The Challenges facing West African Family Farms in Accessing Agricultural Innovations: Institutional and Political Implications

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Summary

West African countries are expecting major contributions from science and technology in the agricultural sector in order to meet the significant challenges of economic growth, food security, and overall poverty reduction.
Although Research-Development in West Africa has experienced instability with regard to financing, much effort has been made over the last three decades. However, with the exception of cash crops, the majority of producers which are family farms have little access to and therefore cannot benefit from agricultural innovations.

How come this is the situation despite the hopes for an agricultural innovation system in these countries? In addition to the frequent recriminations that research and agricultural extension institutions perform poorly – or complaints that producers are too passive and refuse to change, this regional analysis addresses the key issue of the role played by the institutional and political environment in the access and use of agricultural innovations.

The methodological approach was based on the analysis of case studies, which also contributed to deepen strategic thinking with all of the actors involved in order to learn lessons and their implications.
The analysis reveals that in addition to the performance of agricultural innovation and producers' level of knowledge, the political and institutional environment also has a determining role in the access and use of the research results. In most cases, it has a vital role in up-stream and down-stream production support services and notably opportunities providing a better connection of family farms to the market whether it is local, national, regional or international.

But the real challenge is to know how to create a political and institutional environment favourable to such support services in a context of liberalisation and globalisation where most of the States withdrew from the agricultural production support sectors such as marketing inputs, extension services, etc. and where private initiatives often take a long time to materialise on the ground.

This constitutes at the same time calling upon research-development (R&D) institutions to give priority to the analyses presented as simple messages facilitating decision-making and action by policy decision-makers. These analyses should demonstrate the interest of setting up an enabling environment to invest in agricultural innovation.

Key words: Family farms, agricultural innovation, access to and use of agricultural innovation, political and institutional environment

1. Introduction

This analysis of producers' access to agricultural innovation has been carried out within the global framework of a strategic thinking series on agricultural transformation that the Sahel and West Africa Club launched with regional actors in 2002. It concerns notably: (i) West African agricultural transformation and the role of family farms; (ii) Technological innovation within the structural change process of West African family farms: the role research and agricultural extension can play; (iii) Support to the West African Network of Peasant Organisations and Producers (ROPPA) in the implementation of the West African Monetary and Economic Union[1]'s (UEMOA) policy.

[1] Union Economique et Monétaire Ouest Africaine

The key question guiding the analysis is *how can access to and use of agricultural innovation by producers be improved thus enabling family farms (FF) to be able to benefit from the liberalised global context but in particular to respond to the food demands of an ever growing, increasingly urbanised West African population?*

The working hypothesis is that there are other determining factors, sometimes forgotten and still noticed, in addition to the recriminations of poor performance facing research and extension (R & E) institutions and accusations of producers' "passivity" and "inertia",

Thus, the goal of the study is to analyse the institutional, socio-economic and political environment linked to access and use of innovation by family farms with a view to stimulating decision-making and action aimed at improving the livelihoods of family farms.

2. Background and analysis framework

2.1. Main characteristics of family farms

In addition to numerous concepts and definitions, as a production model family farms entwine structure, activities, household composition as well as the capital for production. This relationship is important and has implications on the way in which decisions are made with regard to types of production, organisation and allocation of resources namely household labour, capital, land management and inheritance issues. (Belière *et al.*, 2002[2]).

In terms of the social organisation of work, family farms use mainly unpaid family labour, even if, increasingly they are resorting to a salaried workforce as is the case on cotton and cocoa tree farms.

On the *socio-economic* level and in comparison with commercial agriculture, also called agribusiness, social and cultural values are still important with regard to the family farm. Managing risks is very costly and family farms use few agricultural inputs relying generally on a wide-range of products including staple food and cash crops, livestock, fisheries, logging and other non-agricultural economic activities such as handicrafts, small trade and some family members may even take seasonal jobs via seasonal migration (Zoundi, 2003 b[3]).

Family farms are much smaller in comparison to commercial farms. Some studies carried out in Ghana in 1997 (Owusu *et al.*, 2002[4]) counted 800,000 family farms (FF) growing cocoa with an average area of 3 hectares per farm, among which 80% had less than 4 hectares. In Benin, the average size was 3.3 hectares (Minot *et al*., 2001[5]). In Mali, cotton production is carried out by more than 200,000 agricultural households with fewer than 15 people and 10 hectares (Toulmin & Guèye, 2003[6]). Even if production is primarily for FF home consumption, there is an increase in the sale of production due to the growing need for liquidity. Increasingly, grains provide households with both food and income in addition to other activities such as trade, livestock, handicrafts, fisheries, etc.

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[2] Belières, J-F., Bosc, P-M., Faure, G., Fournier, S. and Losch, B., 2002. 'What future for West Africa's family farms in a world market economy?', *IIED Drylands Programme Issue Paper*, No.113, 42 p.

[3] Zoundi S.J., 2003b. Innovation technologique dans le processus de changement structurel de l'agriculture familiale en Afrique de l'Ouest : Quel rôle pour la recherche et la vulgarisation agricole ? Club du Sahel et de l'Afrique de l'Ouest, Paris (France), 46 p. Voir document sur le site: www.sahel-club.org/fr/agri/index.htm

[4] Owusu; J.G.K., Osei, Y. and Baah, F., 2002 "Current Issues in Agriculture in Ghana: The Future of Family Farming", paper prepared for IIED Sahel, Dakar, Senegal.

[5] Minot, N., Kherallah M., Soulé G.B., and Berry Ph., 2001. "Impact of Agricultural Market Reforms on Smallholder Farmers in Benin and Malawi" *Results of survey of smallholder farmers, communities and villages*, Vol. 1, IFPRI, Washington DC., 299 p.

[6] Toulmin C., Guèye B., 2003. Transformation in West African Agricultures and the role of family farms. Sahel and West Africa Club (SWAC/OECD), SAH/D(2003)541, Paris, France, 144 p.

Thus, the basic element of family farms is the link between the economic, social as well as cultural aspects and the various objectives sought through a balance between individual and collective goals as well as risk management through the diversification of revenue sources (Table 1).

- *Socio-cultural:* based on household labour, with many family relations, objectives and strategies combining both individual and collective concerns while emphasising solidarity. Due to their diverse activities, FF can easily adapt to the context's evolution. One of the adjustments for example is the reduction in cereal planted surface area or even ceasing production if the economic environment becomes unfavourable, such as a drop in price.
- *Economic*: integrating or combining a diversified range of activities relative to the priority objectives (consumption, storage, sale) in order to minimise risk.
- *Technical:* based on the desire to keep and improve the land on which it depends but also the concern to innovate technically and economically (to modernise) in order to respond to the context's evolution as well as to current and future challenges.

Table 1. Several comparisons between family farming and commercial agriculture

Characteristics	Family farm	Commercial Agriculture
Role of household labour	Major	Little or none
Community linkages	Strong: based on solidarity and mutual help between household and broader group	Weak: often no social connection between entrepreneur and local community
Priority objectives	Consume Stock Sell	Sell Buy Consume
Diversification	High: to reduce exposure to risk	Low: specialisation on very few crops and activities
Flexibility	High	Low
Size of holding	Small: averaging 5–10ha	Large: may exceed 100ha
Links to market	Weak: but becoming stronger	Strong
Land access	Inheritance and social arrangements	Purchase

Source: Toulmin & Guèye (2003)

2.2. Access to agricultural innovation by family farms

In response to challenges regarding food security and poverty reduction, many countries have placed their hope in the agricultural innovation system even if research is not well-implicated in the policy decision making process in these countries (Butare & Zoundi, 2005[7]). With regard to this expectation expressed to research and extension (R & E) institutions in West Africa and throughout Africa, the key issue is *how to promote access and effective use of agricultural innovation by producers with a view to increasing agricultural production, leading to economic growth and contributing to food security and poverty reduction.*

[7] Butaré, I. et Zoundi, J.S., 2005. Éclairer la prise de décision politique en Afrique subsaharienne : nouvelle donne pour la recherche agricole et environnementale. 2e éd. Butare et Zoundi, Dakar, Sénégal. 96 p. ISBN 2-9525390-0-6

This challenge to provide producers with access to agricultural innovation has been at the inception of numerous reforms within R&E institutions since the 1970s. Without providing an exhaustive history, recent evolutions have included the promotion of participatory approaches and users assuming more responsibility. The system has gone from innovation led by researchers' and extension practitioners' agenda to "demand driven" innovation.
This vision is explained notably by the establishment of new financing mechanisms with the aim of responding to the paradigm illustrated in Figure 1 (Zoundi, 2004a[8]).

There have been many organisational and institutional evolutions observed in the region among which are the regional research and agricultural extension committees (CRRVA) of Mali, and the Research and Extension Liaison Committee (RELC) in Ghana and the Gambia. In some situations, this has led to the establishment of semi-private institutions where the holding of social capital allows producers the right to voice their opinion and make decisions: such as the *Centre National de Recherche Agronomique* (CNRA) and the *Agence Nationale de Développement Rural* (ANADER) in Côte d'Ivoire, the *Agence Nationale de Conseil Agricole et Rural* (ANCAR) in Senegal. There are even some liberalised cotton sub-sectors in Burkina Faso where the *Union Nationale des Producteurs de Coton du Burkina* (UNPC-B) holds shares in cotton companies giving them the right to voice their *desiderata* with regard to research and agricultural advice (Zoundi, 2004b[9]). These reforms, still underway in countries, have been well-documented in the work carried out by Coraf/Wecard (ODI/CIRAD/ITAD, 1999[10]) and the Sahel and West Africa Club (Zoundi, 2003b). At the regional and international levels, these reforms have also benefited from the contribution of much strategic thinking such as that of the Neuchâtel initiative (www.neuchatelinitiative.net et www.lbl.ch/int) and the "Research-Extension and Producers' Organisations Partnership Network in West and Central Africa (REPO-Net)" (Zoundi, 2003c[11]), as well as the partnership between the Netherlands' Royal Tropical Institute (KIT) and the World Bank[12] on the participatory approaches of development (PAD).

Another important component in family farm's access to agricultural innovation has been the structural adjustment policies. International financing institutes-imposed budgetary measures on the States relegated R&E institutions to second place. These institutions no longer have the means needed to respond to the requests made by the agricultural and rural environment. This situation seems contradictory because commercial trade liberalisation and globalisation in general raises other challenges for West African agriculture such as productivity, competitiveness, sustainability, etc. (Zoundi, 2003a[13]) – *How can access and use of agricultural innovations be promoted when faced with such challenges?* This question can be more specifically asked for FF. Thus, many FF are ever more dependent on the international market. Such is the case for producers of fruits and vegetables, cotton, coffee, cocoa, etc. Moreover, these FF should take into account market requirements related to sanitary, phyto-sanitary and quality standards.

[8] Zoundi, 2004a. Quels mécanismes de financement durable de la recherche agricole en Afrique Sub-Saharienne ? « In » Grain de Sel, n° 29, décembre 2004, Inter-Réseaux, Paris (France), pp 23 (voir document dans : http://www.inter-reseaux.org/IMG/pdf/5.13_dossier_zoundi.pdf).
[9] Zoundi S.J., 2004b. Processus d'innovation dans le secteur coton en Afrique de l'Ouest : Enjeux et défis pour les producteurs dans un contexte de libéralisation/privatisation de la filière coton, ROPPA, 18 p.
[10] ODI/CIRAD/ITAD, 1999. Strengthening Research-Extension-Farmers' Organisations linkages in West and Central Africa. Overview paper. A study prepared for CORAF, the Department for Development and the French Ministère de la Coopération. CORAF. CORAF (Dakar), 47 p. + Appendices. Voir Rapport sur le site: www.odi.uk/rpeg/coraf/overview.pdf
[11] Zoundi S.J., 2003c. Adapting agricultural institutions to the changing rural development context in West Africa: A participating framework offered by the REPO-Net. "In" Agricultural Research and Extension Network (AgReN) Newsletter n° 47, pp 14 (Pour plus *d'informations sur REPO-Net sont disponibles dans le bulletin Agricultural Research and Extension Network (AgREN) N° 47 de Janvier 2003 : www.odi.org.uk/agren/papers/newsletter47.pdf)*
[12] *: This development of participatory approach tools project (1997-99) involved 5 West African countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali) and Madagascar – Some information is available on the site: www.kit.nl/about_kit/html/village_participation_in_agric.asp)*
[13] Zoundi S.J., 2003a. L'évolution du développement rural au sud : quels défis pour l'agriculture sub-saharienne ? « *In* » Agridoc – Revue Thématique, n°6 Octobre 2003, BDPA, Paris (France), pp 13-15 (voir document dans : www.agridoc.com/resdoc/revuethem/pdf/revue_6/Zoundi.pdf)

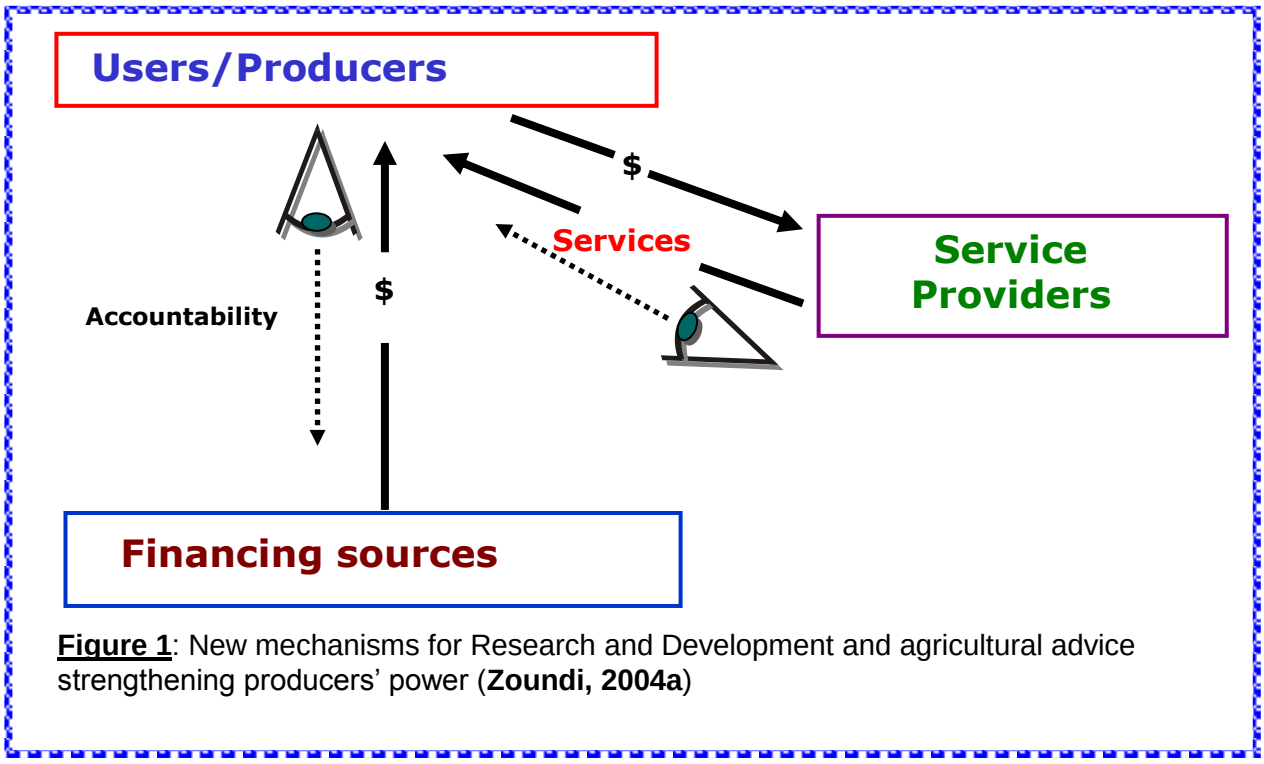

Figure 1: New mechanisms for Research and Development and agricultural advice strengthening producers' power (**Zoundi, 2004a**)

2.3 Method – the Study's structure

The methodology is based on case study analyses and strategies for access and use of agricultural innovation in some West African countries: Burkina Faso, the Gambia, Ghana, Mali, and Nigeria. This exercise was supplemented by an electronic discussion.

Based on the preliminary results of the analysis, a regional consultation with actors was organised with a view to sharing and compiling other experiences so as to facilitate decision-making with regard to forming development partnerships at the regional level.

3. Results and key lessons of the study

In addition to producers' technical expertise with regard to agricultural innovation, strategic thinking carried out with actors on various case studies revealed the importance of taking into account the economic environment linked to the use of innovation. It involves notably factors needed in order to apply agricultural innovations such as inputs and other production factors, but in particular market opportunities that are able to justify or encourage producers to invest in agricultural innovation. In some situations, the implementation of projects and programmes has allowed such a favourable environment to emerge – but for the most part, this environment has remained "artificial", fading away after the end of the project or programme which raises the question of sustainability. *Is there a way to develop adequate policies enabling an environment to be created encouraging producers to use innovation?* The various documented case studies tend to provide responses to this question and some success stories which demonstrate that FF can access agricultural innovations.

3.1. The key role played by upstream and downstream production services

Some case studies analysed revealed that access and use of agricultural innovation can be improved when there is a upstream and downstream favourable environment.

Since the implementation of structural adjustment policies in the 1990s, several West African countries are currently experiencing: (i) State withdrawal from production sectors, (ii) a reduction in all types of production support, (iii) private sector service providers are in a transitory period and for various reasons have difficulty filling the void left by public services.
However, experiences of rice producers of the Office du Niger in Mali (Box 1) show that the private sector's role in providing necessary services for the use of agricultural innovation is essential. This experience also reveals what role the State played, notably in: (i) setting up needed reforms to create a favourable environment for emerging private operators, (ii) creating better land security conditions which was also a determining element for investment in agricultural production, and hence resorting to agricultural innovation.

Thus, access to the necessary inputs (seeds, fertilizer, small equipment, etc.) in order to use agricultural innovation as well as access to a remunerative market presents a favourable environment for family farms to invest in agricultural production through the implementation of agricultural innovations.

Box 1. Upstream and downstream services and producers' access to agricultural innovation: the case of rice production within the *Office du Niger* in Mali.

1. Background

Created in 1932, the *Office du Niger* (ON) was restructured in 1994. Some of the important reforms were: (i) liberalising the marketing of threshed unmilled rice and abolishing the "economic police", (ii) securing land by establishing a *farming permit*[14] (PEA), (iii) signing of a three-party (State – ON – Farmers) agreement.
One of the direct consequences of the restructuration was the emergence of a wide-range of services offered by the private sector providing inputs, processing and marketing.

2. Availability of a wide-range of upstream and downstream services favourable to investment in agricultural innovation

Inputs and other production factors

Access to production factors was greatly facilitated by various financing institutions including classic banks like the *Banque Nationale de Développement Agricole*[15] (BNDA), but particularly many micro-finance institutions: *Centres d'assistance aux réseaux des caisses rurales*[16] (CAREC), *Fédération des caisses rurales mutualistes du Delta*[17] (FCRMD), etc. These private institutions are essentially involved in access to inputs (seeds, fertilizer, pesticides, etc.) needed in order to use agricultural innovations. In 2003, the FCRMD alone provided 80% of producers with credit access to finance inputs for one agricultural campaign of which close to 100% was reimbursed. Similarly, access to agricultural equipment was encouraged with the emergence of private entities like the *Coopérative artisanale des forgerons de l'Office du Niger*[18] (CAFON).

Services facilitating market access

In addition to private infrastructure such as threshers, huskers and rice mills, several private rice harvesting and processing institutions have been set up. Such is the example of the producer association "*Jɛ ka fere*" ("Marketing

[14] Permis d'exploitation agricole
[15] National Agricultural Development Bank
[16] Rural Credit and Savings Bank
[17] Federation of Mutualist Rural Banks of the Delta
[18] Blacksmith's cooperative at the Office du Niger

Together" in the *bamana* language), which, with the support of other organisations such as the NGO *Afrique Verte* and the *Centre de prestation de services*[19] (CPS), carries out processing and remunerative market research for rice sales.

Applying technological packages recommended to producers requires inputs and other production factors such as small equipment. The availability of campaign credit is possible from private financial institutions such as FCRMD, enabling producers to access various factors required for applying these technological packages. Similarly, facilitating market access assured by private organisations such as "*Jɛ ka fere*" allows producers to benefit from remunerative negotiated prices. This return on investment encouraged producers to improve productivity, thus to innovate.
This enabling environment for the use of agricultural innovation has led to spectacular rice yields, increasing from 3 tonnes at the beginning of the restructuration to close to 6.1 tonnes/ha on average in 2003. This illustrates as well that "***anything is possible when there is incentive to use agricultural innovations***".

3.2. Private companies, agribusiness actors and family farms' access to services needed to use agricultural innovations

Experiences presented in Boxes 2, 3 and 4 show the key role played by private operators in facilitating access and use of agricultural innovations.

Box 2. Innovation in cereal crops: Role of private companies and operators

1. Background

Most production yield from cereal food crop production systems in West Africa is used for building up home consumption stocks. Aside from this general trend there are other essential cereal production systems focusing mainly on the market such is the case of mixed cotton-cereal systems. Whatever the system, one of the bottlenecks remains market uncertainty and in particular remunerative prices.

2. Market opportunities for food crops: A catalyst for investment in agricultural innovation

Facilitating Market Access

The NGO *Afrique Verte* has been working in some countries in West Africa (Burkina Faso, Mali and Niger) since 1990. Its experience in facilitating market access to food crop producers consists of: (i) strengthening capacities of professional agricultural organisations (PAO) with regard to marketing techniques, stock management and trade negotiation, (ii) establishing a security system for PAOs to access credit to market cereals, and (iii) putting producers and buyers into contact through the organisation of the "cereal stock market".

Associating **production-market** thus enables food crop producers to benefit from remunerative prices favourable to investing in innovation.

Setting up Processor-Producer contracts

Establishing agro-food producer-processor contracts has led to the Millet-Sorghum Initiative (MIS) framework in West and Central Africa (Burkina Faso, Chad, Mali, Niger, Senegal) or "*Downstream-driven"*, has again illustrated the role played by the market in encouraging the use of agricultural innovation. This initiative implemented by the NGO Sasakawa Global 2000 has consisted of establishing contracts between producers and processors. This helps guarantee: (i) delivery of a known quality product and in sufficient quantity to processors, (ii) a market and a remunerative price to producers known before seeding and providing a "price premium", (iii) producer access to agricultural inputs through credit provided by processors.

In **Niger** for example, setting up contracts has involved the "*Bunkasa Iri" collectif des groupements de producteurs privés de semences*[20] (CGPPS) of Maradi and two processing entities: the *Société de Transformation Alimentaire*[21] (STA) and the "*ALHERI"* Women's Processing Group. In **Senegal**, entering into contracts has involved local cereal processing economic interest groups (GIE TCL) made up of 11 processing companies and the Dramé Escale production economic interest group.

[19] Provision of Services Centre
[20] *collective of private seed producers*
[21] *Food processing company*

With a view to fulfilling the contract in terms of quality and quantity and motivated by guaranteed market access, family farms are investing in innovations, including improved varieties (IKMP1, IKMP5, ZATIB and Souna III for millet; Framida for sorghum), fertilisation systems including chemical fertilizers, cultivation techniques and other post-harvest conservation techniques.
Applying these technological packages has led to significant yield improvement: 886 kg/ha as compared to 500 kg/ha on average for traditional crop millet; 1 560 kg/ha as compared to 700 kg/ha on average for traditional crop sorghum.

In the Sahel, experiences of the NGO Sasakawa Global 2000 (Millet-Sorghum Initiative or ("*downstream-driven"*) and *Afrique Verte* (Box 2) and TIVISKI in Mauritania (Box 3) with regard to milk, highlights the role played by private operators in creating an enabling market environment for investment in innovation. This underlines the key role that agro-food processing actors could play in agricultural development policies.

Box 3. The private sector and producers' access to upstream and downstream production services: The TIVISKI Dairy and the *Association des Producteurs Laitiers Transhumants*[22] (APLT) in Mauritania

1. Background

The TIVISKI dairy (which means "Spring" in *Hassaniya*, a *Moor* dialect), created in 1989 in Nouakchott, started off processing dromedary milk and then cow milk in 1990 followed by goat milk in 1998. Daily production capacity is at 45 tonnes and includes numerous products: pasteurised milk, UHT milk, buttermilk, crème fraîche, yogurt, unfermented cheese, camel cheese.

2. A partnership with livestock breeders fostering access to animal feed and medicines as well as veterinary inputs

Milk is provided to the TIVISKI dairy by a network of nomad livestock breeders located within a 300 km radius from the capital. In 2006, delivery of milk averaged 14,000 litres/day, with peaks of 20,000 litres.
Facing stiff competition from imported milk and in order to guarantee regular supply and the quality of raw material, the dairy initiated the establishment of a milk producers association, which in 2003 became an autonomous NGO (the "*Association des producteurs laitiers transhumants*" - APLT). The APLT is thus an innovative partnership between milk producers and a private company (the dairy).

Through the APLT, the dairy offers milk-supplying livestock breeders opportunities to access veterinary care and cattle feed on credit. More than 1000 nomadic livestock breeding families make up the network of milk suppliers.

The beginning was difficult due to many factors including consumer preference for imported goods. However, high-quality fresh dairy products gradually won over imported sterilized milk, and sales gradually increased. The dairy provides veterinary care, vaccination and feed, on credit, as well as instruction on hygiene. The milk quality has improved and it is so good that raw cow milk is now easily processed in the new UHT plant.

This has created an incentive for innovation in order to meet quantity and quality. There is a double incentive to invest in innovation:

- Facilitated access to inputs on credit, essential elements in order to use certain innovations such as feed formulations or health management of dairy cattle.
- Guaranteed market access for the TIVISKI dairy – With 140 MRO/litre, livestock breeders have a source of permanent, substantial revenue. During the average production period, a livestock breeder can deliver 14-15 litres of milk per day to the dairy earning 50 000 MRO per month (approximately 149 €/month).

Sources:
(i) TIVISKI Dairy (www.tiviski.com)
(ii) Vétérinaires sans frontières (http://www.vsf-belgium.org/docs/info2002/aug_fr_2002.pdf)
(iii). E. HANAK, E. BOUTRIF, P. FABRE, M. PINEIRO (éditeurs scientifiques), 2002. Gestion de la sécurité des aliments dans les pays en développement. Actes de l'atelier international, CIRAD-FAO, 11-13 décembre 2000, Montpellier, France, CIRAD-FAO. Cédérom du CIRAD, Montpellier, France (http://wwww.cirad.fr/colloque/fao/pdf/12-abeiderrahmane-vf.pdf)
(iv). Nouakchott info n° 734 of 24 February 2005 (http://www.akhbarnouakchott.com/mapeci/734/breves.htm)

[22] Association of Transhumant Dairy-Farmers

In Ghana and Nigeria, the initiatives analysed (Box 4) highlight the place of private companies and agribusiness actors in supporting family farms in the access and use of agricultural innovation.
The agribusiness/family farm partnership is in all regards one of the major issues in capitalising on agricultural innovation. This enables the FF to respond to concerns regarding productivity, competitiveness and quality standards required for products to be sold on the international market.

Box 4. Family farms' access to agricultural innovation: The role of agribusiness and other private operators

1. Background

Besides the majority of family farms, more commercial farms (agribusiness) as well as private companies exporting agricultural products are being set up in countries. Thus quality issues need to be taken into account. *How can the existence of these private actors constitute an environment conducive to better access and use of agricultural innovations by family farms?*

2. Partnership between producers-agribusiness/private companies: An impetus facilitating access and use of agricultural innovations

In **Ghana**, the Horticulturalists' Association of Ghana (HAG) was created in 1985. In 2003 it brought together 30 agribusiness actors working with a network of 600 family farms to produce pineapples for export. This Agribusiness / family farm partnership, while at the same time allowing agribusiness to respect their commitments of regularly exported quantity, helps producers access inputs, credit, etc., necessary factors in order to use agricultural innovation required to better respond to the external market. This is in addition to other services offered by HAG: (i) information and facilitation in respecting EUREPGAP (Euro Retailer Working Group – Good Agriculture Practice) quality standards; (ii) research of vegetal material better responding to the market (variety MD-2).

In **Nigeria**, the "OKOMU OIL PALM COMPANY Plc", created in 1977 by the Federal Government and farming 8,000 ha, privatised in 1990, an approach geared towards establishing contracts with family farms for oil palm fruit production. This Agribusiness/family farm partnership, while at the same time providing guaranteed market access, also assures producers of access to inputs and credit.

In **Ghana**, the Sea-freight Pineapple Exporters of Ghana (SPEG), a private company bringing together the majority of pineapple exporters has developed solid partnerships with producers to better respond to the external market. Through this partnership, the SPEG offers producers a guaranteed market and remunerative environment through: (i) facilitating access to market; and (ii) facilitating compliance to EUREPGAP standards.

Whether the contract is between agribusiness/family farms or private companies/family farms, a guaranteed remunerative market and facilitating access to necessary production services (inputs, credit, etc.) constitute an incentive for using agricultural innovation. Pineapple producers' use of innovations has involved improved varieties such as the MD-2, cultural techniques such as *Plastic-Mulching*, etc. The success achieved through these "win-win" partnerships has been a determining factor in the increase of SPEG members from 15 to 42 and an increase in production exported from 3,000 tonnes to 45,000 tonnes from 1995 to 2003.

In all cases examined (IMS-SG2000, Afrique Verte, SPEG, HAG, etc.), the main lesson learned is that *"**… access and use of agricultural innovations can be improved, even in the food crop sub-sector, if there is a favourable market environment …**"*

3.3. Professional agricultural organisations and producers' access to agricultural innovation

With the withdrawal by the State and the low-level of development of private operators in some countries, many professional agricultural organisations (PAO) have developed their own initiatives aiming to facilitate access and use of agricultural innovations. These initiatives combine agricultural advice and in

particular other strategies focusing on producers' access to necessary factors to use technological packages. (Zoundi, 2003c).
The experience of the *Fédération des Paysans du Fouta Djallon*[23] (FPFD) in Guinea is an illustration of the opportunities that PAO can offer their members in terms of access to inputs and the market. Two essential elements encourage agricultural innovation (Box 5).

FPFD's experience is not unique in the region and there are other success stories in West Africa such as the *Fédération provinciale des producteurs agricoles de la Sissili* (FEPPA-SI) in Burkina Faso for corn and cowpea crops and the *Unions sous-préfectorales des producteurs*[24] (USPP) in Benin with the establishment of the *Centrale d'achat et de gestion des intrants agricoles*[25] (CAGIA).

This illustrates the essential role played by professional agricultural organisations in the creation of an enabling environment for producers to access and use innovations.

Box 5. Producers' access to upstream and downstream production services through their PAO: the *Fédération des Paysans du Fouta Djallon* (FPFD) of Guinea

1. Background

The *Fédération des Paysans du Fouta Djallon* (FPFD) is a producers organisation created in November 1992. In 2005, the organisation had 440 groups within 21 unions, with a total of more than 15.000 members. The Federation focused in particular on some agricultural sub-sectors, notably potatoes, onions, tomatoes, etc.

2. How has the FPFD facilitated conditions for its members to access and use agricultural innovation?

During the first years of the FPFD's creation, the producer members faced the major problem of high imports of potatoes and onions. Thus the Federation decided to take action in two ways: (i) negotiate with political authorities to regulate imports and impose taxes during the local production period, and (ii) organise product marketing within the Federation: negotiating prices and signing contracts with wholesalers at the local level and in the capital.
Having created the necessary foundation to ensure market access and remunerative prices, the Federation decided to improve production in order to respond to demand, notably through capitalising on agricultural innovations. This two-fold action enabled its members to access:

- Agricultural innovation and acquire technical skills – The FPFD signed cooperation frameworks with the *Institut de Recherches Agronomiques* of Guinea – IRAG and the *Service National de Promotion Rurale et de la Vulgarisation* – SNPRV. These partnerships include agricultural development and training for producers in order to use agricultural innovations related to potatoes and onions.
- Inputs needed to use agricultural innovations. For marketing, the Federation set up an internal mechanism assuring the ordering and distribution of inputs (seeds, fertilizer, etc.) to its members. Figure 2 presents a general overview of the inputs mobilised in 2001-2003.

The Federation has been able to ensure part of its financing for charges linked to contracts with R & E institutions through product marketing and input supplies.

Access to inputs and the market have enabled most FPFD producers to access and use agricultural innovations needed to respond to local market demand for potatoes and onions. Average potato yields have increased from 10 tonnes/hectare during the 1993-94 campaign to 18 tonnes/hectare during the 1996-97 campaign. In 2003, 95% of the potatoes on the market was supplied by national production of which 50% was from producers organisations. (Camara, 2003[26]).

[23] *Federation of Farmers of Fouta Djallon*
[24] *Sub-Prefecture Producers Union*
[25] *Cooperative for Supply and Management of Agricultural Inputs*
[26] Camara M., 2003. Des formes d'organisation pour la commercialisation : L'expérience de la Fédération des paysans du Fouta Djallon, Guinée, 2 p. (http://ancien.inter-reseaux.org/publications/graindesel/gds24/dossier/formesdorganisation.pdf)

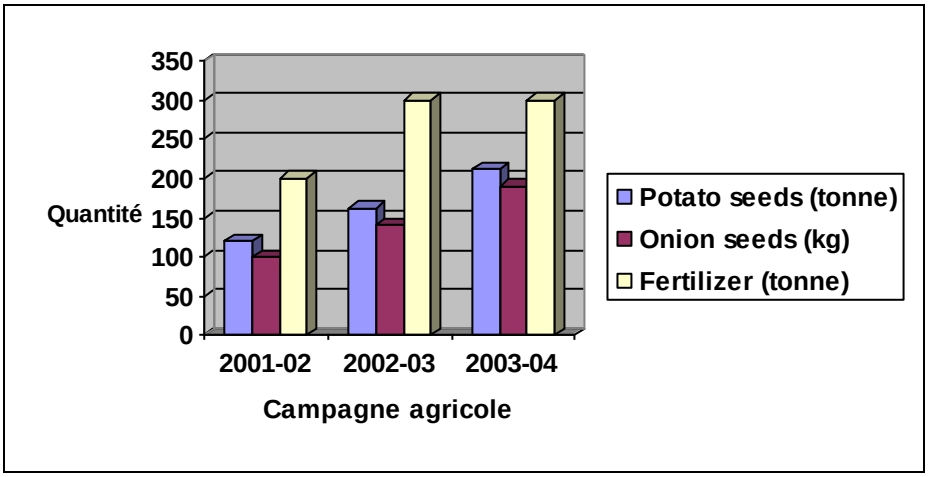

Figure 2. Evolution of input quantities supplied by FPFD to its members

4. What are the policy implications at the national as well as at the regional level?

4.1. Can the conception and implementation of agricultural policies be re-examined?

One of the major lessons learned from various experiences is that it is possible to improve family farms' access and use of agricultural innovations when they are able to access the necessary inputs and the market (local, national, regional and international). Besides cash crops, experiences related to cereals indicate that there could be a revolution even in the food crop sector if there is an incentive to innovate. This can be illustrated through the success of the sorghum variety SK 5912 in Nigeria (Box 6).

The veritable challenge is thus *how to realign agricultural policy conception with a greater and integrated vision* that is to say taking into account all the other agricultural training or support sectors such is the case of agro-industry. Currently this concern is not sufficiently taken into account and the persistence of development sectoral approaches at the country level constitutes a less favourable environment to implement such an integrated vision.

Box 6. A political decision leading to a positive effect on agricultural innovations' access and utilization: *Nigeria Sorghum success story*

1. Context

In 1979, a Nigerian released sorghum variety, SK 5912, which had been improved by the Institute for Agricultural Research (IAR), Samaru, Nigeria was found unsatisfactory by farmers as food. So, the search for alternative uses for this very productive variety was on. In 1982, the collaborative efforts to evaluate suitable varieties of Nigerian sorghum have expanded to include other partners in industry.

2. The political decision and its impact

During the same period, the Nigerian Government changed its policy of gradually substituting imported industrial raw materials to one of total and immediate substitution. IAR and the Federal Institute for Industrial Research, Oshodi, capitalized on the situation and began collaborative pilot and industrial scale brewing research and development for

Lager beer. A series of tests were undertaken with Trophy Breweries, Double Crown Breweries, Premier Breweries and later Nigeria Breweries Ltd. By year 1983, appropriate malting and brewing procedures for sorghum were established and confirmed, finally using 100% substitution. This research for development and industrial success in the use of sorghum and sorghum malt for brewing Lager save the country more than US $ 100 million annually. Malting companies have mushroomed, ever more grain is used in the poultry industry, and academic training and education for degrees and diplomas in the areas of food science and technology have increased significantly.

3. Specific impacts on innovation's utilization and sorghum production

In addition to the money saved, this success has raised the commercial production of Nigerian sorghum variety SK 5912, and two other later-released ICRISAT-bred varieties ICSV 400 and ICSV 111. This commercial use of sorghum is expected to increase the estimated sorghum requirements from the initial 67,000 tonnes/annum in 1989 to 225,000 in 1995 and 1,500,000 in 2005.

Spillover success stories are spreading across Africa: (i) Sorghum as an adjunct by the Bralirwa (Heinneken) Brewery in Rwanda; for Lager beer in Uganda; (ii) ICSV 111 for Guiness Stout and malt drink in Ghana.

Source: SATrends – ICRISAT's monthly newsletter, SAT Trends Issue 30, May 2003 (http://www.icrisat.org/satrends/may2003.htm). For more information: **Dr A B Obilana** (a.obilana@cgiar.org)

4.2. More favourable trade policies to better connect family farms to the market

Most of the analysed case studies highlight the major importance of market opportunities in prompting investment in agricultural innovation. The FPFD's potato experience shows the relevance of greater implementation of liberalisation policies – market openings. In addition to the potato case study in Guinea, several other regional products are particularly involved by local market competitiveness such as rice, meat, milk, etc. For most of the products cited, extra-African imports seem to inhibit local production although production potential exists. This paradoxical situation can be illustrated through the case concerning milk (Box 7) where local production is suffering due to an unfavourable economic environment. *Can family farms truly be urged to invest in innovations in such an environment where it is difficult to sell products even at the local level?* This issue is elaborated in the frozen chicken case (SOS Faim, 2004[27]).

Whether it is the success story of milk in Kenya (Box 7) or that of sorghum in Nigeria (Box 6), the major changes having had impacts on incentives to invest in agricultural innovation indicate the relevance and need to take into account some measures or instruments aiming to accelerate the use of agricultural technologies. These two examples illustrate the determining role of the vision and political commitment in the creation of an economic environment needed for investment in agricultural innovation.

Box 7. Trade policies having impacts on local production and investment in agricultural innovation

The European Union's (EU) dairy production subsidies are estimated at close to US $ 2/dairy cow/day (16 billion Euros/year). Among the instruments used are direct pricing support, production quotas, import restrictions and export subsidies. At the regional level, trade policies were implemented within the framework of liberalisation. The Common External Tariff (CET) has been set up and customs duties applied to imports are 5% for powdered milk and 20% for processed products.

All of these policies together present harmful consequences:

- **West African markets are invaded**: In Senegal, for example, in 2002 dairy product imports were close to 211,000 tonnes, of which 75% was powdered milk in particular from the EU (80%). In monetary means, this is close to 22 billion CFA francs (33.5 million €).

[27] GRET, 2004. Exportations de poulets : L'Europe plume l'Afrique – Campagne pour le droit à la protection des marchés agricoles, 20 p. (www.sosfaim.org/pdf/fr/poulets_brochure.pdf) (www.sosfaim.be/pdf/fr/dp/DP4.pdf)

- **Undermining development of processing factories**: In Koudougou (Burkina Faso), for example, women produce milk foods (from small millet flour diluted in curd cheese) with imported powdered milk. A kilogram of powdered milk retails for up to 1.700 CFA francs (approximately 2.59 €), from which one litre of milk could be reconstituted for 200 CFA francs (0.30 €). A litre of fresh local milk would cost 300 CFA francs (0.46 €). Obviously, local milk is less competitive (price) than imported milk which is supported by the exporting countries, in particular, European countries. Processors cannot compete with the imported products.
- **Producers pushed aside**: A livestock breeder from Burkina Faso's Koudougou region attests: "*When I was young, my father and I supplied the French Government. Today we can produce milk all year long if it is worthwhile (which would mean being sold at around 300 CFA francs, or 0.46 € per litre of milk delivered).But we can't afford to feed our cows if we can't sell our milk "*.

These policies greatly contrast the enabling environment in some countries such as **Kenya**, where success in the dairy sector has benefited from a national support policy that includes the following instruments:

- Establishment of a regulatory body, the Kenya Dairy Board (KDB) created in 1958 to regulate, promote and develop the national milk industry
- Strict control of imports by imposing a 60% customs tariff
- Subsidies by the State: since independence to the end of the 1980s 80% of the small producers' fees for artificial insemination were paid for in addition to providing veterinary services and medication (before their progressive withdrawal as from 1988).

This policy instituted in Kenya encouraged access and use of agricultural innovation by small milk producers. It has had effects on productivity; average production per cow increased from 462 kg to 507 kg between 1985-1998, as compared to 192-209 kg and 350-350 kg respectively in Ethiopia and Uganda for the same period. Kenyan exports of milk, cream, butter and ghee increased from KShs 117.5 million (€ 1.29 million) to KShs 140.6 million (€ 1.55 million) in 1998 to 2002 respectively, while total value of import (only dry milk) decreased from KShs 353 million (€ 3.88 million) to KShs 135 million (€ 1.48 million) in the same period respectively.

Sources:
(i). SWAC, 2007. Livestock in the Sahel and West Africa : A series of policy notes (http://www.oecd.org/document/53/0,3343,en_38233741_38246915_38402165_1_1_1_1,00.html)
(ii). Haggblade S., 2004. Building on successes in African Agriculture, IFPRI Focus 12. Brief 1 of 10, April 2004, IFPRI, Washington DC, USA, 24 p. (http://www.ifpri.org/2020/focus/focus12/focus12.pdf)
(iii). Export Processing Zones Authority, 2005. Dairy Industry in Kenya 2005, EPZ, Nairobi, Kenya, 10 p.
(iv). Karanja A.M., 2003. The dairy industry in Kenya: Post-liberalization agenda. Working Paper n°1, 2003, Tegemeo Institute/Egerton University (http://www.aec.msu.edu/fs2/kenya/o_papers/dairy_sector_color.pdf)
(v). Oudet M., 2005. La révolution blanche est-elle possible au Burkina Faso et plus largement en Afrique de l'Ouest. Misereor, Germany, 30 p. (http://www.abcburkina.net/ancien/documents/filiere_lait_burkina.pdf)

This issue raised with policy decision-makers in various countries on their roles and responsibilities with regard to necessary support provided to the agriculture sector also concerns policy decisions at the regional level on the stakes and acceptable limits of international trade negotiations that are currently underway within the World Trade Organisation (WTO) and the Economic Partnership Agreements (EPA).

4.3. More action-oriented commitment in relation to development of private and public institutions supporting the agriculture sector

The private sector

In relation to private sector actors, certain reforms resulting from liberalisation thus enabling private operators to play a leading role in economic development strategies and policies had certain positive effects but there were also negative aspects. Experiences presented in this paper highlight the importance of these actors notably in supporting the agricultural innovation process for FF. Currently in many countries, policies have not sufficiently emphasised the promotion of upstream and downstream support services in the food crop production sector. Worse yet, in some cases, selective policies have been implemented targeting products which present a so-called "economic advantage" to the detriment of other

highly strategic products for food security. *How can investment in agricultural innovation be promoted in such contexts in order to improve agricultural production and meet the challenges of food security?*

Overall and with reference to the persistence of the changing situation where States are withdrawing and where private initiatives take a long time to materialise, the question is *how to go beyond political discourse and promote investment necessary to strengthening private sector capacities at the national level? How to improve the development of private trans-national operators and strengthen the dynamisation of the regional agricultural product market and thus stimulate investment for agricultural innovation?*

More specifically, in relation to the PAO, the issue of investment to strengthen their capacities and enable them to support family farms in innovation remains a major challenge. There is a large gap between dialogue and political will on one hand and having it turned into action and investment on the other. *How to make radical changes at this level, notably in terms of concrete commitment?*

What is the State's position as well as that of public institutions?

Reforms undertaken within the framework of the structural adjustment and liberalisation policies were perhaps necessary, but we can also question the role that public institutions should play in support of the agriculture sector. Analysis reveals that in many situations, public institutions seem dismantled, lacking capacities and means to accomplish the State directive and regulation missions, etc. With regard to access and use of agricultural innovation, the analysis shows that the public sector plays a crucial role in the implementation of structuring investments, notably those geared towards agricultural vulnerability (water management, etc.) facilitating market access (routes and other infrastructure, etc.), bearing in mind other forms of support to the agriculture sector. In some cases also, the State's role and above all policy decision-makers have been decisive in the creation of an enabling economic environment as has been the case in decisions made by the Nigerian Government in the promotion of local sorghum processing.
How to reaffirm that the State and public institutions have their part to play in support of producers in innovation in a complementary and synergistic approach with the private sector as well as for the creation of a favourable economic environment?

5. Conclusion

This analysis demonstrates that in order to "*create a green revolution through the accelerated wide-spread use of agricultural innovation"*, there is a need to go beyond the recriminations made with regard to research and extension institutions. Thus, an upstream and downstream enabling production environment seems ever more crucial. However, the analysis reveals that the creation of this economic environment requires not just simple political will but in particular a vision and commitment with concrete actions and decisions. This is the main challenge facing policy decision-makers at the national and regional levels.
Although in some cases there seems a long way to go for such political commitment to emerge, the analysis reveals that it is possible to undertake other actions in order to accelerate the use of agricultural innovation.
This constitutes at the same time calling upon research-development (R&D) institutions to give priority to the analyses presented as simple messages facilitating decision-making and action by policy decision-makers. These analyses should demonstrate the interest of setting up an enabling environment to invest in agricultural innovation.