Innovation research in value chains

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In large parts of the Sub-Saharan sub-continent, smallholder agricultural production and food security has remained consistently low[1]. Natural resource management is in distress and most rural Africans remain poor and food insecure despite widespread macroeconomic, political and sector reforms.

Most predictions are that these Africans will remain food insecure in the foreseeable future[2]. In this article, the authors present the novel ProGrOV project.

A paradigm that has dominated agricultural research for several decades is that Sub-Saharan African smallholders operate within their production-possibility frontier. However, recently this perception has been challenged suggesting that they produced close to or on the frontier of the capacity of the agro-ecology[3].

Innovations are changing the production-market landscape much faster than expected and many smallholders in East Africa are undergoing a profound transition from cereal-based subsistence farming to mixed-enterprise, market-oriented agriculture. Certified organic agriculture is used as a case in the research project "ProGrOV" (Productivity and Growth in Organic Value-Chains), a project that aims at strengthening the farmers' ability to supply the products that the markets require.

Renewed optimism in African countries

A market-oriented agriculture has been promoted by many agents of change. And the change is happening. The last ten years have been characterised by a renewed optimism, which is taking root in a number of African countries, including Uganda, Kenya and Tanzania, which have demonstrated high economic growth rates[4]. We do not know the winners and the losers yet – just that they are there. Not all farmers will have the capacity to join the market orientations towards high-value commodities. They are simply not able to innovate.

What is innovation?

What is innovation then? Innovation is a buzz-word and there are a multitude of definitions. Within the business management literature, innovation is mostly seen as a tool used by entrepreneurs to create a resource that will give them an advantage over their competitors[5]. Or more broadly, some see an innovation in an idea, practice, or object that is new to the individual, a newness that gives a value to the individual when implemented[6 & 7]. So we can say that innovation is linked to entrepreneurs and it represents newness, it has a relation to invention or to its process of adoption. As such, innovation is both a process and an outcome, where the most important final feature may be involving change or a discontinuity with the prevailing product/service or market paradigm.

Local innovation

Local innovation can be triggered by many factors. It may be a farmer that explores new possibilities to solve a problem. Or it may be a social way of responding and adapting to

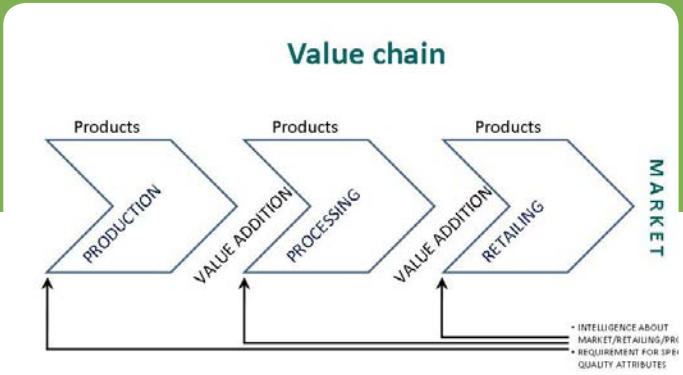

Figure 1. Schematic representation of the value chain.

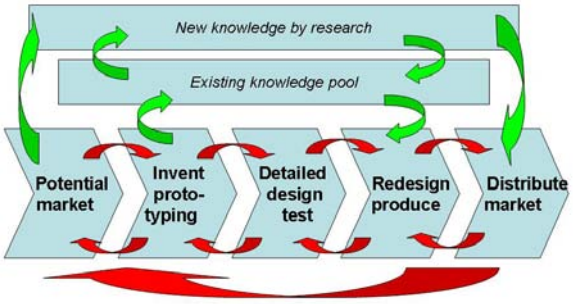

Figure 2. Chain linked model showing flow paths of information and cooperation[12].

changes in access to natural resources, assets, or markets. In this project we focus in particular on the later approach, where we examine the high -value market chain.

This picture illustrates an innovation developed by the entrepreneur AMFRI Farm, a private company in Uganda exporting organic fruits, spices and fruit pulp overseas. The plastic bag contains just two typer of chilli peppers, a ginger tuber and lemongrass. Based on this simple innovative combination, the net profit per unit weight of the spice is larger than if sold in bulk.

The innovation – known in the marketing jargon as "bundling" – is that one bag fits into the dinner-shopping of a busy city dweller who likes fresh spices but does not fancy buying a whole lot of each spice.. This method of pricing and selling a variety of goods by "bundling" them into one package, allows the extraction of surplus from customers who have different willingness to pay for the various products. It also adds convenience since all products are packed neatly into one little bag– ready to be shopped and go!

Limitations and barriers along the chain

The basic characteristic of a value-chain is that there is value addition at each step along the chain (Fig. 1). This value-addition happens through the combination with other resources, e.g. manpower, tools, knowledge and skills, and often other raw materials. To enable this value addition, there has to be feedback information from the market or retailers to the processers, the producers, etc. This kind of feedback loops are well known from systems dynamics. In this context, the loops need to ensure that the recent opportunities and challenges from a dynamic market will be appropriately adjusted by the actors in the chain.

Information flow and interpretative skills

This requires not only information flow but also skills to interpret the signals and react to them. The reactions, for example, may be in the form of new product innovation, which again often requires innovations in the primary production. For smallholder farmers this might be a significant challenge, especially in the absence of significant back-up or support from other chain actors. There are different options to ensure that the value addition is actually beneficial to the weaker agents in the chain, such as poorly organised smallholder farmers[8].

The research concept that we develop

Traditionally, researchers of innovation in value-chains refer to the general model of Kline and Rosenberg (Fig. 2). However, as this is a research project based on farming, farming products and participation in developing countries, we have tried to add some further ideas on how to research value chains in this context. Stakeholder participation and partnerships are cornerstones in modern paradigms of integrated agricultural research for development (IAR4D) and such new paradigms call for change in the way agricultural research is being conducted[9, 10, 11].

Our approach to research value chains is schematically shown in the following diagram (Fig 3). At the bottom of the diagram are depicted the information feedback loops that bring back translated news (signals) regarding market requirements, retailers

Productivity and Growth in Organic Value-Chains (ProGrOV)

Improving productivity and growth in existing organic value-chains in Uganda, Kenya and Tanzania. This is what the research project ProGrOV is about, by way of developing agro-ecological methods, governance and management of chains, and by capacity development regarding research focussed on organic and interdisciplinary approaches.

The project is a collaboration between Universities in Uganda, Kenya, Tanzania and Denmark. It is funded by the Danish Ministry of Foreign Affairs and coordinated by ICROFS.

Read more at
http://www.icrofs.org/Pages/Research/progrov.html

requests, etc. These signals may include price determining information like preferences for certain intrinsic quality attributes (e.g. maturity, size/weight, uniformity in colour, shelf life. It could also be extrinsic quality attributes such as food safety, production method and the values that are embedded in certified organic, environmental issues or place of origin, which may relate to the concept of the "terroir". In addition to this complexity, a product may have different markets that emphasise different attributes. An example may be fruits that are needed at different degrees of maturity by two apparently fairly similar markets in Europe. Conversely, it can be a product that is sold both at a local market, which has an emphasis on its role as a traditional dish, and in an export market where it is valued because of its exotic flavour.

The approach to quality in ProGrOV research

From the above examples of quality attributes, it may be obvious that it is complicated to describe such quality attributes in a way that makes them "researchable" (quantify and/or qualify, reproducible). For the purpose of the ProGrov project, we have a priori chosen to focus on organic value chains with certain extrinsic quality attributes attached. However, there are still important intrinsic quality attributes which organic products need to fulfil in order to gain market access at satisfactory prices. Thus, when performing biological/agricultural research in order to improve organic production at field and farm level one needs to take these intrinsic quality attributes into account.

Interpreting the intrinsic quality attributes

These intrinsic quality attributes should be translated into quantifiable quality criteria to be used for assessing the crop and livestock production resulting from the innovations tested in ProGrOV. Thus, for example, an indication that the colour of tomatoes is an important attribute for the buyers would then be translated into a scale of percent green parts of a batch of tomatoes, which would then be applied systematically to assess the tomatoes harvested in crop experiments.

The information on the attributes and their prioritization and thresholds etc. will come from interactions with the chain agents e.g. buyers, retailers, hotels, etc., in the relevant PoGrOV studies, which deals with the chains.

Thus, product quality in the ProGrOV project is a relative and context dependant concept and does not postulate to be neither objective nor covering all aspects of (intrinsic) product quality. However, the interpretation of the intrinsic quality attributes will be in terms of reproducible and quantifiable indicators to be used by the researchers and communicated as part of results.

Projecting the future of the present

Finally, when getting an idea and translating it into an innovation, the entrepreneurs are projecting what philosophers call "projecting the future in the present". By this they mean that we do neither know the future, nor consumers' possible preferences – and we base our expectations of consumers' future behaviour on their current behaviour. If that was true, there would have been no markets for PCs, liquid soap, Facebook, fashion clothes, not to speak of pineapples or bananas in Danish grocery stores.

Stakeholders test the research questions

The upper side of the diagram (Fig. 3) represents the research process, which is informed by the stakeholders, i.e. the national organic organisation, farmers, private companies, and selected markets such as local supermarkets, etc. The research questions and research findings are tested in value-chain stakeholder forums. The tests thus act as dissemination a forum for reality check for the researcher, as well as a forum where the fine-tuning of the research is taking place and actions are taken to adjust the research. The fora obviously differ along the value chain. Thus, if one assumes that a certain input of livestock manure could improve the amount and quality of vegetables, then before testing this intervention experimentally it is necessary to discuss the feasibility of the intervention with the farmers (i.e. would they potentially be able to find an duse equivalent amounts of manure?).

Intervention incentives for farmers

The starting point for farmers accepting or shunning the intervention during the consultation will be availability or lack of improved breeds of dairy cattle amongst the farmers. One example is the large framed Friesians that consume larger quantities of fodder necessary for producing larger volumes of manure. Given that intensive dairy-vegetable production systems increases the availability of organic fertiliser, which can be applied to the vegetable garden to maintain the quality of the vegetable yield as demanded by the consumers, there might be a strong enough incentive for farmers to accept the intervention. An intensive livestock- vegetable production system helps to diversify farmers' earnings and empowers them to be less vulnerable against natural and economic shocks associated with the single commodity approach in agriculture. Moreover, interventions on how to handle and use manure as soil amendments has room for improvements in organic agriculture of east Africa since many farmers do not distribute this resource efficienlty and sometimes use it in herbal concoctions with tephrosia, paw paw leaves and Mexican marigold to produce

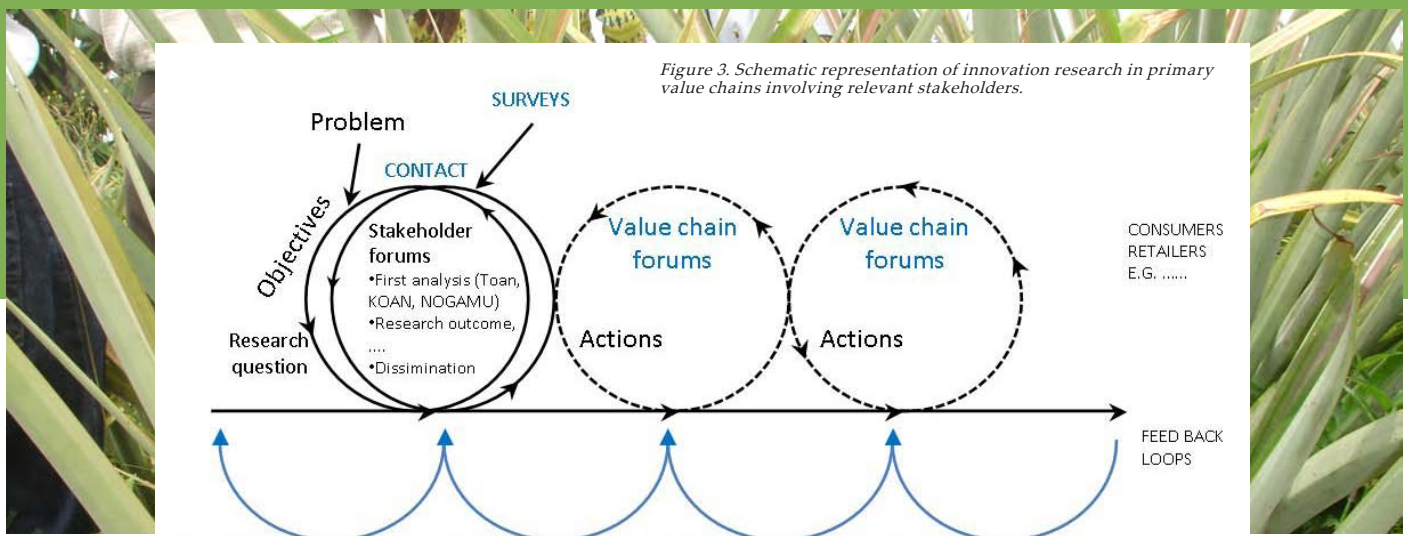

Figure 3. Schematic representation of innovation research in primary value chains involving relevant stakeholders.

organic insecticides.

Value-chain research can help the whole chain

Value-chain research can be said to provide a tool or an interdisciplinary research approach in its own right to help researchers, entrepreneurs, and stakeholders at each part of the value chain, and from multiple disciplines, to identify relevant research questions that can contribute to the whole chain (Fig. 3). This research approach is a further development of the general concepts described in the academic literature (Fig. 2) and emerged at a recent workshop in Uganda where all project participants were gathered to initiate the project. As a first draft, it will be fine-tuned, changed and properly described in the coming years. We would be happy for feedback from anybody interested in this research or research approach.

Further reading

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