

Modelling the role of Intellectual Property Management for the development of the agricultural sector in developing countries

– A System Dynamics approach –

Introduction

The challenges that the development of the agricultural sector in developing countries faces today are different from those when the green revolution happened. External forces are affecting agricultural research in developing countries. These forces include the integration of markets, growing activities of the private sector, including but not limited to multinational companies, better communications, an increase in technological innovations and the introduction of national and international legal and regulatory regimes that strongly affect the distribution of agricultural inputs and products. Changes in research management and management of research products are occurring in response to these global trends. The advent of the applied biotechnological sector in agriculture and the subsequent change of international intellectual property regimes such as the establishment of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) have changed the impact of agricultural research, both in public and private Institutions, as well as the power relations between the actors of the market. These developments are reflected by patenting of gene constructs, methods, and plant varieties and the establishment of a "business model" in public institutions for generating licensing revenues, based on legislation such as the U.S., Bayh-Dole Act. The clarification of ownership of assets, licensing of rights, and freedom-to-operate is important in this context. Assets can include research inputs, including patent rights for a gene sequence or for a materials and reagents, obtained under material transfer agreements, laboratory or industrial process, and research outputs. Copyrights and trade secrets may govern access to and use of experimental techniques and laboratory notes as well. Patents over research outputs may be sought for novel processes and products, while plant variety protection could be sought for new crop varieties.

This study focuses on the seed market in West African countries and the supporting role that Intellectual Property Management might play for the development of capacity for entrepreneurship, marketing strategies, and increased quality low-cost seed supply in this sector and the agricultural sector in general. The impact of Intellectual Property management as a policy parameter is modelled using the West African Seed Alliance as a case study in a system dynamics modelling approach.

Background

Experience shows that subsistence farmers in West Africa are very vulnerable to production risks caused by climatic variability, plagues, environmental degradation, and other factors. Relief interventions will continue to be required to support farming systems and protect livelihoods. However, the development of the more formalized seed system needed to support commercialization will only proceed if there is general agreement on the need for independent seed delivery through commercial entities or civil society organizations. If disasters occur that require seed interventions or if poverty limits the ability of farmers to access seed through commercial channels, market friendly safety nets must be implemented which avoid undermining the development of the formalized seed and input supply system. Engaging the private seed industry to think through relief strategies is essential for maintaining a viable seed

industry in the region.

In this background context, the West African Seed Alliance (WASA) was brought into existence. The Seed Alliance is the result of extensive dialogue between United States Agency for International Development (USAID), Program for a Green Revolution in Africa (ProGRA), Program for Africa's Seed Systems (PASS), private sector seed companies, research institutions, government agencies, and NGOs that will, among others, identify and address the critical constraints for agricultural development such as small and fragmented national markets, distorted national policies responsible for high cost of doing business, lack of availability of improved seed varieties and an inadequate smallholder demand for improved inputs to establish a sustainable commercial seed industry in West Africa. The aim of the project is to improve the agricultural enabling environment by working on agricultural market standards, and regulations and public investment policy and to improve the agricultural sector productivity by making rural and agricultural finance accessible and available in order to support agribusiness and producer organizations to leverage markets and trade capacity. WASA activities will be initiated in Burkina Faso, Ghana, Mali, Nigeria, and Niger, but other countries will also be added over time, based upon stakeholder commitment and industry viability.

The objectives of WASA activities range from the improvement of the development, production, distribution and sales of planting materials across the region to Intellectual Asset/Property management policies and practice. The objectives include, to:

1. Build business management capacity of West African seed distributors, dealers and retailers, as well as private industry and existing national seed trade associations.
2. Promote regulatory harmonization and other policy measures to facilitate the movement of seeds and other planting material across borders
3. Increase the release of improved genetics, traits and planting materials from local, regional and international research from both the private and public sectors

Intellectual Property Management

The objectives of the WASA activities also address issues of Intellectual Property Management. Intellectual Property Management is seen to be necessary to ensure that research and policy measures reach the farmers and stimulate agricultural development. Intellectual Property Management involves the following activities:

- Protection of traditional knowledge to the patenting of improved varieties.
- Promotion of the movement and exchange of seeds to promote the cross-country development of the agricultural sector.
- Capacity building both in the private and the public sector. The private sector refers to multinational companies while the public sector includes national as well as international research institutes and governmental agencies.
- Management strategies that result in the increased release of improved genetic material from the private and public sector so that small and medium enterprises and small-scale farmers are also able to benefit.

One of the major challenges that the WASA project faces is that competing actors with different market and different levels of bargaining power have to be brought together. Powerful seed companies such as Monsanto compete in a market with much less powerful actors such as local agro dealers.

The key issue that this study focuses on is the role of the management and the use of intellectual property rights (formal and informal) in this process. We are especially interested in the necessary links between the competing actors that have to be established and in the question of how these links have to be designed so that power relations can be balanced and the development of local innovations systems is supported. We focus on the seed sector, as there are major biotechnological activities on this agricultural input.

A dynamic simulation model for the analysis of the role of Intellectual Property Management

Our project develops a system dynamics model of the agricultural sector and the seed market. The model is based on the WASA activities in West Africa and the generated results and insights into the development process of the agricultural sector in general and the seed market in specific.

This project is jointly implemented by the Central Advisory Service on Intellectual Property (CAS-IP) of the Consultative Group on International Agricultural Research (CGIAR), the International Crop Research Institute for the Semi Arid Tropics (ICRISAT) and Flury&Giulani Consult.

The purpose of the model is to identify:

- The role of the private sector in the development process of the agricultural sector
- Methods and tools that would "level -the-playing field" in the power relations between powerful actors of the international private sector and local actors that want to enter and succeed in these the markets

The two main model sectors in the model are:

- A supply chain covering the dynamics of the seed market and the decisions of the seed companies (private sector).
- An agricultural market model representing farmers and farmers' decisions (local actors).

The interaction of these two model sectors endogenously generates prices and market shares of agricultural inputs, demand for agricultural inputs, production costs, production outputs and farmers' incomes. Developments on the world markets and productivity increases due to agricultural research are exogenous variables that have an impact on system behaviour. Intellectual property management of the public and private sector can then be included in the model as a policy parameter implemented by the various actors and its impact on long-term developments of the market can be simulated. Thus, important lessons can be drawn from this example to understand and then support the development process of the African agricultural sector.

The proposed poster presents the model structure. It also shows preliminary model runs that illustrate the kinds of behaviour patterns observed on the seed market as well as possible entry points for intellectual property management policies.