

Inventory and characterization of technological agricultural innovations developed and promoted in Benin from 1996 to 2016

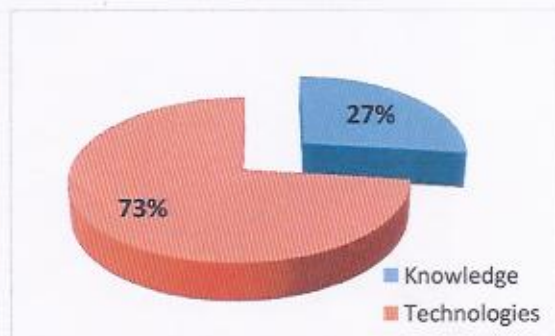
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- In the last 20 years, Technical and Financial Partners (TFP) have supported research and extension in Benin, by promoting many innovations, which according to Ahoyo Adjovi *et al.*, (2013), are widely perceived as the ultimate option to curb agricultural crises in poor countries. They are one of the main means to gain a competitive advantage by meeting the needs of the market or users. Innovations bring together technologies and knowledge which are various with very interesting effects. The present policy brief presents a view of promising innovations developed by the National Agricultural Research System (NARS) in Benin these two decades.

Part 1: Overview of innovations generated

The inventory of knowledge and technologies developed by Benin's National Agricultural Research System (NARS) reveals a total of 609 innovations generated between 1996 and 2016



including 445 technologies (73.07%) and 164 knowledge (26.93%), as showed in the figure 1.

Figure 1: Technologies and knowledge developed these last 20 years in Benin

Agricultural areas concerned by technologies development

Interests of the national innovations systems in agricultural goods, evolved unevenly in time and from one sub-sector to another.

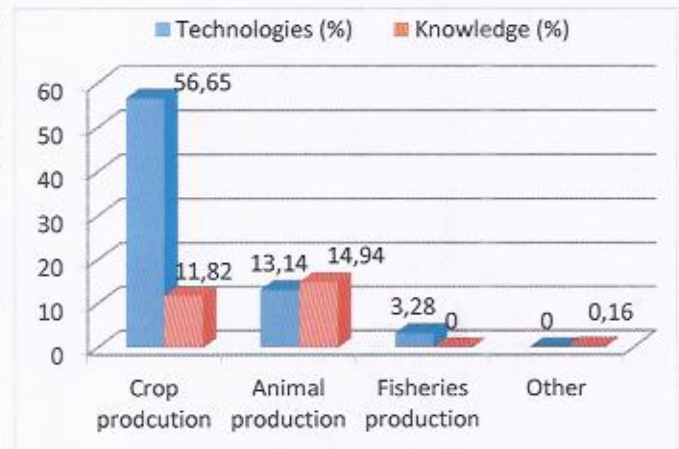


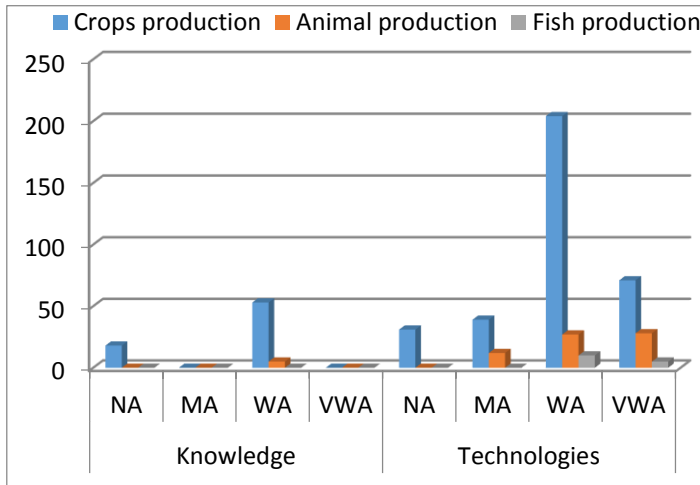
Figure 2: Technologies and knowledge developed by sub sectors these last 20 years in Benin

Crop production is the most heavily covered sub-sector with 345 technologies and 72 knowledge. It was followed by animal production sub-sector with 81 technologies and 91 knowledge. The fisheries with 20 technologies and 0 knowledge is sector the least investigated sub-sector in terms of technology and knowledge. Although, the number of technologies promoted is relatively lower here, the content of the packages is quite rich and diverse as found previously by Ahoyo Adjovi *et al.*, (2013). Being a flagship domain of government, advanced studies must be initiated to lead to the development of appropriate technologies to promote the fisheries sub-sector in Benin. A real interest was also given to the sustainable management of soils with the assumption that the adoption of those technologies will increase the yields (Adégbola *et al.*, 2016).



Crops productions remain the mains area concerned by the technologies and knowledge developed those 20 years in Benin

Perception of effects of innovations by users



Legend: NA: No Appreciated ; MA: Middle Appreciated ; WA: Well Appreciated ; VWA: Very Well Appreciated

According to the graph of the figure 3 the innovations were globally appreciated by users. The most technologies and knowledge with goods appreciations were recorded in crops production subsectors followed by breeding and finally fish production subsector. This level of apperception of the innovation by ten users is really in accordance with the number of technologies and knowledge developed and published.

Figure 3: Level of appreciation of innovations by users

Part 2: Promising technologies: selection criteria's and characteristics

The study has showed that 57.75% that means 257 technologies generated were considered as promising. Several criteria were defined to select those promising technologies. In fact, the technology must:

- have reached the whole third steps of technologies development ;
- be easily applicable and usable by users ;
- meet user's needs ;
- be able to provide positives effects in term of productivity and beneficiaries income improvement ;
- be less investments for their adoption.

Crops production remains the most heavily covered area (80%), followed by animal production (14%) and fish production (6%).

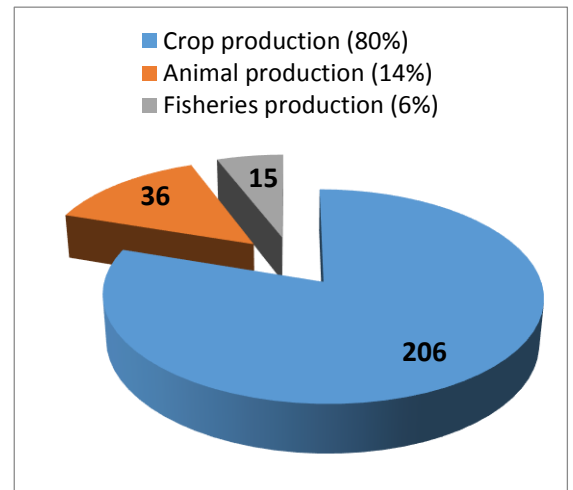


Figure 4: Number of promising technologies developed by sub-sector these last 20 years in Benin

With the existing gap between capacity building need and innovations already available, TFP are called to strengthen their contributions to improve national innovation system functioning

Unequal distribution of promising technologies through the decades

As showed by the graph on figure 5, the number of promising technologies generated evolves saw-toothed from 1996 to 2016. The best numbers are recorded in 2000 and 2014. On the other hand, 1997 and 2007 years show the low numbers of promising technologies generated during the period.

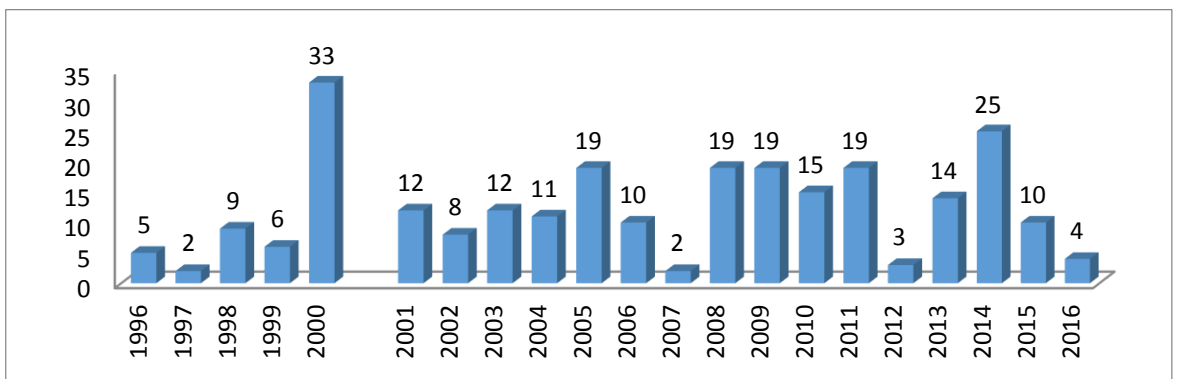
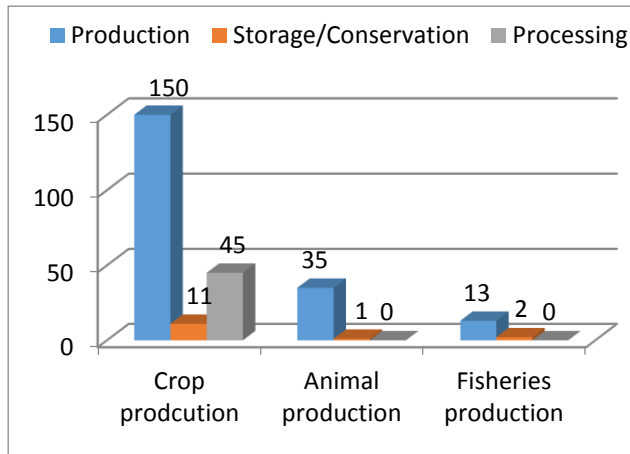


Figure 5: Number of promising technologies developed these last 20 years in Benin

At the macroeconomic level, publics' stockholders and also the technical and Financial Partners are also a real potentials users of technologies and knowledge, for their decisions making

Promising technologies generated by links for each sub-sector



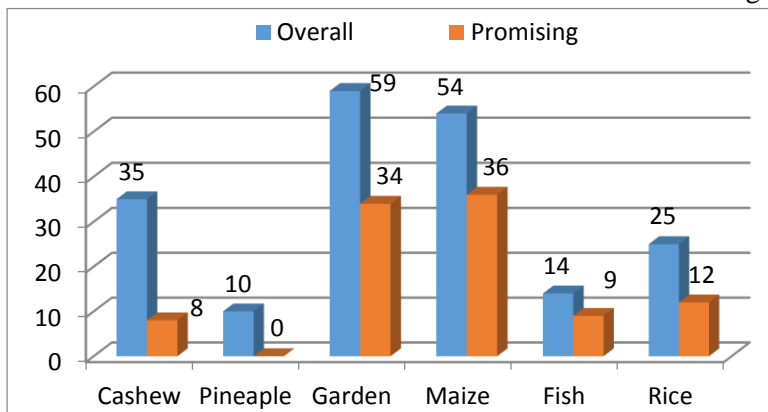
The production link gathers the most of promising technologies (77.04%) considering the three areas. The transformation link follows (17.51%) and finally the storage/conservation link (5.45%).

In recent years there has been a significant development of processing technologies to address storage / conservation issues and to create added value.

Figure 6: Number of promising technologies developed for each links and areas these last 20 years in Benin

Promising technologies generated by main agricultural fields

Six headlights agricultural fields represent a priority for the current government.



Maize, vegetable crops (garden) and rice lead the way in terms of the number of promising technologies (Figure 7). The pineapple is the least with none promising among the ten technologies found in this field.

Although the relative sector plays an important role for Benin economy with its third rank among exports crops, it remains several constraints as unavailability of safe and productive seeds and specific fertilizers.

Figure 7: Number of promising technologies developed by headlights fields these last 20 years in Benin

There are many (61.78%) technologies developed those 20 years in Benin that reach the level of extension in their development process.

Level of development/extension of promising technologies

The development and the diffusion process of technologies are done through various steps such as: (i) Pre-extension; (ii) extension; (ii) experimentation in real environment under farmer management. The analysis reveals that the major part of promising technologies have gone into extension (61.87%), followed respectively by farm-based technologies under farm management (21.01%), and pre-extension (17.12%) (Figure 8). However there is a lack about the precious information related to technologies and research results found in reports which are not really edited and published (Adegbola *et al.*, 2012).

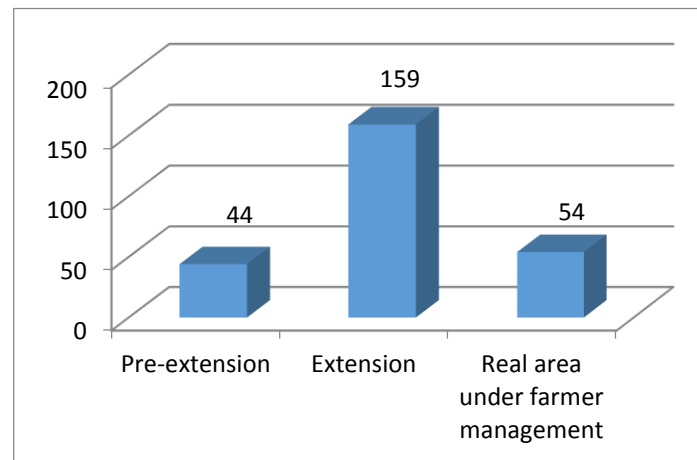
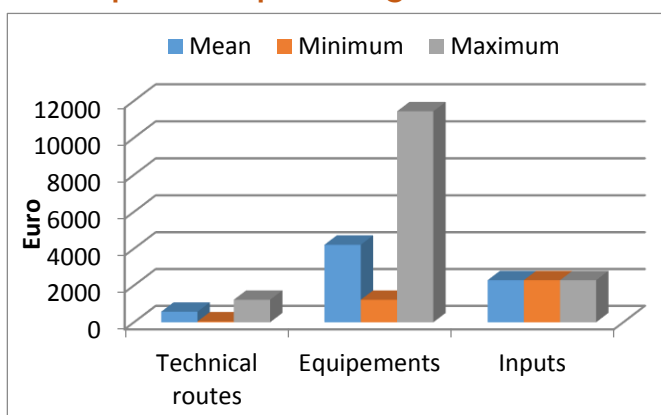


Figure 8: Number of promising technologies by level of development

A repertory of technologies in order to provide quick and useful information for further users was made by INRAB.

This initiative is going to be followed by an online system which should be set up and be reachable for the whole NSAR entities in order to refresh periodically the data base.

Initial investment cost for the development of promising



As showed by the figure 9, technologies development requires several costs that had evolved through the years. These costs are not the same in different cases according to the nature of technologies considered. Along the related period, investments were almost focused on equipment's technologies. The investment in inputs follows and after by technical routes with very low investment rate.

Figure 9: Initial investment coast in promising technologies

Source: Adégbola *et al.*, 2015



Figure 10: A woman in admiration of cooked stove manufactured by INRAB

The main beneficiaries of innovations are the final users such as seed producers, farmers, breeders, fish producers, processors, exporter, traders, small and middles enterprises in agriculture and agribusiness, equipments manufacturers, professional organizations, etc. NGOs and extensions services are actives in the diffusion of those innovations. The women specificity is usually taking account in the innovation process. Crops production remains the main area on which the number of innovations is abundant, followed by animal and later by fish production.

Added to this policy brief, INRAB has made a repertory of those technologies in order to provide quick and useful information for further users. It is waiting from all actors mainly from Technical and Financial Partners and Government to strengthen INRAB and the National System of Agricultural Research in the way of innovations generation. There are many fields which remain capitals for Benin's economy and food security, but which are still inefficacies because of many weakness and threats.

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