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Research Application Summary

Analysing the agricultural science and technology innovation systems: A case study of the banana sub-sector in Uganda

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Abstract

Bananas are an important staple food crop and livelihood base for about 16 million people in Uganda. Its survival over the years can be traced to key factors and actors, who through learning, adjusting and innovations have sustained bananas in Uganda against several biophysical threats over the years. Preliminary results show key innovation in the banana subsector as; germplasm collection, preservation and generation of new varieties, integration of livestock into the banana farming - system for soil improvement, integration of cultural and conventional practices for pest and disease management, optimization and scaling-up of traditional value-addition, and promoting irrigation technologies in banana systems to stagger production and control prices.

Key words: Banana sub-sector, functions, innovations, key actors, linkages

Résumé

Les bananes sont une culture et aliment de base important et la base des moyens de subsistance pour environ 16 millions de personnes en Ouganda. Sa survie au cours des années peut être attribuée à des facteurs clés et les acteurs qui, à travers l'apprentissage, l'adaptation et les innovations ont subi des bananes en Ouganda contre plusieurs menaces biophysique au fil des ans. Les résultats préliminaires montrent de l'innovation clé dans le secteur des bananes, comme, la collecte du matériel génétique, la conservation et la production de nouvelles variétés, l'intégration de l'élevage dans la culture de la banane-système pour l'amélioration des sols, l'intégration des pratiques culturelles et traditionnelles pour l'optimisation de la gestion des ravageurs et maladies, et l'extension des d'ajout de valeur traditionnelle, et la promotion des technologies d'irrigation dans les systèmes de bananes d'étaler la production et le contrôle des prix.

Mots clés: Banane sous-secteur, les fonctions, les innovations, les acteurs

Background

Agriculture remain the main driver of the Ugandan economy and food security, supporting directly over 73% of the populations and contributing over 40% of the national GDP (DSIP, 2010). Agricultural export contribution counted for 61% in 2005, 56% in 2006, 47% in 2007 and 46% in 2008. Bananas have in the last decade become a major cash crop, involving over 10 regular export companies (UEPB, 2010). As part of understanding the innovation behaviors in the agricultural sector, this study aims at identifying the key actors in the banana sub-sector, to analyze their innovation behaviors, linkages, strength and weakness in order to determine strategies for improving the performance of the banana sub-sector.

This study is part of four previous Agricultural science and technology innovation systems (ASTI) studies commissioned by CTA in sub-Saharan Africa as part of the effort to strengthen local science, technology and innovation system in agriculture. The study in Kenya focused on floriculture (Bolo, 2005), while in Malawi it looked at fisheries and maize (Safalaoh *et al*., 2007; Tembo *et al.*, 2009). In Uganda this study is focusing on the banana sub-sector which will help identify key actors, innovation and innovators and bottlenecks in the banana sub-sector. It is anticipated that the results of the study will also demonstrate the importance of science and technology development to achieving broader development goals. The analysis of the actors and their various interaction will also contribute to better targeting of R&D and policy interventions.

Literature Summary

While the origin, arrival and propagation of bananas (East Africa highland AAA variety), is debatable (Robertshaw, 2006), bananas have evolved to become an essential staple food crop in Uganda. Its current production is estimated at 9.2 million metric tones annually and valued at 1.5 billion dollars (FAO, 2007). Unfortunately, its production and productivity have been declining largely due to biophysical conditions such as pests, diseases (mostly the banana bacterial wilt and *sigatoka*), and soil degradation (Gold *et al.*, 1999; Bagamba, 2007).

Between 1999- 2006 banana production fell by 78% with a yield gap of 140% kg/ha on farmers' fields as compared to research stations (MAAIF DSIP, 2010). A number of innovations by government and civil society have been central to the survival of bananas in Uganda and its commercialization. Banana germplasm collection and preservations that started in 1920 has been accelerated with the formation in 1989 of the Uganda

National Banana Research Program (UNBRP) (Tushemererwe *et al.*, 2006) in collaboration with international research centers (IITA and Bioversity). To date there are 147 Diploids varieties, 197 Triploids and 200 East African highland varieties (Matooke or cooking bananas) collected from Uganda, Rwanda, Burundi, Congo, Kenya and Tanzania.

Research Approach

This ASTI (Agricultural Science and Technology Innovation) study is focusing on the banana subsector, as one of the major staple crops emerging from subsistence to commercial production in Uganda. The study has employed four levels of investigations: i) Literature from agencies and the internet, ii) Interviews with representatives of agencies, and focus groups where possible; iii) Field visits to selected sites (Luwero, Mbarara and Bushenyi districts), and key market points in Kampala, and iv) Workshops. Investigations are still on going. An inception workshop to inform actors of the study was held in June 2010 and a stakeholder workshop to validate study findings will be held in October 2010.

Research Application

Several actors are involved in the banana value chain with varied interactions (Fig. 1). Some of these actors and their roles are described below.

Enterprise selections and targeted support initiated by Uganda Cooperative Alliance – UCA (Kapiriri, 2007) has been adopted by National Agricultural Advisory Services (NAADS) as its mode of operation and bananas have been prioritized in 10 out of 14 NAADs regions (NAADS, 2007). Value addition initiated by farmers groups through the support of NGOs, Uganda Cooperative Alliance (UCA) and research are being scaled up through the Presidential initiatives, and value addition is a main focus in the new National Development Plan (DSIP, 2010) and NAADS second phase (NAADS, 2007). The various banana products have been classified as: Fresh cooking bananas, Dessert Bananas, Processed banana fruit products (Fig. 2, Banana wine) and Non food based products especially crafts. NAADS is also scaling up the integration of livestock into the banana farming system along side NGOs as source of manure.

There are some major weaknesses in the agricultural sector as a whole that greatly affect innovations in the banana sub-sector. The lack of accurate and up-to-date information (MAAIF DSIP, 2010), the absence of formal structures such as marketing boards and systems for non-traditional cash crops are emerging

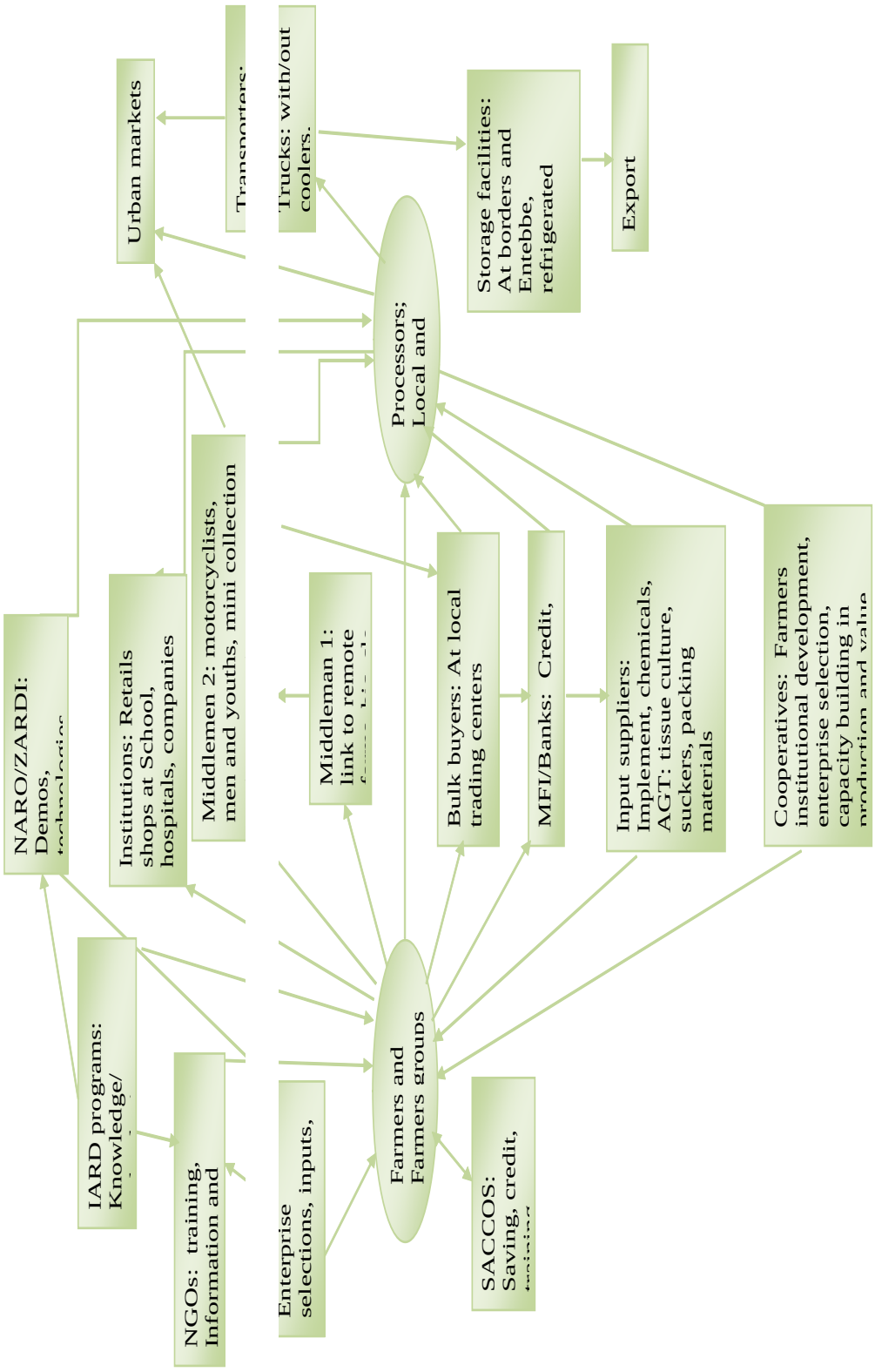

Figure 1. Example of linkages within one category of actors, the entrepreneurs.

Figure 2. Value addition and packaging by Tigebwa farmers group (Bushenyi).

Figure 3. Banana being packed to reduce weight at Kisoro daily market, destination Kampala.

in this study as key constraints to informed decision making, that has made joint marketing difficult (MAAIF DSIP, 2010) . Furthermore, bananas are produced hundreds of km away from the main consumers population (Van Asten *et al*., 2005) and with poor transport infrastructure this greatly affects the quality and prices of bananas. Innovations to reduce weight and damage are beginning to emerge, such as plucking and packing fingers in sacks (Fig. 3). Nonetheless, the slow response to addressing

the declining soil fertility challenges in the central region, that was first advanced in 1949 (Van Asten *et al.*, 2005) remains the main cause of banana spatial shift to western Uganda.

While the preliminary results of this study show a growing interest in the sub-sector, a diversity of actors, old and new innovations, it also points to the lack of formal structures and systems for non-traditional commercial crops such as bananas, lack of accurate and up-to-date information to inform decision making and the targeting of government support as key weaknesses. The findings of this study therefore will contribute to the pool of knowledge for decision making especially of the new agricultural sector policy formulation process for Uganda to be concluded this year (DISP, 2010). The result will provide insights into how innovations in agriculture science work and how they can be enhanced by the new Uganda National Development Plan (NDP). As spinoff benefit, the study will inform the need for and justification for better organisation of actors in the subsector, and support to formation of formal structures and systems to facilitate its development.

Based on the preliminary findings, the sub-sector needs to streamline linkages among actors and strengthen information and technology generation and diffusion throughout the system. Participants in inception workshop suggested establishment of a banana network as one way for actors to link up and share information and technologies. All subsequent recommendations of educating and organize middlemen, revamping the small scale value-addition by farmers groups and ensuring that markets are predictable to support innovations along the value chain would be addressed in a formalized structure with appropriate systems.

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