), followed by millet (0.7 million ha), maize (0.5 million ha), cassava (0.5 million Ha). As for cash crops, cotton is at the top of the list (0.4 million ha) followed by cocoa (0.3 million ha) and coffee (0.3 million ha). The last figures give some indication of seed requirements and, consequently, of the seed market of the CEMAC which, with its six member countries, covers a total population of over 30 million people on a land area close to 3 000 000 km².

Pricing

Seed trade has been liberalized and yet standard prices are being implemented with some variation due to transportation cost. Some importers with fraudulent intention set highly uncompetitive prices when they succeed in smuggling in their goods. The huge price gap between hybrid and composite seeds partly explains farmers' reluctance to purchase hybrid seeds. Profit margins on their part vary from crop to crop. However, they are more attractive for dry seeds (up to 200%) than for wet seeds (barely 50%).

Distribution channels

On the whole, seeds, especially wet seeds, are not marketed through any organized channel. Seed sales, which for a long time remained a state controlled activity, gradually became a private business.

Seed marketing involves several levels:

- Vegetable seeds are marketed by private agro-businesses specialized in the trade of inputs and enjoying a maze of sales points.
- Regional companies and projects, very often handling one crop (cotton, coffee, cocoa, rubber, etc.) are involved in on-farm seed dissemination.
- Government is still distributing seeds on the remaining public seed farms.
- Local markets, which often open periodically for transactions, remain the major source of supplies of traditional seeds.
- The barter system is used in villages.

But the real constraint to seed distribution is the lack of appropriate seed storage facilities to ensure good quality seed across seasons.

The actors

In Cameroon, there are four groups of actors:

- The importers/distributors: Tropicasem, Jaco, etc.
- The growers: AOUDI Sanguéré, GIC TONGO, SCAP, etc.
- The growers/distributors: Prosemcam, Afrisem, PELENGET

- The retailers who fall into three categories;
 - Franchised retailers with exclusive contracts to distribute only a company's brand;
 - Multicard retailers who juggle with all the brand names;
 - Undocumented street hawkers.

The socioeconomic environment

The present environment of globalization is characterized by all-out competition. Legally established operators are penalized by a lack of institutional and regulatory framework as they face amateurs who flood the market with low quality products. The situation will certainly improve if there are seed laws and an attractive environment put in place.

Constraints to the development of seed trade in sub-Saharan Africa

The development of seed trade in sub-Saharan Africa is confronted with major constraints including:

Natural constraints

- Unfavorable climate for plant growth.
- Fragile, unfertile, and often arid soils.
- Isolated production zones.

Economic and technical constraints

- Small market with no room for profitable investments.
- Lack of breeder and foundation seeds favoring low-grade seeds in the market.
- Dislocation of the main functions of the seed chain: the various actors of the seed sector are not known and do not collaborate, hence the conflicts arising in the performance of activities.
- Lack of a funding structure adapted to agriculture and likely to take account of the risks and vagaries associated with agricultural activity.
- Absence of an attractive environment.
- Lack of a distribution network, so much so that seeds are not available at the time of planting.
- Lack of coordination of seed related activities.
- Nonexistence of institutional and regulatory framework.
- Lack of effective extension system.
- Unavailability and high costs of agricultural inputs (fertilizer, pesticide, herbicide, farming implement, etc.).

Social constraints

- Lack of professionals of the seed trade;
- Farmers' reluctance to adopt new technologies.

Biotic constraints are due to pests, diseases, and grain-eating birds.

Future prospects of seed markets

The future augurs rather well for the development of the seed market in sub-Saharan Africa. The signals include the present economic situation that is particularly favorable for a genuine seed industry, as well as the opportunities offered by the HIPC initiative in the fight against poverty.

Improvement of environmental conditions

The vast majority of African countries in sub-Saharan Africa, who choose agriculture as their battle horse in the process of economic development, have embarked on policies aimed at establishing an enabling environment for the promotion of the seed sector:

- The organization and regulation of the seed sector;
- The transfer of seed production and marketing functions to a more dynamic private sector;
- The emergence of a new breed of more efficient operators;
- A massive government support to the sector in the form of an array of facilities to attract investors, etc.

HIPC and poverty alleviation

Agriculture is a major asset for most African countries given its potentials. It employs on average 60 to 70% of the active population. Thus, it appears as the main focus of governments and international organizations in the fight against poverty. Admittedly, poverty cannot be controlled in the absence of sustainable economic growth involving the development of agriculture. The HIPC initiative, which benefits most of those countries, is an opportunity for Public Powers to obtain more resources for poverty alleviation. Therefore, it is hoped that a large proportion of investments will be on good quality seeds in order to modernize agriculture, and overcome the host of challenges earlier described.

Seed regulation in sub-Saharan Africa

Generalities of seed regulation in sub-Saharan Africa

Generally speaking in Africa, the level of regulation varies according to the region and the country, as well as the level of agricultural development. Regulatory machineries are well advanced in West, East, and southern Africa, but are still quite rudimentary in Central Africa where the majority of the countries have not passed any seed legislation. Existing regulations, where appropriate, are so restrictive that they appear rather like obstacles to investments. It is essential that they be reviewed for greater flexibility. To import and export seeds, the countries generally follow international regulations laid down by bodies such as ISTA, EU, OECD, etc.

However, it must be pointed out that even in the absence of an official seed regulation exercise, each country employs various devices for seed quality control and trade regulation. The main control instruments are:

- Plant protection department of the Ministry of Agriculture (Plant quarantine services);
- Research services;
- Customs services in ports and airports;
- Economic and commercial services;
- Fraud squad;
- The law and other services (police, gendarmerie, etc.).

At present, all the African countries are focused on the drafting of appropriate seed legislations. Regional groupings are being set up on harmonization, coordination, and cost issues.

Justification of seed laws

The question that springs to mind is the need for a common seed legislation for Africa. During the pre- and post-colonial era, seed related activities were concentrated in the hands of the state which could not be both judge and jury by putting a legislation in place. The situation has changed in the wake of liberalization and state withdrawal, making a system of arbitrage mandatory.

Indeed, demand and supply mechanisms in seed trade call for quality control as the buyer cannot assess with certainty the product quality, and as the popular saying goes “nothing looks like a good seed than a dead one”.

Characteristics of seed laws in sub-Saharan Africa: Cameroon

The goal and objectives of the Seed Act in Cameroon Generally the Seed Act lays down the conditions for the conduct of seed related activities.

The law sets out the general principles of the regulatory framework governing seed importation, production, and marketing. The enactment of (enforceable) technical regulations is the responsibility of the Ministry of Agriculture and the National Seed Board.

Its purpose is to promote agricultural development and improve the seed trade through the following measures:

- Definition of technical standards;
- Protection of the actors against unfair competition;
- Protection of the breeder against fraud and forgery;
- Guaranty of high-grade seeds to the users.

Bodies established/institutionalized by law

New bodies were established by law and charged with specific tasks:

1. The National Seed Board (CSN): Advisory body responsible for the coordination and monitoring of the implementation of government policy. It has a permanent secretariat which sees to the day-to-day execution of missions assigned by the Board through a Technical Seed Committee (CTS) comprising task forces on variety registration, quality control, and certification.
2. The National Seed Registration Committee charged with the introduction of new varieties following conclusive trials.
3. The catalog of species and varieties grown in Cameroon.
4. Adapted certification and mandatory control prior to marketing.

Lastly, the law provides for incentives and penalties:

- Low-interest loans;
- Training of professionals;
- Market information;
- Fines and penal sanctions.

Features of the Seed Act in Cameroon

The Seed Act in Cameroon has two main characteristics: it is flexible and incentive driven.

It is flexible because:

- The proposed certification system does not apply systematically to all types of seeds.
- The certification system takes account of the economic and technical constraints of the seed market while preserving its main mission, which is to guarantee seed quality.
- Certification is done gradually on the basis of the economic interest of the country.

The Seed Act in Cameroon is also incentive driven:

- It does not set any barrier to access to the seed market. The conduct of seed related activities is subject to a simple declaration.
- The Act provides for active involvement of intermediary actors (seed breeders, growers, packaging specialists, importers, and distributors) in the management of the sector.
- Membership to the NSB allows for a large representation of economic operators.
- The Act protects the interests of the different actors of the sector against fraud, unfair competition, and forgery.
- The Act provides for sanctions against fraud.

Conclusion

In the context of a more competitive agricultural sector that is meant to fully play its role, special attention must be accorded to the development of the seed market, knowing that seeds are a key element of agricultural output.

Unfortunately, seed markets in sub-Saharan Africa remain by and large barely developed due to a number of negative factors. The various governments are trying to reverse the situation by lending credibility to agriculture in the context of poverty alleviation. Thus, the authorities have demonstrated their political will by placing special emphasis on the development of the seed industry as a means to induce the modernization of agriculture and, consequently, of sustainable economic growth. The steps being taken cover various aspects: organize the production of breeder and foundation seeds; organize the seed sector by creating an attractive environment as well as an institutional and regulatory framework, and lastly, provide support to all the actors of the seed chain. The formation of regional groupings for a better coordination and harmonization of seed related projects, with the ensuing savings in time and financial resources, is an initiative that should be encouraged.

Recommendations

1. Ensure that the various African governments fulfill their commitments to divert part of the oil revenues to the development of agriculture in general, and of seeds in particular.
2. Promote local production of seeds within regional groupings in order to facilitate the coordination and harmonization exercise and to reduce costs.
3. Encourage states and private operators in setting up bodies to take care of agricultural statistics and seed market information for a better planning of seed related activities and greater transparency in pricing.
4. Strengthen research structures by developing high-yielding and ecologically adapted varieties.
5. Emphasize capacity building (training) at all levels.
6. Set up funding structures that have been successfully experimented in other countries.
7. Promote professionalism in agriculture in general and in seed production in particular.
8. Improve allied services such as roads, drying, storage, and processing units, etc.

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Seed sector actors and seed and planting material sources for roots and tuber crops in Togo

Kossi M. Sedzro

Introduction

Roots and tuber crops (cassava, yam, sweetpotato, and cocoyam) are important food crops in Togo. They are considered as staple diet by the people or as sources of income by the farmers. Roots and tuber crops contribute to the improvement of food security and poverty alleviation in rural areas (Horton 1988; CTA 1987; Akoroda 1992).

This presentation will focus mainly on the two most popular roots and tuber crops in Togo: cassava and yam. According to agricultural records, the annual national production figures generally range from 400 000 to 500 000 tonnes (Desa 1970/2000). Over the last three decades, cassava and yam production has been erratic and, above all, did not tally with population growth (Desa 1970/2000; Lev and Shriver 1998).

Factors often mentioned as the causes of such low production data include:

- Low soil fertility or lack of adequate quantity or/and quality of planting material.
- Roots and tubers are special crops compared with cereals; the planting material is heavy and cumbersome and, as a result, not easily transported (Bell et al. 2000, Gregg and Van Gastel 1997). For example, to plant one hectare of maize, the farmer needs to carry only 20–25 kg of seeds to his plot, while for the same acreage of cassava, he will have to transport 8000 to 10 000 stem cuttings weighing more than one tonne.

Efforts made in the 1980s, especially by the International Institute of Tropical Agriculture (IITA) in collaboration with national research and technology transfer programs of the subregion to boost the production of roots and tuber crops did not yield the expected results, if put against the amount of resources invested (Ajayi 2000; Kugbei 2000).

The question was how to produce enough good quality roots and tubers planting material to meet production needs.

To answer the question, one had to find out about the source of such plant material, the key actors in the roots and tuber crops seed sector in Togo, their main roles, and the main problems they are facing.

Sources of seed supply

The farmer collects his planting material from his own farm (self-supply) or from other yam farmers.

Self supply

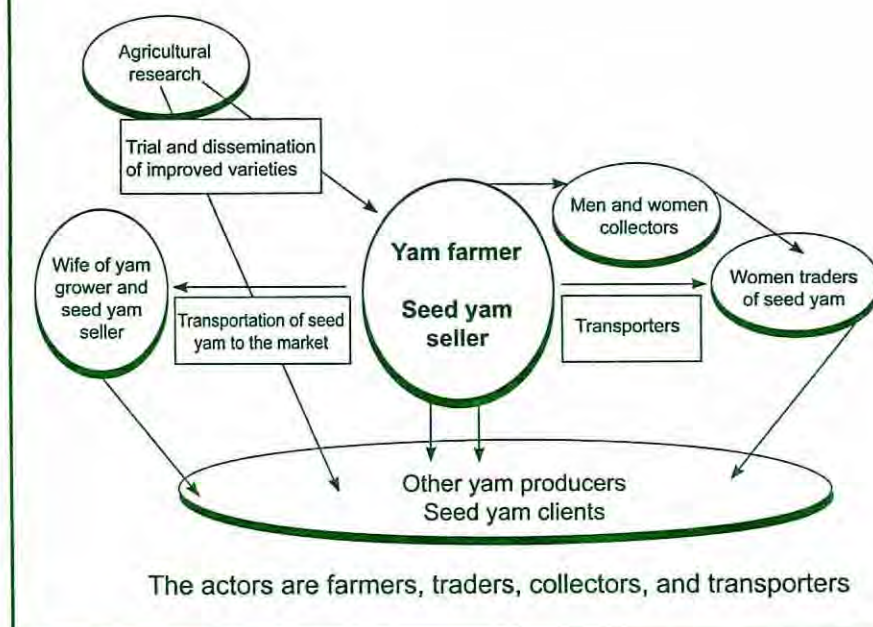
The farmer plants the seed yam from the previous season, namely yam heads, small tubers or fragments of big tubers.

Yam heads are derived from the milking of early-maturing double harvest varieties. The small and large tubers are carefully selected and put aside by the farmer after harvest at the end of a full cycle.

Milking allows an early first harvest for sale or own-consumption and the collection of good quality seeds. Nevertheless, it presents a few drawbacks, namely:

- The obligation to milk inside the growing cycle just for seeds even if bulking is not well advanced or rainfall inadequate (low rainfall).
- The risk of asphyxiation or death of the plant when milking takes place under high rainfall conditions (development of fungi).

Key actors of seed yam sector



Supply by the neighbor

If the farmer cannot produce his own seeds, he can buy from neighboring yam farmers. He can pay cash or in kind by contributing labor for mounding, for example. In this case, he could make contacts and inform his supplier in advance about his choice of varieties and amounts required. This is the mode of supply mostly used by farmers who are just beginning. It also provides the farmer with a large gamut of yam species and varieties to grow on his farm. Each variety in his yam collection meets a specific need (sale, consumption, etc.).

Making contacts beforehand is crucial for a timely supply of seeds with desired characteristics. The farmer who sells seed yam usually begins selling after planting his own farm. Therefore, the seed buyer has to wait even if he's been left behind by the cropping calendar.

Market supply

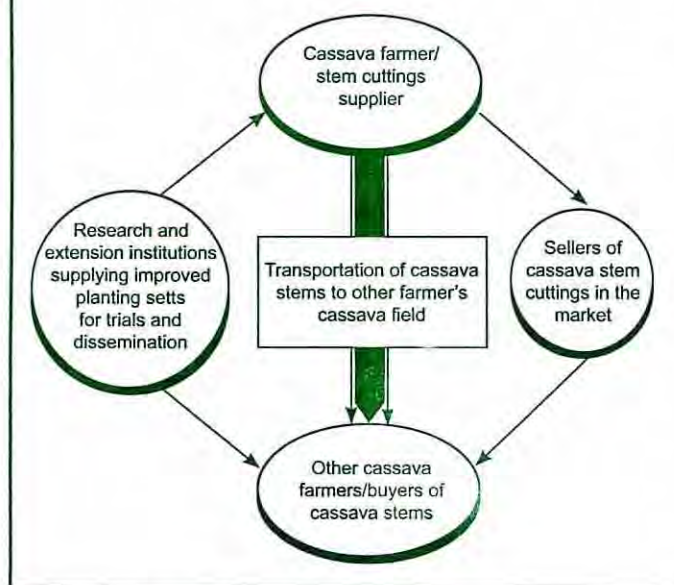
The farmer can purchase his seed yam on the market where he is offered a variety of choices. But he may be running some risks if he does not take some precautions:

- The risk of buying a mixture of varieties he may not be able to identify or missing the desired variety;
- The risk of buying unclean seeds (infested by mealybugs, dry rot, etc.). Such infestations are not always visible at the time of purchase.

Tests and adoption of new varieties

Agricultural research introduces new varieties which are tested on-farm for adoption by the farmers should the latter find them interesting or with good performance. The varieties are moving from farmer-to-farmer without any real extension program.

Key actors of the cassava seed sector



Seed yam growers

Seed yams are cultivated along with ware yams on the same plot. Part of the seed yam production is sold to other farmers and to traders.

Objectives of the seed yam grower

A survey conducted among yam farmers showed that the farmer produces seeds in 27% of cases for his own farm, 32% for sale, and 41% for both (own farm and sale).

Seed yam production techniques

The seed yams used by the farmer may originate from:

- Milking: applied mainly on early-maturing or double harvest yam varieties (Laboco, Kpona, etc.).
- Disease-free minisetts carefully selected and put aside at harvest at the end of the growing cycle.
- Disease-free large tubers harvested at the end of the cycle and carefully selected for cutting into mini-fragments.
- Small size yam tubers obtained through rapid multiplication technique.

Main elements of production cost

According to a survey carried out in 2002 in a yam production region, the following are, by order of importance, the main elements of the production cost of yam:

- Seeds (57%);
- Labor for different farm work including land preparation, mounding, planting, weeding, milking, etc. (41%);
- Land (2%).

Cultivated varieties

Varieties retained for extension are: *loboko, florido, koukou, kratsi, katala*. The most common varieties in the yam belt

in Togo include: *laboco, heabalo, katala, doudakou, kani, teklo, brutani, alassoyi, roumolkou, kratsi, koukou, kabansi, yema, ato, sossogan, gualabou, katchabina, kpeyené, hegbete, voté, sakata, and tounatalou*.

Main constraints to seed yam production

The constraints to yam production also affecting seeds include:

- Scarcity and high cost of seed;
- Lack of farmhands especially at the peak of the growing season;
- Diseases and rodents;
- Lack of land both in quantity and quality.

Key actors of the seed trade

There are two types of yam traders: the seed grower and the woman seed trader. Both men and women are involved in the seed trade but the former sells at the farm gate while the latter sells at market places.

Seed growers/traders

The yam farmer himself or his wife carries the seed to the market for sale. But usually, the farmer directly sells his seed yam at the storage point. A survey showed that 48% of seed growers sell at the granary (this could be on-farm), 27% in the village market, 10% in the house, and the remaining 15% in markets outside the village. He is engaged in whole and retail sales. The yam seed growers/traders control the sector not only in terms of the amounts of seed produced but also in terms of trading period. They sell only after meeting their own seed requirements.

Women seed traders

Generally these are traders who, in addition to the ware yam, sell seed yams in the market or at home. The trader can purchase her seed stock from her husband's vendor or be assisted by collectors who pick seed yam supplies from the grower on her behalf.

Main difficulties encountered by women traders

These boil down to storage losses, high cost, and the necessary care associated with seed transportation. Storage losses are mainly due to rodents, rots caused by insect pests and diseases, etc.

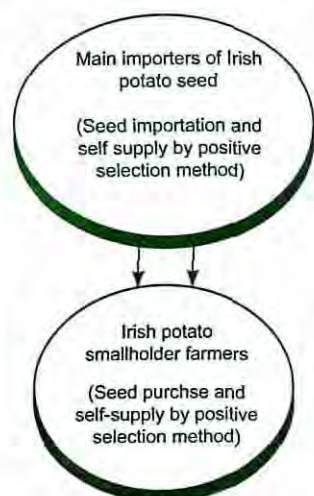
Seed carriers and marketing channel

Traders use the services of haulage contractors to transport their products by lorries or pick-up vans.

Farmers who decide to sell their seeds in the market or need some seeds for their own farms can also use the same services.

The high cost and difficulty associated with transportation are proven factors limiting the extension of the marketing channel to yam production areas.

Key actors of Irish potato seed sector



The key actors of the cassava seed sector are cassava farmers and cassava stems sellers.

Origin of planting setts

The planting material used by the farmer originates from his own farm, from neighboring cassava fields, or from the market.

Own farm

These are stem cuttings from the farmer's own unharvested field used as woodlot, or from stem material kept under observation after harvest, should harvesting occur before the rains are steady during the new season. Cuttings from stems under evaluation have a low recovery rate due to partial dehydration.

No farmer is engaged in the multiplication of cassava stem cuttings. Therefore, planting setts must come from one's own field or from other farmers.

Neighboring farm or market

If the farmer cannot obtain planting setts from his own farm, he can contact the neighboring farmer who will usually give out the quantity he can afford free of charge. The farmer can always obtain planting setts of new cassava varieties from his neighbor to supplement or enrich his cassava collection depending on production objectives (own consumption, marketing, processing). If his needs are still not met, he can then turn to the market.

The sale of cassava stems at market places or by the roadside is common particularly in locations where cassava planting material is in short supply and where cassava stems are sometimes used as firewood. According to a survey conducted in 2002, the prices set by the farmers vary greatly from 10 to 15 FCFA per stem of 8–10 cuttings in Togo and Bénin to about 5 Cedis per stem in Ghana.

Research and extension institution

The extension and dissemination of planting materials are not well structured. However, improved materials are released by research and extension institutions for on-farm trials and dissemination. Following the trials, any material considered good by farmers spread without the intervention of extension services.

Thus, the following varieties have been disseminated: TMS 30572, 30555, 30001, and 4(2)-1425, 312 524, *Tuaka*, *Gbazékouté*, etc.

Sweetpotato, cocoyam, and Irish potato

The sweetpotato and cocoyam seed sectors and planting materials supply conditions are almost similar to those of cassava. Irish potato farmers are the main actors of that seed sector.

Irish potato seed supply

Irish potato seeds must be imported from Europe (France and particularly Holland) almost every season. Imported seeds are quite expensive (more than 50% of production costs).

Varieties that are adapted to the cropping conditions are not always available when orders are placed, or do not arrive in time for planting from April to May, or have not reached adequate physiological maturity on arrival.

Agricultural credit is not often available or easily accessible to enable the funding of seed importation, in particular. *Smallholder farmers cannot, on their own and individually, import the minimum quantity of seeds prescribed by the European suppliers.*

Research carried out in collaboration with Danyi farmers has shown that farmers can produce their own seeds using the positive selection approach recommended by the Centro Internacional de la Papa (CIP) and imported first generation seeds.

Conclusion

The main sources of seeds for roots and tuber crops in Togo are: own farm, neighbor, and markets. However seeds from the farmer's own farm is the most prevailing source of supply and the farmer here is the main actor.

There is no farmer involved solely in the multiplication of planting setts. The farmer is also the seed grower. The extension and dissemination of planting materials are not well structured.

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Dissemination of improved seeds by farmer organizations in the Dosso area in Niger: a solution to the problem of seed supply in rural areas

Illya Miko

Background and current situation

Despite the efforts made by the Government of Niger since the 1980s, the agricultural input supply system in general, and the improved seed supply, in particular, have been dysfunctional. However, Government was able to put up a seed scheme under the National Grain Program (PCN) to assist the research program in the supply of breeder seeds (M0) to Lossa Seed Farm.

The M0 seeds are multiplied into M1 seeds on that site and given to secondary seed multiplication centers for the production of M2 seeds. The M2 seeds are made available to pilot farmers around the centers for the production of M3 seeds for release.

This scheme came across serious operational difficulties and the efforts quickly fell through with the program phasing out in 1990. Since then, Development Projects and NGOs, each in its own mandate area, have been trying to address the constraints associated with seed supply with the backing of rural organizations.

Consequently, the Projet d'Appui au Développement Rural (Rural Development Support Program) of the Dosso Department and the National Institute of Agricultural Research of Niger (INRAN) have joined hands since 1999 in 23 R&D villages across the department (Fig. 1), with a view to establishing a network of specialized groupings (GSMS) tasked with the multiplication and diffusion of adequate quantities of improved good quality seeds.

The need for support and the approach used

Since 1999, The PADER project in Dosso felt the need to rely on rural organizations and collaborate with INRAN to develop a strategy for the production and dissemination of good quality seed of improved varieties in rural areas. Thus, 23 farmers' groupings were prepared to embark on the spread of

Figure 1. Distribution of groupings in the Dosso area.



improved seeds. From 1999 to 2001, those groupings first carried out varietal trials based on production constraints identified during diagnostic surveys conducted on their lands. At the end of the trials, the varieties to be multiplied were retained and the farmers trained on the practical conduct of seed multiplication plots. Table 1 gives the types of trials carried out from 1999 to 2001 in line with identified production constraints.

Steps towards sustainable operations

In order to render the seed multiplication networks sustainable and to put established GSMS on a sound footing across the department, the following steps have been taken:

Organizational arrangements

Grouping level

R&D villages were identified based on the existence of registered farmer organizations. For the sake of professionalism, seed growers were gradually led to set up the *Groupement Spécialisé de Multiplication de Semences* GSMS (Specialized Seed Multiplication Groups) in each village.

The GSMS are authorized by government order N°96-067 of 9. November 1996 establishing the regime of rural cooperatives, and the bylaw N°96-430/PRN/MAG/EL of 9. November 1996 governing farmer organizations. Each GSMS is endowed with a management committee in charge of resource mobilization as well as seed multiplication and marketing.

Table 1. Type of TMP conducted per crop based on production constraints.

Production constraints	Planned tests/activities	Varietal technologies tested
Constraints/cycle of local varieties	Earliness trials	<ul style="list-style-type: none"> • Millet: SRMT-490 et CT6, HKP et H80-10GR • Cowpea: TN27-80 et TN28-87 • Peanut: T177-83 et T169-83
Production constraints of local cultivars	Yield trials	<ul style="list-style-type: none"> • Millet: Zatib et GR-P1 et MTDO-92 • Cowpea: TN256-87 et TN3-78 • Sorghum: NAD-1 et Sepon-82 • Peanut: T181-83 et TS32-1 • Rice: FKR-48 et D52-37, FKR-48 et IR2042
Constraints/millet and cowpea <i>Striga</i>	Resistance to <i>Striga</i>	<ul style="list-style-type: none"> • Cowpea: TN121-80 et TN93-80
Constraints/Cowpea parasites	Resistance to thrips	<ul style="list-style-type: none"> • Cowpea: IT90K372-1-2 et IT89KD374-57

Farmer level

There are a number of minimum requirements for seed multiplication by the farmers. Selected farmers are those with their farms sited away from seed multiplication plots. They are credit worthy seed growers who can afford production inputs to guarantee the success of the growing season. To secure adequate management of multiplication plots in line with the technical standards applied in the village, multiplication plots are blocked to allow for synchronized plot maintenance operations.

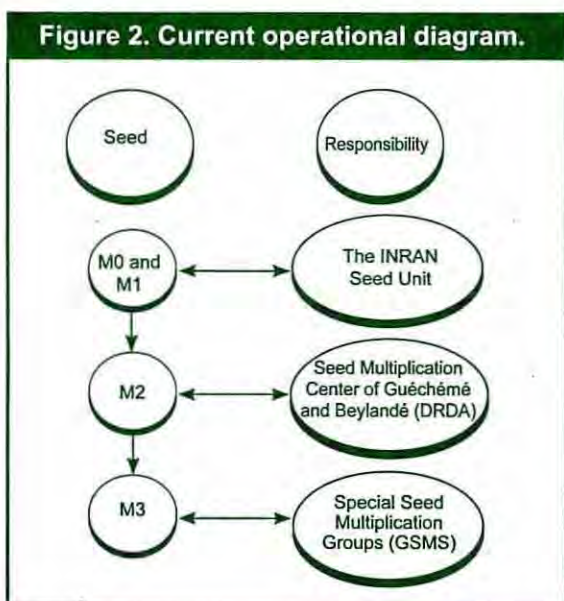
Technical provisions

The GSMS have undertaken to produce M3 seeds for release. So every year, their management committees obtain M2 seeds from the two seed centers of the département (Guéchémé, Beylandé) to supply their members. For the purpose of sustainability, cooperative activities as well as technical training were intensified over the 2002 and 2003 seasons. Backstopping was provided with a view to making the groupings autonomous by the beginning of the third multiplication season in 2004.

The operational diagram of the network is shown in Figure 2.

Linkages with partners

The GSMS will become functional only if dynamic linkages are maintained with partners on the ground. So, for a start, GSMS benefited from active assistance from supervisory services in establishing partnerships with projects and NGOs based in their mandate areas. The objective is to obtain assistance in farming input supply and, above all, in organizing the marketing of produced seeds. Furthermore, in order to be part of the national seed multiplication and dissemination system, the GSMS gradually joined the



Association of Private Seed Farmers of Niger (APPSN) which now includes production in their seed information system and thus helps with marketing.

The GSMS maintain functional linkages with the research institution in order to train their members and introduce new varieties through on-farm demonstrations and trials aimed at the renewal of the germplasm.

Funding of the operation

The launching of the GSMS in 2002 took place with some difficulties, mainly financial, due to the fact that the PARDER credit line was not operational. Two other alternatives were then considered. INRAN and PADER supplied M1 foundation seeds to the GSMSs. The latter contributed the other production inputs (fertilizer, pesticide, storage).

During the 2003 season, steps were taken to provide the groups with access to the project credit line.

Sustainable working capital

In 2002, the working capital for the GSMSs was quite modest. It included the value of seeds entrusted to them and, in some cases, mobilized inputs or support from other potential partners. Such fund is sustainable as it is paid back with an interest agreed upon by members of the GSMSs.

Thus, an input supply contract is signed between the GSMS Management Committee and each seed grower who receives the inputs (foundation seeds, fertilizer, and pesticides). Under such contract, seed growers are bound to sell their productions through their GSMS in order to guarantee adequate recovery rate.

Seed control and certification

For seed quality control and certification, a regional certification committee has been established and is made up of INRAN breeders, the regional seed officer, the group supervisor, and the members of the management committee of each village. The committee takes stock of all the seed multiplication plots in the region (farmers' fields and seed centers) and inspect them in the course of joint missions organized during the growing season.

Seed dissemination and marketing

The GSMSs' management committee organize the packaging and marketing of members' productions. Consequently, the following steps have been taken:

- The construction on each land of a seed storage unit. To this effect, each GSMS approached the Project entitled "Construction Sans Bois" for the building of a 10-tonne capacity warehouse. The benefits of the GSMS are two-pronged: they are built with affordable material and offer ideal conditions for seed storage.
- Seed warrantage. The sustainability of this operation in farmers' field depends on the GSMSs' ability to sell their production. For that purpose, each GSMS is developing a warrantage partnership with decentralized credit institutions in order to market their members' production. Warrantage is done on the basis of the grain value of seed stock at harvest and of their real value during the marketing process.

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Seed and Planting Materials Successes through Plant Breeding

IITA successes in plant breeding in African rural development

Rodomiro Ortiz

Low agricultural productivity and a high percentage of poor and undernourished people both adults and children, are common features of sub-Saharan Africa. Low infant weight appears predominant in West and Central Africa as well as the Great Lakes Region of Eastern Africa.

The annual demand for food keeps growing (3.3%) and may not be matched by the growth in agricultural production. Not surprisingly, per capita calorie intake remains at low levels in sub-Saharan Africa, and below the developing world average. If current trends continue, there will be approximately 300 million malnourished people or 32% of the total population in 2010, which will convert sub-Saharan Africa (taking over from South Asia), to being the region with the highest number of inhabitants who are chronically malnourished.

Agriculture still accounts for 33% of GDP and 40% of exports for sub-Saharan Africa. It provides jobs to 65% of the labor force (versus 15% in industry and 20% in services), and the forecasts from the African Development Bank suggest that about 60% of the economically active African population will still be employed in agriculture by 2010. In short, agriculture remains the dominant factor for economic development in most of Africa, and more importantly, the rural poor depend on agriculture for their livelihoods.

Hence, research-for-development interventions aiming to ensure food, reduce poverty, and generate income must be high in any agenda in which science will be pursued for assisting development in Africa.

Impact of plant breeding in Africa

A recent survey by the International Food Policy Research Institute (IFPRI) reveals key successes emerging in African agriculture particularly breakthroughs in maize breeding across Africa, sustained gains in cassava breeding and successful combat of its disease and pests, control of the rinderpest livestock disease, booming horticultural and flower exports in East and Southern Africa and increased cotton production and exports in West Africa (Gabre-Madhin and Haggblade 2003).

This paper presents some successes of plant breeding of the four most important food crops in Africa: cassava, yam, maize, and plantain/banana, as well as the most important legume grown in Africa (cowpea) and the legume with the highest growth in the last decades in this continent: soybean.

Cassava: the best kept-secret of Africa

A recent book by Nweke et al. (2001) revealed for the first time, that cassava could be transformed from a poor man's crop to an urban food, from being a subsistent crop to an industrial cash crop. Their book describes how long-term research by IITA and African partners led to the development of improved, high-yielding Tropical *Manihot* Selection (TMS) cultivars that increased cassava yields by 40% without the use of fertilizer. About 206 releases of cassava cultivars from IITA germplasm are recorded in 20 African nations. In the 1990s, African programs incorporated IITA-bred materials in 80% of their cassava bred germplasm, this led to 50% gains in cassava yields on average. The improved cultivars raised per capita output by 10% continent-wide, benefiting 14 million rural people.

The national research capacity available in Africa and backstopping from IITA provide a means to deal with new threats affecting this crop in the continent. For example, the total benefits from the cassava multiplication research-for-development partnership project between NARO (Uganda) and IITA to combat the cassava mosaic disease pandemic in six districts was approximately US\$36 million over four years (1998–2001) for an initial investment of US\$0.8 million.

Partnerships between National Agricultural Research Systems and IITA are key for this and other successes in the genetic enhancement of cassava in Africa. In this regard, the first ever CGIAR Outstanding Partnership Award was given in 1996 to the Institute of Agricultural Research (Sierra Leone) and IITA for cassava improvement. Because of the successes in cassava research-for-development by IITA and partners, the Integrated Action Program for Cassava Starch Production and Export was launched by the President of the Republic of Ghana for developing the cassava starch industry as a major vehicle for job creation and poverty reduction in rural areas.

Similarly, the Government of Nigeria took positive steps to promote cassava production in the country, and inaugurated in 2002 a cassava production committee of all stakeholders: research directors, farmers and extension agents, food processors, and marketers to encourage cassava export. While addressing the committee in Abuja recently, President Obasanjo stated that cassava export could be capable of generating an income of US\$1.5 billion within two years.

Breeding of yams

IITA and national or local partners generated several new cultivars of yams (*Dioscorea rotundata* and *D. alata*) with high and stable yield of tubers (50 to 100% superior to popular local cultivars) as well as good storability and food quality attributes through breeding and selection. High levels of host plant resistance bred into the cultivars against the two most important diseases of the crop, yam anthracnose disease and yam mosaic virus, contribute significantly to the high level and stability of field performance. With the aim of limiting production cost, the improved yam cultivars were selected for good performance in the absence of external input of fertilizer or staking (in the moist savanna zone) and emphasis was placed on tuber shapes that facilitate harvesting. Many of these new cultivars were assessed at multiple sites in the yam producing locations of West Africa for suitability to local farming and food systems in comparison with popular indigenous cultivars and with active participation of potential farmers. Three IITA-bred cultivars of *D. rotundata* (white yam) were formally released by Nigeria in 2001. Several others are in the pipeline in the other major producing countries in the subregion.

Water yam (*D. alata*), a species introduced to Africa from Asia, deserves special mention. It is generally superior to the indigenous white yam (*D. rotundata*) in yield potential (especially under low to average soil fertility), ease of propagation (production of bulbils and reliability of sprouting), early vigor for weed suppression, and storability of tubers. Indeed it has superior characteristics for sustainable production. Its major limitation in the field is the susceptibility of most cultivars to anthracnose disease caused by *Colletotrichum gloeosporioides* that exerts a devastating impact on productivity.

The tuber culinary quality of most cultivars of the species is inferior to that of white yam in the preparation of West African dishes. New water yam cultivars with much improved food quality, resistance to anthracnose and high tuber yield have been developed and are under multisite testing with partners in Nigeria and Côte d'Ivoire. Already, one of the key parental sources, earlier introduced from Puerto Rico, has gained very wide acceptance in West Africa. Introduction to farmers through an NGO in Ebonyi State of Nigeria has led to a rapid spread in that State and neighboring ones.

Improving maize for, in, and from sub-Saharan Africa

Maize production in sub-Saharan Africa today would be 25% less, if new cultivars were not grown by African farmers. Breeding for resistance to maize streak virus, the parasitic weed *Striga*, insects, downy mildew, and other pests was among the major targets of partnerships set up by IITA in West and Central Africa, and Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT) in Eastern and Southern Africa. The CGIAR acknowledged the successes on the genetic enhancement of African maize by giving the 1986 King Baudouin Award to IITA for its work to overcome maize streak virus, a major endemic disease affecting maize throughout Africa.

In the mid-1990s East and Southern African farmers planted about 50% of maize area with bred hybrids that showed yield gains of about 40% over local cultivars. From the 1970s onwards, IITA and research-for-development partners recorded 267 releases of maize cultivars in 11 West and Central African nations, 81 of which were released by the private sector, including hybrids. IITA and CIMMYT provided 49 and 11% of genetic materials, respectively, to the new cultivars, which were grown in about 37% of the total maize area in this subregion. The mean on-farm yield gains with improved germplasm appears to be about 45%, which explains why over nine million West and Central African farmers grow improved open-pollinating cultivars on about 20% of the total maize area, thereby boosting total subregional maize output by 2.5 million t/year⁻¹.

The African research-for-development partnerships setup along the genetic enhancement of maize played a catalyzing role in the process of providing improved seeds to farmers. For example, in response to the request made by the Nigerian Federal Government, IITA with active participation of Nigerian partners developed and released the first generation of inbred lines and hybrids in 1983. The spillover effect of this release was the formation of a small seed industry to market hybrid maize in Nigeria. In 1993, each of the three seed companies operating in Nigeria (Premier, UTC, and UAC) officially announced IITA open-pollinated and hybrid maize cultivars in their seed catalogs. Furthermore, IITA promoted community-based seed production schemes in West and Central Africa with many regional partners in order to make improved seeds available to farmers.

Cooking bananas and plantain hybrids for African farmers and markets

West African plantains in the lowlands and East African highland bananas (for both cooking and beer) are examples of African farmer ingenuity, tenacity, organizational, and inventive capacity in adapting this imported *Musa* crop species from Asia to respective environments. Although their asexual propagation may limit crop evolution, today, both subregions are acknowledged as secondary centers of variation for plantains and bananas, because farmers selected sports (mutants) arising in their fields, which today account for most of the caloric intake from fruit crops in the African diet.

In 1987, African governments encouraged IITA to launch an urgent research program to help combat black Sigatoka disease. This fungal leaf spot disease causes significant yield loss in plantains, an important food and cash crop to more than 70 million people in sub-Saharan Africa. An interim measure adopted by IITA in the late 1980s was the introduction from Asia of black Sigatoka-resistant cooking bananas, while the long-term strategy was to develop black sigatoka-resistant plantains. After their introduction to Nigeria, cooking banana plantlets were produced in two tissue culture laboratories located at IITA High Rainfall Station (Onne, near Port Harcourt) and the Agricultural Development Program at

Owerri (Imo State). With the collaboration of 24 institutions, vegetatively propagated planting materials (suckers) were distributed to 29 585 farmers in 710 villages.

A recent impact assessment examined the adoption and diffusion of cooking banana in Nigeria. Cooking banana gained a high level of acceptance and spread among the people, and thus established itself within the farming system in the region. The crop has been adopted by 55% of farmers, occupying about 26% of total fields, while its cultivation has increased by more than 930% since the introduction, with a multiplication rate of 600% across farmers. Bearing in mind that cooking banana was neither a traditional crop nor an improved cultivar from an existing one, the level and rate of adoption and diffusion are quite high and encouraging. At the end of the 1990s, about 80% of farmers, who adopted this new crop, were selling 10 to 90% of their total cooking banana production, while the other 20% produced entirely for household consumption. About 58% farmers sold at least 50% of their cooking banana. At the end of the 1990s, the average selling price of cooking bananas was N6.5/kg compared to N13.3/kg for plantains (about US\$1 = N111).

However, the cooking bananas may have an increased overall value because of their significantly higher bunch weight than plantains. The introduction of cooking bananas and their subsequent adoption and diffusion made a positive impact in the region: on farmers' farm enterprises, farm resource use and allocation, income and food base of the people as well as employment generation. Therefore, the potential of cooking banana in contributing to bridging the hunger gap, and uplifting the income level of farmers in the region is quite high. As such, it is no longer appropriate to regard cooking banana as a stopgap measure, rather a suitable supplement (or even substitute) to plantain for some farmers and consumers in Nigeria.

IITA researchers were able in early 1990s to rapidly (about 5 years) develop improved plantain-banana hybrid germplasm using a range of conventional and innovative approaches: interspecific hybridization, ploidy manipulation, embryo culture, rapid in vitro multiplication, field testing, and selection. This result is a noteworthy achievement, considering that programs elsewhere required decades of breeding before *Musa* hybrids became available. The potential impact of using black Sigatoka-resistant plantains shows a cost-benefit impact of 10 :1 over fungicides during periods of adequate production in rural southeastern Nigeria; while this advantage may reduce to 5.5:1 during periods of scarcity in plantain production which dramatically influences the prices of plantain fruit. Owing to its pioneering research-for-development on breeding hybrid plantains resistant to black sigatoka and for advances made in the genetics of *Musa* not an easy task for a triploid species, IITA received the King Baudouin Award in 1994. The successful professional career-solely in Africa, of the leader of this IITA team, the late Dirk R. Vuylsteke, was acknowledged by dedicating one of the recent volumes of the annual series Plant Breeding Reviews, perhaps the only one ever given so far to a plant breeder of the

CGIAR. PITA 14 (or TMP × 7152-2) appears to be one of the most promising IITA plantain hybrids because of its early fruiting, high bunch weight, and big fruits. While detailed analysis of the acceptability of PITA 14 in southeastern Nigeria is underway, it is noteworthy that several farmers have established sucker multiplication plots and are selling suckers to other farmers. Owing to this early success, IITA started in 2001, large-scale introduction (on-farm) of hybrids with black sigatoka resistance to the farming community in 11 Nigerian States of the plantain belt.

Cowpea: the African legume for the dry savannas

In the last 40 years, Africa recorded significant improvement in the production trend for cowpea owing to both increases in area and yield—the largest among legumes. At about US\$ 500/t, the increased production represents an annual value of some US\$650 million in Nigeria alone. In the early 1990s, IITA, in collaboration with the International Livestock Research Institute (ILRI), initiated a breeding program to develop improved cowpea cultivars that provide both grain for human consumption and fodder for livestock in the dry season. Impact assessment shows that farmers obtain substantial benefits by adopting dry-season dual-purpose cowpea. These include food security during a critical period of the year, cash income, fodder, and in situ grazing after harvesting, in periods when the prices of cowpea grain peak, and when good quality fodder is scarce. Dry season dual-purpose cowpea is thus a profitable technology that will find economic and ecological niches in the mixed crop/livestock farming systems of the semiarid zones of Africa.

Soybean: the potential for “a legume revolution” from Africa

Adoption of IITA high-yielding and pod-shattering resistant soybean cultivars over the last decade increased average farmers' yields in Nigeria from 310 kg/ha in 1991 to 730 kg/ha in 2001, which led to nearly 3 times increase in production from 145 000 t to 429 000 t within the same period, though soybean area grown increased by only 26%. Children who consume soybeans are showing a significantly better nutritional status than those that do not. Not surprisingly, several health centers and hospitals in Nigeria are using soybean products to treat malnourished children. Government policy and farm-level technology influenced the success of soybean in Nigeria.

This crop also contributed to the economic independence of women and generation of more income allowing acquisition of new household items and payment of medical bills and school fees. Measuring Impact of Crop Improvement for, and in Marginal African Lands: a recent report by Brader (2002) shows that high adoption rates of early-maturing cultivars does not translate into large yield gains because they are targeting new land thought to be marginal for agriculture. Hence, yield per se was not the main aim of breeding early-maturing cultivars in crops such as maize and cowpea but to

enable the crop to be grown in new areas perhaps by replacing other crops; e.g., maize displacing sorghum in dry lands. As pointed out by Adesina et al. (1997), early-maturing maize cultivars allowed the crop to be grown in the semiarid tropics of Burkina Faso, Guinea, Mali, Niger, and Senegal. Likewise, crop breeding for pests or abiotic stresses was a cornerstone in stabilizing yields and reducing risks in pest-prone, low-input, rainfed environments (where drought may often occur), rather than resulting in potential yield gains by small landholders who are not having an easy access to credits for inputs or to output markets.

Outlook

The impact of any crop improvement program can only be judged over relatively long periods, covering cultivar development, release, distribution, and adoption. Through the introduction of more productive cultivars that are resisting prevailing pests and the effective biological control of the cassava mealybug and other pests, large-scale famine was avoided in sub-Saharan Africa. Without these research-for-development efforts, 25% less maize would have been produced in sub-Saharan Africa, equal to 8 million t/year, or the food requirements of 40 million people. Cassava production would be 50% or less, or over 13 million t/year of dry cassava, enough to meet the calorie requirements of 65 million people. For both crops alone research-for-development by IITA and African partners mean that over 100 million more people are fed; i.e., one out of six inhabitants of sub-Saharan Africa!

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Harmonization of Seed Legislation in sub-Saharan Africa

Minutes of the meeting

Justin Rakotoarisaona

Date	29 March 2003
Venue	Safari Park Hotel, Nairobi
Chairman	Mr Arturo Martinez
Present	
- Mr Guy Blaise Satsa	AFSTA
- Mr Arturo Martinez	AGPS FAO
- Mr François Burgaud	GNIS
- Mr Wolfgang Bertenbreiter	GTZ/WASNET
- Mr Edward Zulu	SADC Seed Network
- Mr Patrice Annequin	IFDC Afrique
- Mr Bernard Le Buanec	ISF
- Mr Mark Condon	ASTA
- Mr Emmanuel Sackey	ARIPO
- Mr Justin Rakotoarisaona	AFSTA
Apologies	
- Mr Baba Dioum	CMA/OAC
- Mr Marc Atouga	UEMOA
- Mr Obongo Nyachae	Secretary of Seed Working Group in EAC
Absent	
-	Representative of ECOWAS
Observers	
- Mr Wynand van der Walt	South Africa
- Mrs Christiane Gorin	UNIS & TECHNISEM
- Mr Amadou M. Djigo	UNIS

Introduction

The meeting started at 9.00am. After welcoming the participants to the meeting and thanking them for their time, the President of AFSTA stated that AFSTA members are interested in the result of the harmonization process of seed legislation since it represents the private sector, which is the main player in the field in seed trade. Then, he handed over to Mr Arturo Martinez to chair the meeting. After his general remarks, he asked Mr François Burgaud to explain the purpose of the meeting. He pointed out that the main purpose of the meeting is to better know the actions all of the stakeholders

and actors in the seed legislation and policy harmonization process with a hope to coordinate the activities and to adopt a common view and a more efficient way forward.

Adoption of the agenda

Apart from the welcome addresses and the general remarks, the agenda was mainly the presentation of the activities of each organization i.e., what each one has done and the future actions in terms of seed legislation and policy harmonization process. Each presentation was followed by a question and answer session. This agenda was adopted for the meeting.

Presentation of each organization

The following organizations presented their activities:

- SADC Seed Security Network represented by Mr Edward Zulu
- WASDU/WASNET represented by Mr Wolfgang Bertenbreiter
- IFDC represented by Mr Patrice Annequin
- GNIS represented by Mr François Burgaud
- ARIPO represented by Mr Emmanuel Sackey

After each presentation, questions and comments were entertained.

SADC seed security network

Mr Edward Zulu gave the situation of the harmonization process in the SADC countries. He explained that the idea of harmonization in SADC is to ensure that the procedures on seed matters are similar and the goal is to provide freer and expanded seed trade across the region and beyond. This vision has not been attained and movement of seeds from one country to another still faces undue constraints.

After pointing out the constraints, he gave the current status of the achievement and the way forward.

Mr Martinez asked how do we proceed to work with the policy makers?

Mr Mark Condon stressed that the harmonization process needs political will and commitment from policy makers in response to this question.

Mr Zulu indicated that the compulsory involvement of the policy makers is one of the main reasons, which pushed to work inside SADC member countries.

WASDU/WASNET

Mr Wolfgang Bertenbreiter presented WASDU/WASNET program in terms of seed legislation and policy harmonization process. He explained among others that there are 12 member countries of WASNET, outlined its objectives, and its current activities.

Mr Martinez wanted to have an explanation on how the network will work toward the harmonization.

Mr Wolfgang Bertenbreiter explained that all the 12 countries have access to a shared database and public and private discussion helps the network move toward the harmonization.

In addition, Mr François Burgaud wanted to know WASNET's links with the public sector and political people at national and regional level i.e., UMOA and ECOWAS.

Mr Wolfgang Bertenbreiter responded that WASDU/WASNET is mainly working on the relationship between the private and public sector at national level and at regional level. Of course, some links exist with the regional organizations but not formally.

IFDC

Mr Patrice Annequin presented the ATRIP (African Trade and Investment Program) namely its objectives and its components among others the harmonization of seed regulations and the market information system in the six ATRIP eligible countries (Burkina Faso, Mali, Bénin, Nigeria, and Ghana). The result of the study can be used to develop a model for the UEMOA and ECOWAS countries.

He mentioned also the MIR project (Market Input Regionally) whose vision is to attain a sustainable intensified agricultural production at subregional level (UEMOA and ECOWAS). He specifically laid the stress on the economic importance of cotton and mentioned the cotton emergency program as part of the MIR project.

Mr Burgaud asked some clarifications about ATRIP project among others why the number of the countries was six and the position of IFDC within UEMOA and ECOWAS. He then pointed out that it was difficult to set up a statistical database despite AFSTA's effort to collect it. He therefore suggested that IFDC would give human resource to collect the data through the MIR project by identifying people in the Ministry of Agriculture of UEMOA and ECOWAS. IFDC can afterward disseminate the information.

GNIS

Mr François Burgaud stated that GNIS works with the CMA/AOC on the harmonization process. He then explained the situation of the OAPI (African Intellectual Property Rights Organization), which currently has 16 member countries. These countries ratified a new "Bangui" convention with breeders' rights. One is identifying trial centers to conduct DSU test in Cameroon, Senegal, and Côte d'Ivoire to implement the Bangui convention.

He also informed that GNIS runs small bilateral projects with northern Africa countries (Morocco, Algeria, Tunisia, and Egypt) dealing with regulations (mainly training on DSU and certification and how to implement UPOV system). Study tours for the concerned persons are part of the training.

He insisted on the fact that GNIS mainly cooperates with the seed sector through other organizations. It is the case for example, with FAO on harmonization of the seed regulations in Africa. GNIS is doing this with the financial support of the Ministries of Agriculture and Foreign Affairs of France.

ARIPO

Mr Emmanuel Sackey explained the origin and objectives of African Regional Intellectual Property Rights Organizations (ARIPO), which currently has 15 member states. He stated that ARIPO would like to be involved in the harmonization of plant variety release (PVP) process and harmonization of IPR is a perfect example of harmonization at regional and continental levels. He therefore underlined the fact that the mandate of ARIPO on plants is not clear. He also evoked the necessity of creating a training center in IPR in Africa to raise awareness at regional and continental levels so that there is enough human resource to deal with IPR.

Mr François Burgaud suggested that there should be a direct link between ARIPO and OAPI for the shake of coordination of the harmonization process and that ARIPO would be more involved in implementation of PVP in member countries.

General discussion

Mr Bernard Le Buanec thanked AFSTA for organizing the meeting whose purpose is in line with AFSTA objectives. He stated that harmonization is a difficult process and remains a problem even in Europe. ISF has a mandate of harmonization at international level and the sovereignty of each country makes it difficult among others. He suggested the following procedures for harmonization in Africa:

- FAO should define the broad principle for harmonization.
- Then, the trading blocks where movement of seeds is free should be identified (map of Africa with general block) to be the basis of the harmonization. The responsibilities for each organization and the rules for harmonization should be indicated within the trading blocks.
- Afterwards, there should be a political meeting to convince the regulatory authorities and regional associations must be the counterparts of the policy makers. He suggested the creation of regional seed groups to focus on the harmonization of the most important common market at AFSTA level.
- Small harmonization projects within the trading blocks should be carried out taking into consideration the prevailing context.

Otherwise, it would be difficult to make progress in harmonizing seed regulations and policy in Africa. He further added that the national association in each country should be active in the harmonization process and work out a way forward. Moreover, he pointed out that contrary to the case of chemicals and untreated seeds, the absence of regulations for treated seed is a complete vacuum because 95% of traded seeds are treated. He ended by explaining that the farm saved seed concept in the UPOV convention was probably better adapted to Africa and countries in development in particular for subsistence farmers than for Europe and other industrialized countries.

Mr Patrice Annequin said that he could give the map of trading blocks in Africa. He suggested that IFDC and AFSTA should help fertilizer associations and seed associations in the subregion. He also proposed that a meeting should be convened in West Africa for general coordination of the harmonization process.

Mr François Burgaud stated that it is necessary to have a meeting in West Africa to discuss several important topics such as among others the links between the regional organizations, the lobbying capacity of national seed associations, etc.

Mr Mark Condon said that AFSTA is a development organization that should promote the movement of seed and Intellectual Property Rights. It should first work with the existing framework. He agreed that sovereignty is a big issue for the implementation of the harmonization process. He also

stated that seed is perceived as public goods (No change in the political perception of seed) in Africa and it is necessary to modify this perception to support the private seed sector.

Mr Arturo Martinez summarized the discussion and gave general explanations on various aspects of seed issues at international level.

It was agreed that WASDU/WASNET, IFDC, and AFSTA should take the lead for the meeting in West Africa. They should consult with one another and decide the appropriate time and location for the meeting and its practical aspects.

The meeting ended with the general feeling that actions for harmonization of seed policy and regulations in Africa should be strengthened and coordinated through concerted action plan whenever appropriate at different levels of all organizations implicated in the harmonization process. Each participant will try to inform the others of its activities for the following year.

Another meeting will be organized after the AFSTA congress 2004 in Tunis, Tunisia.

The President of AFSTA thanked the participants and declared the meeting closed at 11:30 am.

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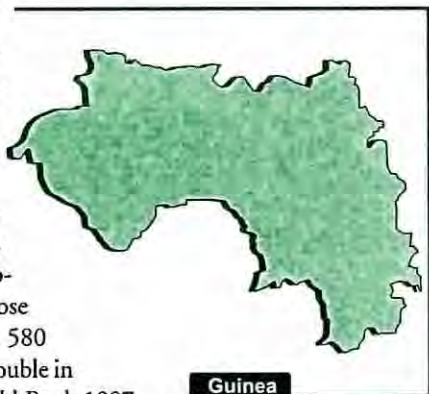
Formal Seed Systems in WASNET Member Countries

Characteristics of the seed sector in Guinea

Nomory Yombouo

Introduction

In Guinea like everywhere else in the developing world, food security is still a serious challenge facing every government, particularly in sub-Saharan Africa whose population of over 580 million is likely to double in 25 years' time (World Bank 1997



Atlas statistics). However, such population increase is not in line with the growth of the average GNP per capita/year (US\$765 or 7% of average GNP of developed nations. US\$300/inhabitant/year in Guinea (WFP 2001, work for food).

SSA heavily depends on agriculture that accounts for 30% of the GNP (according to the same source).

Seed security is one of the most secure pathways towards food security. Despite their socioeconomic importance, seeds are still poorly handled all along the seed production channel.

The production of improved seeds is under the influence of the informal sector (farmer level), hence the weaknesses noted with respect to the supply of good quality seed to low-income farmers in Guinea.

Today, tremendous efforts should be made as a matter of priority in the seed sector to meet the demand of seeds and to pave the way for food self-sufficiency.

Characteristics of the seed sector

Seed sector development policy

The objective of the country is to achieve food security in the coming years so as to bridge the wide gap between agricultural output and population growth. With a view to curbing the basic economic imbalances created by the crisis and helping the agricultural sector to regain its erstwhile vitality, the government of the 2nd Republic opted for liberalization and, as a result, came up with a plan of action the main thrusts of which were laid down in the National Recovery Plan 1985/1997 and in the Policy Statement on agricultural development I (1991) and II (1992). (LPDA I, LPDAII).

The National Seed Project (PNS) was developed from 1987 to 1988 in accordance with the following objectives of the plan:

- Establish and equip three (3) seed production and packaging centers to meet the demand of farmers in good quality seeds.
- Enact a seed law.
- Set up a national seed network.
- Prepare a national catalogue for species and varieties.
- Train agents and members of the Seed farmers' grouping.
- Create seed villages.
- Promote seed marketing.
- Privatize seed production and packaging centers.

The National Seed Project was phased out in June 1995 by decree 97/070/PRG/SGG of 5 May 1997 and replaced by the "Division Semences, Plants et Fertilisants" (Seed, Plant and Fertilizer Division) on 14 September 1999.

The following activities were planned for implementation by the new division:

- Maintenance and exploitation of PSN's assets;
- Support to seed production and packaging centers; (through rural development projects, NGOs...)
- Update of decree 129/PRG/SGG of 15 June 1988 establishing the National Seed Committee (ongoing);
- Creation of a National Seed Network;
- Establishment of a central laboratory for seed quality control and certification;
- Development of a national catalogue of species and planting materials and support to planting material farmers;
- Drafting of the seed law (ongoing);
- Further training for the seed staff including field partners (training of seed inspectors, controllers, technicians and growers).

Upstream, the implementation process are the "Institut de Recherche Agronomique de Guinée" (IRAG), (Agricultural Research Institute of Guinea), in charge of the production of breeder and foundation seeds, and the Service National de la Promotion Rurale et de la Vulgarisation (SNPRV) (National Department for Rural Enhancement and Extension) responsible for the multiplication and dissemination of improved seeds.

Component of the seed sector (public and private)

In the Republic of Guinea, seed production involves two sectors (formal and informal).

The formal or public sector falls under the government's technical structures, namely the Ministry for Agriculture and Livestock (MAE).

The technical departments are:

- IRAG – Institut de Recherche Agronomique de Guinée
- DNA – Direction Nationale de l'Agriculture (National Directorate of Agriculture).
- DISIA – Division des Semences et Autres Intrants Agricoles (Division of Seeds and other Agricultural Inputs).
- CCS – Centre de Conditionnement de Semences (Seed packaging Center).
- SNPRV – Service National de la Promotion Rurale et de la Vulgarisation (National Department for Rural Enhancement and Extension).
- Development Projects.

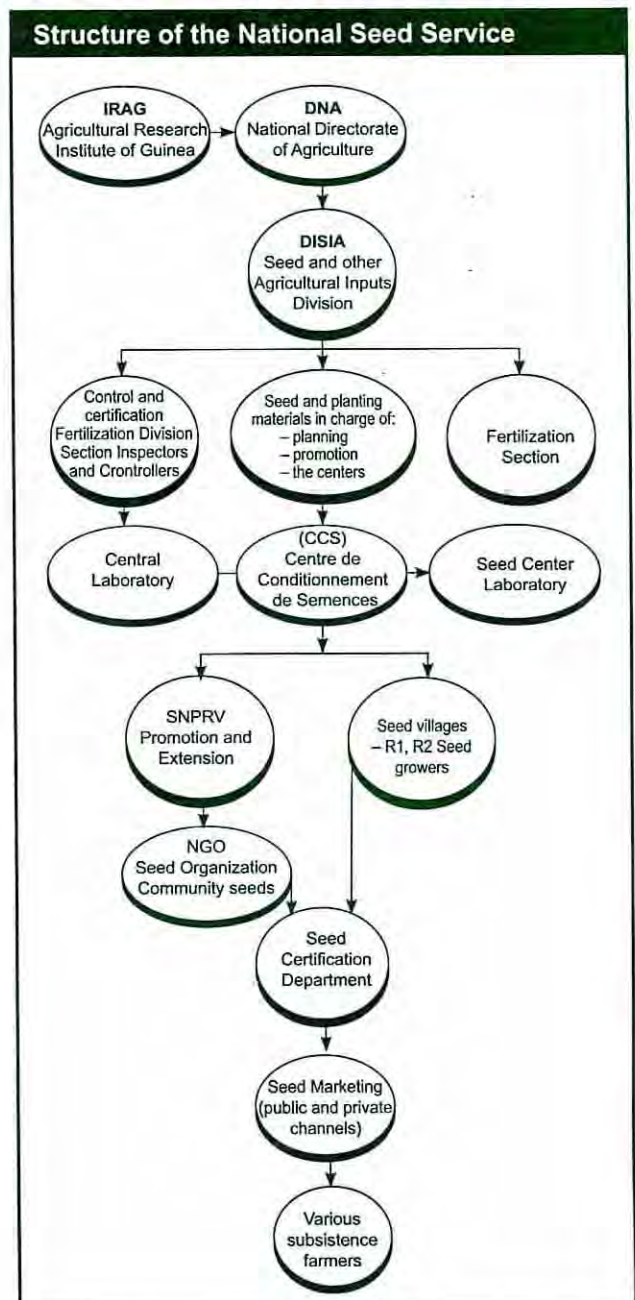
Informal or private sector: This sector is held by private enterprises, seed and planting material farmers, agricultural NGOs etc., in conformity with the Policy Statement of Agricultural Development (LPDA).

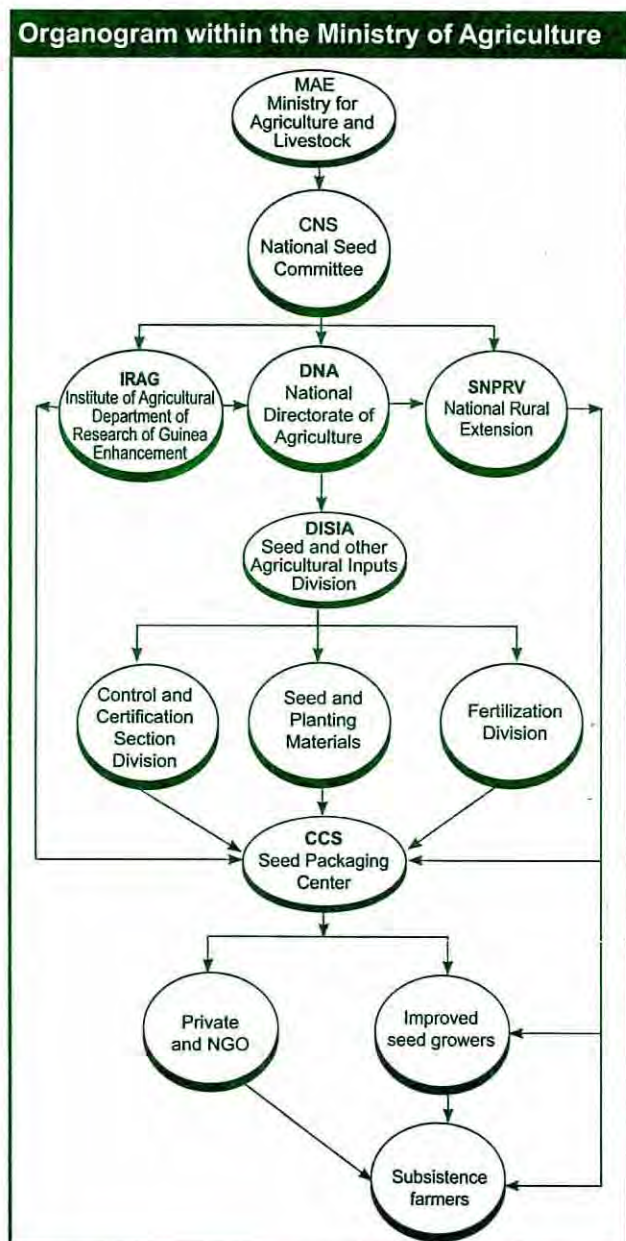
Mandate and mission of the components of the sector

- IRAG's mission carried out through its various stations established in the four natural regions of the country is to conduct research, develop new high yielding and ecologically adapted varieties, produce breeder (G0, G1, G2) and foundation seeds (G3-G4); and develop cropping pathways.
- The role of the National Directorate of Agriculture is to implement the agricultural development policy and define a strategy;
- The mission of the Seeds and other Agricultural Inputs Division, the technical branch of the DNA, is to:
 - assist the National Directorate in defining the implementation components of the policy and strategy governing seeds, planting materials and fertilizers;
 - control and harmonize the activities carried out by the various actors;
 - coordinate the work of seed packaging centers and of projects falling under the Division;
 - draft, update and disseminate legal and regulatory instruments pertaining to seeds and fertilizers;
 - control enforcement of rules as well as observance of standards applied to seeds and fertilizers;
 - develop collaboration with the network of national and international bodies involved in seed and fertilizer related activities.

The DISIA is composed of three technical sections:

- The mandate of the Seed and planting materials Section (SSP) is to assist the head of the division in the implementation of seed and planting materials related activities.
- The Fertilization Section (SF) supports the Division in the execution of tasks aimed at a better distribution and utilization of fertilizers.
- The Seed and Planting Material Regulation and Control Section assists the Division in carrying out activities pertaining to the control, certification and enforcement of the regulation in force.
- The Seed Packaging Center (CCS) acts as an intermediary between IRAG and the SNPRV for the multiplication of first and second generation (R1- R2) seeds.





- The National Department for Rural Enhancement and Extension (SNPRV) promotes the dissemination and extension of improved varieties and cropping patterns among the farmers and users.
- The Pineapple Sucker in vitro Multiplication Center (CMRA) as a project supplies improved varieties to pineapple farmers' groups. It is based at Dubréka.

The private sector handles the production and marketing of planting materials.

Objectives

- Increase yields through the use of improved seeds;
- Spread the utilization of good quality seeds;
- Diversify the seed sector (into the production of other seeds other than rice, maize and groundnut);
- Ensure better quality control and certification;
- Promote and supervise seed villages;

- Reach 70% of use of improved seeds by the farmers;
- Create an efficient seed market;
- Ensure national coverage of seed production;
- Promote and guarantee pre-sprouting and good conservation of Irish potato;
- Encourage large scale production;
- Revamp and ensure partial privatization of the seed sector.

Main crops of the seed sector

All the crops are directly or indirectly covered by the seed sector. However, below are the crops currently handled by the seed department:

- Food crops: rice, maize, groundnut, cassava, Irish potato.
- Cash crops: oil palm, banana, coffee, cotton etc.
- Vegetable crops: tomato, egg plant, pepper etc.

The seeds and planting materials of crops such as mango, avocado, cashew and pineapple are developed by the private sector without any proper control.

Major constraints to the development of the seed sector (besides financial constraints)

The revival of seed production is more than ever necessary. However, to achieve usable results, a number of constraints should be addressed, namely:

Institutional

- The National Seed Committee established by decree 129/PRG/SGG of 15 June 1988 is not yet operational.
- Poor understanding of the distribution of roles between the state and the private sector due to the absence of appropriate legislation;
- Lack of harmony and coordination among partners of the seed sector (conflict of attributions, incoherent interventions).

Technical and agricultural

- Ignorance of varieties of all the species concerned by seed production;
- Non mastery of cropping itineraries by the majority of farmers;
- Lack of professionalism in the seed sector;
- Lack of state-owned lands near seed centers;
- Lack of seed conservation techniques and means.

Economic

- Absence of seed pricing policy;
- Low purchasing power of farmers;
- Difficult access to credit by small-holder farmers (annual interest rate as high as 30%);
- Poor development of production zones;
- Isolation of some production zones;
- Absence of national coverage.

Commercial

- Lack of marketing and processing structures;
- Lack of communication means;

- Uncontrolled seed markets;
- Unfair competition by partners on the seed market;
- Lack of means for data processing.

Potentials or assets of the seed sector

Despite the prevailing situation, the seed sector can count on the following benefits:

- Existence of three seed centers with a storage capacity of 800–1000 mt/year);
- Smooth partnership between the centers and the NGOs;
- Creation of seed villages (60 villages) as well as seed grower groups (3500 seed growers);
- Favorable and diversified soil and climatic conditions;
- Good performance of some improved and local varieties;
- A staff of 100 people is now committed to the management of the seed sector.

Ongoing projects in the seed sector

Project on the multiplication and dissemination of new African rice varieties developed by WARDA (community seed production).

Objectives

- Improve the availability of low-cost and good quality seed to the benefit of the village communities;
- Reinforce the capacity of seed farmers and technicians in seed production and dissemination.

Ongoing activities

- Identification of lead farmers and groups in the relevant zones;
- Distribution of inputs;
- Establishment of contracts with beneficiaries.

Donor

Japanes-Human.

Pineapple sucker in vitro multiplication center

Objectives

- Establish a pineapple nursery to boost production (up to 2500 tonnes of pineapple);
- Assist and train pineapple growers' groups;
- Create a marketing channel for exportation.

Ongoing activities

- Completion of an in vitro pineapple nursery to contain 150 000 plants on 3 ha;
- Cultivation of 17 ha.

Donor

Gerant Meffre, French scientist and agricultural promoter.

Seed aspects in which Guinea has comparative advantages

- Foundation seed production;
- Production of farmer seeds (by farmers' groups);
- Constitution of farmers' groups and identification of lead farmers (production, conservation, marketing).

Nomory Yombouno Chef Division Intérimaire des Semences Plantes et Fertilisants Direction Nationale de l'Agriculture Ministère de l'Agriculture et de l'Elevage BP 576 Conakry Tel + 224 41 42 60 Email isys@biasy.net

Characteristics of the seed sector in the Republic of Mali

Siaka Coulibaly

Introduction

The Republic of Mali is a hinterland country bordered East by Niger and Burkina Faso; West by Senegal; South by Guinea and Côte d'Ivoire; North by Algeria and Mauritania. It is located between longitude 4° 10' East and 12° West Latitude 10° to 25° North.



Mali covers an area of 1241 298 km², 40% of which lie within the 200–1200 mm rainfall area. The agricultural activities are concentrated in the center, in the south and in the valleys of the Niger and Senegal rivers and their affluents.

Mali has a population of 10 million with up to 80% living in the rural areas and 35% under 20 years of age. The population grows at a rate of 2.5%.

The potential agricultural land spreads over 11 500 000 hectares but only an average of 2 000 000–2 500 000 hectares or 21.73% are effectively under cultivation. Agricultural production in Mali is widely diversified and include food crops, cash crops, as well as fruits and vegetables. The land areas cropped with cereals are in the range of 1 590 000 ha for millet, sorghum and maize; 200 000 ha for rice; 100 000 ha for cotton; 70 000 ha for groundnut.

Agriculture is the backbone of the Malian economy. It is the predominant activity in rural areas alongside extensive animal husbandry. Almost 75% of export earnings is derived from agriculture which accounts for 45% of the GDP and is the main source of income for 80% of the population.

The primary sector's contribution to the GDP is estimated at 10 879 billion FCFA, or 45%: food crops (29%); industrial crops (8%); livestock (5%); fisheries (2%); forestry (1%).

Characteristics of the national seed sector

Seed sector development policy

The national seed policy in Mali is structured around the national seed plan adopted by the Government in 1991 to chart the way for the production and dissemination of good quality seed. The plan defines the role of the various actors of the seed sector, namely the role to be played by the State through its technical structures and the role of farmers as seed growers.

Components of the seed sector

Public components

- IER: Institut d'Economie Rurale through the Agricultural Research Division;
- DNAMR: Direction Nationale de l'Appui au Monde Rural (National Directorate for Support to Rural Areas);
- SSN: Service Semencier National (National Seed Service);
- DGRC: Direction Générale du Contrôle et de la Réglementation (General Control and Regulation Directorate).

Private components

- Private farms
- Seed farmers' groupings

Mandate and mission of each component of the sector

Through the Agricultural Research Division, the IER is tasked with:

- Varietal development;
- Introduction of new varieties;
- Adaptation trials of breeder and foundation seeds;
- Drafting of technical documents (Identification and fact sheets)

The DNAMR

The SSN is under the DNAMR. It is responsible for:

- The coordination of the activities carried out by the various actors of the Malian seed sector;
- The planning of the production of different categories of seeds;
- Advise to farmers as part of the implementation of R1 and R2 seed production schemes;
- The training of all the actors of the seed sector;
- Seed dissemination.

The extension structures also falling under the DNAMR are responsible for agricultural extension as well as direct monitoring of the production of R2 seeds. They provide technical backstopping to the seed growers' groups.

The DGRC's mandate is to regulate production and seed introduction activities. As a result, the DGRC is to:

- Field test seeds;
- Analyse seed samples in the laboratory for the purpose of certification;
- Draft and see to the enforcement of laws and regulations governing the import and export of seeds of all species.

Structures of SSN

The SSN is placed under the DNAMR. Based in Segou, the fourth economic region of Mali, it comprises 2 technical divisions, an administrative office, and a web of 6 stations distributed across the various ecological zones to handle operational multiplication.

The mandates of the various divisions of the SSN are:

Production and seed promotion support division

- Draft R1 seed production schemes and programs;
- Provide technical support to the various actors of the seed sector;
- Train all the actors of the seed sector;
- Promote seeds;
- Organize seed growers' groups with a view to establishing cooperative structures.

Program monitoring and evaluation division

As a management orientation body, its duty is to:

- Ensure compliance with technical and financial standards during the implementation process;
- Provide useful hints in the pricing of different categories of seeds;
- Evaluate the various programs and activities carried out by the SSN;
- Evaluate seed utilization rates;
- Set up a statistical data bank.



Administrative and financial office

It is tasked mainly with the material and financial management of the SSN, including:

- The drafting and execution of budgets allocated to activity programs;
- Acquisition and management of movable and immovable property;
- Proper book-keeping.

The stations

The six stations are in charge of:

- Supervision and implementation of R1 seed production programs;
- Technical backstopping to seed growers and their organization into GIE and/or cooperatives.
- Management of the infrastructures.

General orientations and/or objectives of the seed sector

The National Seed Sector falls within the scope of the policy implemented by the government in relation to its progressive withdrawal from the main development functions. As far as rural development is concerned, this equally means the transfer of a number of skills to the farmers.

With respect to seeds in particular, production and marketing activities will be handed over to experienced private farmers' groups. The need for privatization was expressed by the National Seed Service almost a decade ago when half of the production process was entrusted to the farmers. Such move was later on concluded with the farmers taking over the control of marketing channels. Technical departments were then tasked with the planning and coordination of the various production programs as well as with backstopping advice in the seed sector.

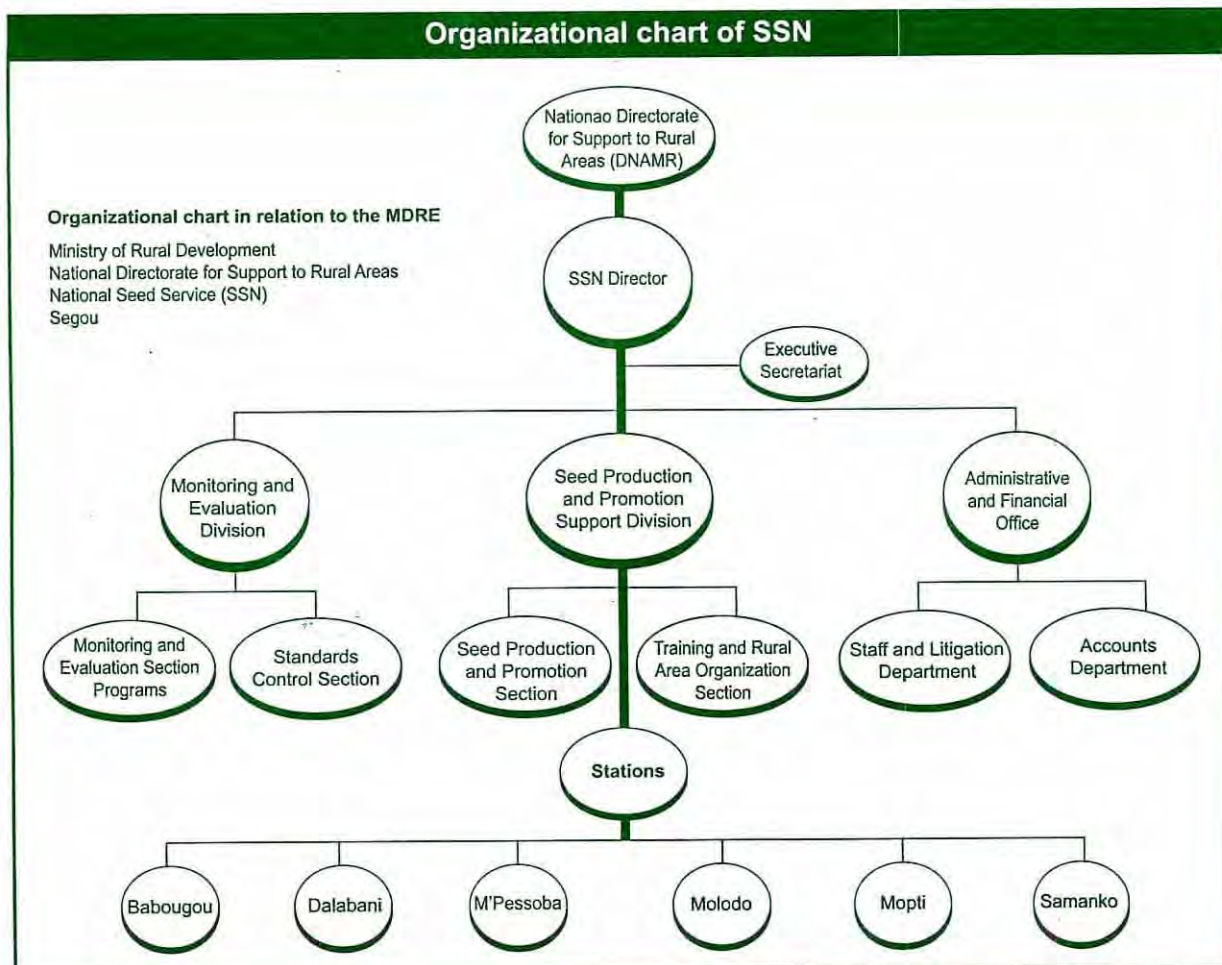
A private farm managed by the GIE and well experienced in the production and marketing of irrigated seed rice has already been put in place in the Office du Niger mandate area.

Major crops in the seed sector

Food crops

The overall objective of the formal seed sector is to work towards food self-sufficiency through the use of high yielding seeds, hence the importance granted to food crops. Over the last three seasons, production activities were focused on:

Rice	15-18 varieties	Sorghum	4 varieties
Maize	8-10 varieties	Cowpea	4-6 varieties
Millet	4-6 varieties	Groundnut	4-6 varieties



Industrial crops

The needs which exist in terms of industrial crop seeds are solely handled by companies such as CMDT for cotton, and SUKALA for sugarcane.

Major constraints to the development of the seed sector

The constraints include:

- Difficulties in the planning and programming of production due to delays recorded in the identification of users' needs.
- Inadequate promotion of the utilization of improved seeds (particularly of dry crops such as maize, millet and sorghum).
- Absence of a structure at IER to adequately supply farmers in foundation seeds.
- Climatic hazards which unceasingly threaten dry seed productions.
- Lack of farmers' organizations and weak farmers' groupings in the prevailing economic situations.

Seed sector potentials or assets

The seed sector has been endowed with a national seed plan that defines the role of all the actors of the seed policy. Such a tool should, in the long run, help the sector achieve its overall and specific objectives.

The seed sector can also build on the assets of the APCAM (The Standing Assembly of Agricultural Chambers) and use its branch offices in organizing the farmers into « TON » or other GIE. This is a welcome opportunity for farmers' organizations to take over seed production and marketing activities.

The National Seed Service has facilities and equipment that the private sector can make use of. Besides, it has trained a large number of farmers in seed technology.

Private seed producers have been emerging in isolation or as organized groups (Economic Interest Group) alongside SSN collaborative farmers.

Since the restructuring of the Ministry for Rural Development, Mali now has a regulation and control division (DGRC) which, as a decentralized entity, will assist in raising the quality of national productions and regulate seed trade.

Ongoing project in the seed sector

Since 1994, the seed sector has not benefited from any external funding and, as a result, has had to live on limited government resources. The different funds received by the sector (from 1978 to 1984 from ADB, and 1986 to 1994 from UNDP/FAO) did not make it possible to achieve a sustainable seed sector. Conscious of the importance of seeds in attaining food security and self-sufficiency, the Government applied for a loan from ADB (ADF) in view of a viable and sustainable national seed sector. All the conditionalities having been fulfilled, the first tranche of the loan should be disbursed shortly.

Objective of the Seed Sector Support Project in Mali (PAFISEM)

The goal of this project running over a period of five years is to achieve a sustainable seed sector through privatization. Its overall objective is to reduce poverty by contributing to food self-sufficiency and security.

The objective of PAFISEM is to add some value to the achievements of research in plant breeding by promoting the use of improved seeds. Thanks to PAFISEM, seed production activities will be extended to market garden crops, wheat and fruit trees.

Results expected by PAFISEM:

- Transfer of production and marketing activities to farmers' groups or private actors;
- Privatization of branch offices (State farms);
- Organization of foundation seed production;
- Production and marketing of about 7150 tonnes of dry crop R1 seeds, and 5700 tonnes of seed rice to cover respectively, 30%, 85%, and 25% of needs in dry crops, irrigated rice and controlled submergence rice.
- Production of 100 000 tonnes of R2 seeds by farmers settled in well organized structures with a BNDA line of credit.
- Constitution of a renewable dry crop security seed stock of 500 tonnes.
- Rehabilitation of the central seed laboratory and establishment of four control and certification regional laboratories.
- Training of all the actors of the sector in professional skills.

Ongoing activities

Ongoing activities at PAFISEM relate to the preparation of invitations to tender.

PAFISEM Donors

Total cost of PAFISEM 6.55 million UC, that is, 6 005 774 000 FCFA.

- The Bank Group.
- ADF 5.67 million UC or 5 195 556 000 FCFA.
- Other sources of funding.
- Government 0.77 million UC or 709 807 000 FCFA.
- Beneficiaries 0.11 million UC, or 100 411 000 FCFA.

Areas in which Mali has comparative advantage

The Republic of Mali has experience in seed technology in relation to the following species: millet, maize, sorghum, cowpea, groundnut, and rice.

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Other Seed Related Information

International Seed Network Initiative

Since seed is produced in and subject to open environments, no commercial seed is 100 percent genetically pure, whether traditional or biotech seed. With the existence of genetically enhanced crops, it is currently impossible to guarantee that traditional seed will not contain a minute level of adventitious (unintended) biotech material. Moreover, seed is destroyed in the testing process for genetic purity, therefore, only a small percentage of a seed lot can be tested. Hence, zero tolerance of adventitious biotech material, which may only be verified by testing 100 percent of a seed lot, cannot be guaranteed.

In the light of this, a global standard of tolerance for the adventitious (unintentional) presence of biotech material in traditional seed is needed to prevent potential disruptions in domestic and international seed distribution. Recognizing this need, the International Seed Trade Federation (FIS) created the International Seed Network Initiative (ISNI) in June 1999 to establish a globally accepted tolerance level for the adventitious presence of biotech material in traditional seed. The initiative also seeks to establish standardized biotech testing protocols and an enhanced quality assurance system in seed production to minimize adventitious presence. Proposed quality assurance procedures provide for positive identification, traceability, and control of seed through each step of the production process. The ISNI's proposed tolerance level is one percent for adventitious biotech presence in maize, cotton, soybeans, and canola. Such a threshold would help the seed industry continue to maintain the highest level of genetic seed purity possible in this age of the gene revolution.

The Organization for Economic Cooperation and Development Seed Schemes, Association of Official Seed Certifying Agencies, Association of Official Seed Analysts and International Seed Testing Association have sanctioned the ISNI on an experimental, voluntary basis with interested countries.

Seed Links International Organizations

Canadian Seed Trade Association

Through the collective efforts of its membership, the CSTA fosters an environment conducive to researching, developing, distributing, and trading seed and associated technologies; with the goal of bettering the choices and successes of its members' customers.

Convention on Biological Diversity, United Nations Environment Program

The Convention on Biological Diversity is a pact among the vast majority of the world's governments designed to maintain the world's ecological underpinnings in the face of economic development. It establishes three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.

Food and Agriculture Organization, Seed and Plant Genetic Resources Service

The FAO's Seed and Plant Genetic Resources Service manages programs for seed policies, seed improvement, seed production, seed security and germplasm exchange.

International Plant Protection Convention, FAO Plant Protection Service

This convention maintains and increases international cooperation in controlling pests and diseases of plants and plant products as well as prevents their introduction and spread across national boundaries.

International Society for Seed Science

The ISSS is a membership organization that strives to advance education and research for the public benefit in the scientific study of seeds.

International Seed Trade Federation (FIS)

The FIS is a non-profit group of national associations and individual seed companies. With members from about 70 developed and developing countries of all continents, it represents the mainstream of world seed trade and serves as an international forum where general seed industry issues are discussed.

International Seed Testing Association

The primary purpose of the ISTA is to develop, adopt and publish standard procedures for sampling and testing seeds and to promote uniform application of these procedures for evaluation of seeds moving in international trade. ISTA's secondary purposes include actively promoting research in all areas of seed science and technology and encouraging variety certification.

International Union for the Protection of New Varieties of Plants (UPOV)

UPOV is an intergovernmental organization based in Geneva, Switzerland. Its objective is the protection of new varieties of plants by an intellectual property rights.

North American Plant Protection Organization

NAPPO, a Regional Plant Protection Organization of the International Plant Protection Convention, coordinates the efforts among Canada, the United States and Mexico to protect their plant resources from the entry, establishment and spread of regulated plant pests, while facilitating intra/interregional trade.

Organization of Economic Cooperation and Development Seed Schemes

The OECD groups 30 member countries in an organization that provides governments a setting in which to discuss, develop and perfect economic and social policy. The OECD Schemes for the Varietal Certification of Seed Moving in International Trade addresses global seed trade issues.

Courses, Meetings, Publications

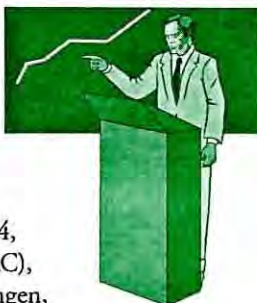
Meetings/seminars/ congresses/courses

International Course on: Agro biodiversity, Biotechnology; Plant Breeding and Seed Sector Development.

Duration 10 weeks, April–July 2004, International Agricultural Centre (IAC), Wageningen University, Wageningen, The Netherlands. The overall objective is to provide professional participants with the knowledge and skills to identify, plan, and implement plant breeding and seed programs.

The course program is built around a number of modules like: (a) Seed policy, legislation and programmes, (b) Management of Seed enterprises, (c) Master class on Seed technology, (d) Seed certification, (f) Seed Agronomy and Seed physiology etc. Fellowships are available for nationals of developing countries from the Netherlands Fellowship Programme (NFP).

NFP now offers scholarships for single courses/short training periods. Applicants for a NFP fellowship should submit their application to the Netherlands Diplomatic Representative (Embassy/Consulate) in their home country. Application deadline is 2003 October 1. Information sheets on individual courses are available on the home page below.



Information: International Agricultural Centre (IAC), PO Box 88, 6700 AB Wageningen, The Netherlands; Tel: +31 317 495 495; Fax: +31 317 495 395; E-mail: training.iac@wur.nl; Website: www.iac.wageningen-ur.nl.

11–13 February 2004: 2nd General Assembly of WASNET-SAVANA Hotel, Dakar, Senegal. Info: wasnet@ghana.com

24–25 February 2004: 4th Annual Native Seed Quality Conference- hosted by Mid-West Services, Sioux Falls, South Dakota. For more information workshops@mwseed.com

24–26 March 2004: 5th Congress of the Africa Seed Trade Association (AFSTA), Tunis, Tunisia. Info: Fax: (+254 20) 272 7861 - Tel: (+254 20) 272 7853; Website: www.afsta.org

29 April–4 May 2004: Seed Ecology 2004: An International Meeting on *Seeds and the Environment*

Rhodes Island, Greece. Info: <http://www.biology.uoa.gr/SeedEcology2004.htm>

13–24 May 2004: 27th Congress of the International Seed Testing Association (ISTA), Budapest, Hungary. Info: ista.office@ista.ch

22–26 May 2004: Congress of the International Seed Federation (ISF). Inter Continental Hotel, Berlin, Germany. Info: worldseed2004@bdp-online.de/isf@worldseed.org

26 September–1 October 2004: 4th International Crop Science Congress Brisbane, Queensland, Australia. Info: +61 (7) 3858 5554 Fax +61 (7) 3858 5583 4icsc04@im.com.au

For New Readers

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