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Introduction: a Full Granary

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1.1 Why We Study Success Stories

A granary full of cereal can start with a single seed, the most renewable agricultural resource. But seed is also alive and delicate, and in most developing countries farmers still cannot get enough good quality seed to make their countries food secure. Farmers often can only get quality seed if there are viable seed enterprises that multiply, store and distribute seeds. These enterprises can be small family farms, public agencies and medium-sized companies. This book takes a people-centred look at those enterprises, at the people with the skills, talent and gumption to open the doors of a business as difficult as seed, and to keep it running in a place as challenging as Africa.

Seed is often expensive, placing poor farmers at a disadvantage. Large seed companies concentrate more on countries with big farmers and a large demand for seed, especially hybrid maize and vegetable seed. They often ignore seeds with thin profit margins, such as self-pollinated crops, like wheat, rice and beans, open-pollinated crops like non-hybrid maize or vegetatively propagated crops, because farmers often save the seeds from one harvest to the next and because proprietary laws are missing or not enforced. However, these are the crops still widely grown by most smallholder farmers, providing food and employment for themselves and others. Letting farmers try new varieties and then distributing the seed will be crucial as the world adapts to climate change.

Nevertheless, there are a few unsung examples in Africa and elsewhere of successful seed enterprises (see Box 1.1) running on less equipment and modest capital investment. It is important to identify and describe their unique experiences in the search to build durable, quality seed systems in Africa.

Recent case studies by FAO and partners in Brazil, India, Côte d'Ivoire and nine other African countries aim to find the constraints and the keys to overcoming them to build successful seed enterprises. We hope that the business models and experiences will inspire others to produce and distribute seed for Africa's food security crops. The seed for these crops is less profitable than vegetable seed or hybrid maize, but it is possible to make money and serve the community at the same time, as the cases in this book show.

Box 1.1 Definition.

Successful seed enterprise. Any farmer, association, small or medium-sized company, public agency or any other person or group that is able to stay in business for several years, producing or selling seed, overcoming the cash flow challenges of seed. The enterprise keeps its customers or finds new ones by offering quality seed and by creating new products and services. The enterprise should be able to manage and finance itself.

1.2 The Issues

Specializing in seed is difficult. Farmers must have the seed ready at planting time, which means they must either grow it off-season, save it from the previous harvest or bring it from somewhere else. They must invest time and money months before their product is ready to sell, only to find that by planting time many of the seed customers are out of money.

The seed must be of high quality. Farmers disappointed by poor germination or by seed-borne disease lose confidence in the seed producers. Seed has to be planted and tended to know if it is any good (Tripp, 2001). So certification, or brand names, became a way of signalling quality, but the certifier and the enterprise must keep a consistent high quality.

To grow healthy seed, a crop must be in excellent condition. The field needs to be kept especially free of weeds and diseases to avoid passing health problems on to the next generation. Formal seed is often dusted with a coating of fungicide as an added protection. Then the seed must be packaged, labelled and marketed.

In spite of these problems with cash flow and quality, in the 1980s some development workers began to see an inherent logic in encouraging smallholder farmers to produce the seed for common food crops, especially self-pollinated (like rice, finger millet, beans, cowpea and groundnuts) and cross-pollinated crops like maize, sorghum and pearl millet. After all, the farmers were already producing and managing seed for their own crops, often selling or giving seed to their neighbours as well. With a little effort they could grow seed to sell as well. Plus the farmers as seed producers were close (geographically and culturally) to their potential clients. And there was the appeal of giving relatively low-income people a new money earner, while promoting new, high yielding or disease resistant crop varieties.

But it wasn't as simple as that. Producing seed for sale at a larger scale requires many steps which are omitted in farm-saved seed. National seed regulations often inhibit trade by unregistered entrepreneurs or trade of local varieties that are not included in the national seed catalogue (De Schutter, 2009). Those interested in becoming a seed producer must have ties with research and plant breeders to get the 'foundation seed' needed to grow certified seed. Then the producers must contact a perhaps distant government seed certification agency and arrange for inspections while the seed crop is in the field. This costs money and requires management skills and contacts. Turning village farmers into a group of organized seed producers requires that they work together, from seed to sale, while often the farmers find it easier to do most tasks alone or just with household members.

Government seed certification agencies tend to have limited staff and slim travel budgets and cannot inspect seed plots of hundreds of scattered smallholder seed producers. But, if outgrowers work as a group and sow their crop at the same time, all plots in a given area can be inspected on the same day. However, organizing farmers is easier said than done. They find it easier to take decisions and organize their work at the household level (Netting, 1993).

Producing and distributing high quality seed often require investment in labour, machinery, chemicals, processing and storage facilities, packaging and marketing. Investors only embark on it if they are sure of having a return to their investment. After independence, African countries understood that in order to feed their populations agricultural development should go hand in hand with the development of their seed sector.

In the absence of a private sector, governments invested heavily in producing seed of most of their food security crops, most of which are either self-pollinated, open-pollinated or vegetatively propagated. Although some were successful, the structural adjustment policy in the 1980s forced governments to abandon seed production and distribution without considering the difficulties for the private sector to assume responsibility for producing the less profitable seeds of food security crops.

Many countries have encouraged privatization and withdrawn from investment in plant breeding and seed production. Over 90% of the crops in developing countries are grown from farm-saved seed (Minot *et al.*, 2007), although much of the saved seed is of modern, high-yielding varieties. However, on the whole, private businesses did not come forward to fill the gap left by government withdrawal. Donors and NGOs started to support farmer seed production.

After food prices spiked in 2008, African governments became concerned about increasing their food production, in part to lower the costs of importing food, especially rice. Yet African farmers who were planting modern crop varieties were reaping harvests of up to double those of their neighbours. And governments complained that, years after national and international centres had released new varieties, the seeds were still in short supply. By 2010, African governments, the FAO and other donors were once again emphasizing improved seed.

Global changes. In 2050 the world's population will be 9.1 billion, 34% higher than in 2010. All population increase will occur in developing countries, particularly in Africa. Seventy per cent of the world's population will then be urban, compared with just 49% today (FAO, 2009). Food production must increase by 70% to feed this larger, more urbanized and wealthier population (which will buy more meat, milk and eggs). The world will need genetic diversity to adapt to global warming. As farmers respond to improved transportation and opportunities to sell new crops, from fruits and vegetables to biofuels, they will need a more constant access to seeds of new crops and varieties. Changes in world market prices also affect choices made by the local agroprocessing industry. Facing rising costs of barley, for instance, breweries in several African countries have shifted to sourcing locally grown sorghum, thus immediately influencing seed demand.

Strong research programmes and solid seed systems for all crops are crucial, particularly in Africa, to give farmers access to better varieties and quality seeds at all times, in all sites and for all cropping systems and markets.

A study commissioned by the Rockefeller Foundation on seed development programmes in sub-Saharan Africa describes issues of varietal development, seed multiplication, marketing, output markets and capacity building for major food security crops (Minot *et al.*, 2007). Most seed studies, however, compare cases and



Much of the equipment in the seed plants that survived in the public sector is now 30 years old, over-sized, and needs replacing.

draw conclusions without presenting an in-depth analysis of the seed enterprises themselves. Hence FAO and partners decided to systematically document a wide range of successful enterprises that produce or distribute seed of local food crops to respond to farmers' demands. These workable business models will hopefully inspire others.

1.3 Case Studies in Brazil, India and Côte d'Ivoire

In 2008 the FAO commissioned studies of successful seed enterprises in Brazil, India and Côte d'Ivoire (FAO, 2010).

Brazil has successful seed enterprises for soybean and open-pollinated maize. Soybean is a commercial crop grown on farms ranging from 10 to 100 hectares in the south and 500 to 5000 hectares in central Brazil. The soybean case study looked at a private seed production enterprise (Maua Seed Company) established in Paraná State (southern Brazil) in 1975 by three agronomists who obtained varieties under licence from Embrapa (the national agricultural research agency) and helped farmers get loans to produce seed. As more farmers joined in, seed production increased from 2800 t in the 1970s to about 20,000 t in 2008.

In contrast, farmers growing non-hybrid maize are mainly smallholder subsistence farmers. The maize seed case study examined a collaborative enterprise established in 1999 by farmer groups with financial support from an NGO (AS-APTA), foreign donors and government and technical support from the State University of Londrina. The programme started working with 1500 organized farmers in ten towns in Paraná. By 2006 the programme had expanded to 4000 farmers in 22 towns. Seed is sold through local agricultural retailers and at local community fairs.

In India, the public sector supplies predominantly self-pollinated varieties and the private sector supplies hybrids. However, private sector participation in sorghum, pearl millet and rice seed production has been encouraged by the low marginal cost of getting into the business and the high seed turnover rate.

Also the cooperative system is highly developed in India, often supporting farmers with credit, inputs, storage, processing and marketing facilities. One of the most successful cases is the Mulukanoor cooperative in Andhra Pradesh. The agricultural officers employed by this cooperative monitor seed crops in the field and train the farmers in quality control. The cooperative buys back all seed produced, after deducting the cost of inputs and credit advanced. Seed is processed in the cooperative's own seed processing factory before it is sold to various seed companies in the states of Andhra Pradesh, Karnataka and Maharashtra for commercial paddy production.

In Côte d'Ivoire a true public-private partnership in variety development and seed production was the basis for success. The new rice varieties were bred by public research institutions, seeds produced by a large rice cooperative and the quality control done by the national seed service at minimum cost. Linking production of quality seed to paddy production sustained the demand for seed. The cooperative provided training in rice and seed production for participating farmers.

Key lessons. From these three studies the FAO learned that small-scale seed enterprises are nurtured by: government support, access to credit, entrepreneurship, technical skills and capacity, sustaining demand for quality seeds, enterprise ownership

and profitability, adequate equipment, improved varieties and early generation seeds, and links between formal and informal seed sectors.

1.4 Method

Based on the lessons from the first three case studies and given the need to support seed for the long-term development of African agriculture, in 2009 the FAO asked AfricaRice to conduct a study of successful seed enterprises in Africa. The cases are quite diverse, including public agencies in Morocco and Nigeria, private companies in Madagascar, Kenya, Uganda, Nigeria and elsewhere, farmer groups in countries like Mali, Cameroon and Guinea, and enterprising farmers in The Gambia, Guinea and Kenya. The FAO and AfricaRice wanted to know how these enterprises had survived, and often prospered, at such a challenging task as producing a delicate product with specific cash flow challenges and slim profit margins for a scattered and often cash-strapped market.

Potential case studies of successful seed enterprises were identified after consulting with national and international experts. We selected a few small and medium-size enterprises with at least 5 years of successful operation, which were producing self-pollinated and open-pollinated crop seed. However, this seed may just be one activity. A seed enterprise may also be producing hybrid maize seed, vegetables, or importing vegetable seed in order to survive, while also selling self-pollinated crop seed.

Country chapters were written based on past experience of the authors. AfricaRice social or agricultural scientists with experience in Africa and seed, and partners in each of the countries, visited the enterprises, interviewed the managers and other staff members, visited the facilities, the outgrowers, traders and credit providers and talked to researchers as well as other people who know the seed sector.

All the studies were reviewed by the authors themselves during a regional workshop, as well as by outside peer reviewers (experts in seed systems), and were edited for clarity and to give the book a uniform voice.

1.5 How the Book is Organized

The book opens with a review of how seed enterprises work (Chapter 2) followed by nine country chapters and a conclusion. Each country chapter is written by AfricaRice staff, FAO staff, one or more national collaborators (technical people familiar with local seed activities) who helped plan and guide the work, and occasionally staff from CIAT, CIP, ICRISAT and Wageningen University.

The chapters are written as case studies of successful enterprises. We discuss a few of the mistakes the enterprises have made, but we omitted cases which we deemed unsuccessful. The country chapters are arranged geographically, starting with Cameroon, and proceeding clockwise around Africa through Nigeria, Mali, Guinea, The Gambia, Morocco, Kenya, Uganda and Madagascar. The book ends with lessons learned and recommendations for development agencies, donors, decision makers and banks.

Country context. Each chapter starts with an overview of the country's agriculture (farms, crops, agricultural economy and history of agriculture). It then describes

the country's seed sector, seed policies and norms, and the influences on seed supply and demand.

Next, each enterprise in the study is described individually, covering history, structure, cash flow and marketing.

History includes what type of enterprise it is (e.g. family farm, cooperative, private company), its size, why the founders were motivated to get into the seed business, how the whole enterprise fits together, how it evolved and the events that shaped it.

Structure is a study of how the seed enterprise is put together, including management, workers, land, equipment, suppliers and customers, activities, links with research and extension, and seed quality control. Management's vision, how they see the future and adapt to change, as well as the technical capacities of the enterprise, is described. The section discusses growing seed off-season or using storage to save seed to sell at the main planting season.

Some of the enterprises buy seed, while others grow it, but most use outgrowers. The section describes which category of seed is sold (breeder seed, foundation seed or certified, etc.), and the main activities, e.g. other goods or services they provide, besides seed.

How the enterprise perceives national seed policies and laws and how it deals with plant variety protection (PVP) issues and uses public resources, such as capital or training, are discussed.

Cash flow. This section assesses how the enterprise manages to obtain inputs for seed production and then wait for the next growing season to be able to market seeds. Few of the enterprises have easy access to loans. Ironically, many seed enterprises are forced to provide credit, since sometimes farmers, distributors or agro-dealers have no cash to buy seed at planting time.

Marketing strategy and how the enterprise estimates seed demand and plans seed production are described. Some enterprises sell mostly to farmers while others sell to projects, international organizations, government agencies, retailers or NGOs. All successful enterprises manage to keep customers and maintain their trust.

All seed enterprises have to maintain a name brand. Some do little advertising and a few have explicit links to the media. Some use field days and other direct-to-farmer forms of advertising. The enterprise must have a way of learning about changing demand and meeting it.

Conclusion. The chapter ends with a conclusion on the challenges and strengths of the enterprises in the country, including their limitations and constraints, but stressing the strategies they use to overcome those, i.e. the main reasons for the success and the sustainability of the enterprises, and their major strengths.



Farmers often buy seed. Understanding the importance of direct sales to farmers and others sheds light on the vision of seed enterprises.

1.6 Audience

We avoided technical jargon when possible in order to appeal to a wider audience. Topics are discussed that matter to seed enterprises, that are often discussed by people in the seed sector, but that are rarely documented. The book hopes to inspire future generations of researchers, development workers and entrepreneurs.

But mainly we address the decision makers who set policy, plan research and manage breeder and foundation seed, as well as donors and development agencies supporting seed development in Africa. Last but not least, we hope that people who create and manage seed enterprises will find the book useful.

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