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Policy Brief

Scaling-Up Promising Post-Harvest Technologies by Implementing Cost-Effective Policy Actions in the National Agricultural Policy Framework (PSRSA) in Benin

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SIX MAIN LESSONS

1. Post-harvest losses (PHLs) have driven a great deal of research and projects in the field over the last three decades in Benin. However, the adoption of technologies and innovations by smallholder farmers remains low due to many institutional bottlenecks, financial constraints tied to dependency on donor funds, little consideration for the needs and economic conditions of farmers, and low commitment of government to address PHLs as an urgent national issue.

2. A technology prioritization study should be undertaken in order to prepare a broad agenda for addressing PHLs at all levels of agricultural value chains, with differential intervention strategies aimed at smallholder farmers and women, on the one hand, and large-scale farmers and traders of grains and pulses, on the other.

3. There is a need to move the national agricultural policy framework (PSRSA) from a paper commitment to a more focused and result-oriented implementation. To have a greater impact on beneficiaries, the PSRSA post-harvest management (PHM) components must be effectively realized.

4. Within the framework of the creation of the national fund for agricultural development (FNDA), a clear budget line should be devoted to PHM-supporting credit, with the aim of stimulating innovation and increasing smallholder farmers and entrepreneurs' access to PHM equipment.

5. A holistic approach on food and nutrition issues should be adopted to make good use of domestic resources and foreign aid for relevant PHM interventions that can seriously impact on the livelihoods of farmers. The National Council for Food and Nutrition (CAN) should advocate for this while leading the implementation of the PHM component of the PSRSA. The most promising PHM technologies should be identified, and policy interventions should be implemented, to foster a larger adoption among smallholder farmers and small- and medium-scale food enterprises.

6. Training on value-chain management and market development will be crucial to efficiently address PHM concerns in Benin. Farmers should be prepared to share the costs of agricultural extension, as they are the primary beneficiaries of farm outputs. They should articulate their needs to research and extension institutions and advocate for their interests with policy-makers. PHM innovation platforms would need to be set up in each region of the country, with their national apex organization located at the 'Programme de Technologies Agricoles et Alimentaires (PTAA).

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INTRODUCTION

Research at the global level has shown that halving losses and waste along the food value-chain would save food resources equivalent to 25% of current agricultural production[i]. The level of PHLs in Sub-Saharan Africa (SSA) is comparable to a devastating disease, ignored by the victims themselves. Indeed, although PHLs are silently compromising farmers' food security and development, most of them pay little attention to the phenomenon, either despairing of acquiring affordable technologies to address it or by accepting it as fate of nature. PHLs continuously weaken the capacity of farmers to keep the food produced for their survival, and to accumulate revenues needed to reduce poverty and improve their livelihoods. While agricultural productivity is low in SSA and has not substantially increased over the last 20 years[ii], post-harvest loss of grains and pulses are estimated at about 14% of production, and valued up to US$4 billion, which is enough to feed 48 million people[iii]. Technologies to address them are specific to the various stages in the value chain, and their adoption will depend, inter alia, on their ability to save labour and to preserve or improve food quality. This concern is particularly expressed by women, who are involved in many stages of the food value-chain, especially in crop harvesting, food processing and trade. Unfortunately, little attention has been paid to women's demand for labour-saving technologies and food quality that take into account local culture and related food habits.

This policy brief will highlight the importance of PHLs and the main constraints to the adoption of PHM technologies followed by a discussion on scaling-up promising technologies.

Finally, recommendations are made for improving PHM-related policies in Benin. In particular, emphasis is put on how the "Plan Stratégique de Relance du Secteur Agricole – PSRSA" (Strategic Plan for Reviving the Agricultural Sector), which now functions as the national agricultural policy framework, could be more effective in promoting these technologies.

Post-harvest losses and constraints to the adoption of PHM technologies and innovations

Over the period 1980-2005, the annual growth rate of cereal yields and per capita production was about 2-2.5%, which is below the population growth (3%)[iv]. PHLs on cereals (especially maize) and pulses are estimated to be 15% and 30%, due to precarious and archaic storage conditions[v]. As a result, food deficits are high in most areas of the country, averaging 28.3% of food production (maize, yams, cassava, beans, and groundnuts)[vi]. Rice production covered only 10-15% of its demand in 2002, and this figure will double by 2015[vii]. Like other cotton producing countries in West Africa, Benin is a net importer of cereals. In 2008-2010, rice imports in Benin were 80% of total cereal imports but only 17.1% of cereal consumption[viii]. It is, therefore, a real concern that every year the country loses about a third of local cereal harvests when production is already low. By urgently increasing crop production and combating PHLs, the country's food dependency, as well as its and malnutrition rate, should be rapidly reduced.

Although many technologies have been designed and disseminated to reduce PHLs, the adoption rate has remained low and has not been sustained after the end of donor-funded projects. The reasons for this are not only the lack of funds or non-adaptation of some technologies to local conditions, but mostly the lack of political will to alleviate the burden of donor dependency in policy design and implementation. There is urgent need to address underlying constraints, and to promote the most promising technologies by means of energetic policy actions. A cost-effective implementation of post-harvest management components of the national agricultural policy framework (PSRSA) is urgently required.

[5] The proportion of children below 5 living with delayed growth increased from 30% in 1996-2001 to 45% in 2007-2011 (cf. Honfoga, B.G., Ntandou-Bonzitou, G. & Vodouhè, R.S., 2013. Politiques de sécurité alimentaire au Bénin 1990-2010: Effets sur l'alimentation et la nutrition des pauvres. Communication présentée au Séminaire National Universitaire en matière de Sécurité Alimentaire, Université d'Abomey-Calavi, Bénin).

The reasons for the low adoption rates of PHM technologies and innovations are two-fold:

(i) ***Low response of proposed technologies to the needs of smallholder farmers*, stemming from high cost, low relevance and non-availability of those technologies.**

There are a few technologies that adequately address the food processing stage of food value-chains, where food losses mostly occur. For example, in Southeast Asia village milling accounts for 20-30% of weight losses in traditional post-harvest operations, while commercial milling represents 5-30% of weight losses in mechanized post-harvest[ix] processes. However, in Benin women's constraints in this respect are often overlooked, and consumers' tastes and preferences, which are mostly rooted in cultures and food habits, are largely ignored by 'improved technologies'. Most of these technological solutions are out of reach of the majority of farmers due to high procurement costs and low adaptability to household grain storage and processing traditions. The lack of a purposeful training programme for farmers is an overarching limitation to bridging the gap between these traditions and the requirements for profitability, which would trigger the propensity of adoption and long-term use of technologies by smallholder farmers.

(ii) ***Low PHM-research uptake in agricultural policies* due to low dissemination of available technologies among farmers, low demand from decision-makers for PHM knowledge and products, and the absence of an exchange platform on food and nutrition issues.**

Technology dissemination is often absent in annual budgets of research institutions, reflecting a lack of practical and user-oriented perspectives in policy research. Interaction between researchers, senior extension agents, policy makers and the media is poor and the work that is done by renowned scientists and innovators (champions) is rarely recognized or acknowledged. As a result, many eminent researchers have become frustrated with designing research agendas that are truly responsive to the country's needs for useful technologies and innovations.

The quest for obtaining spot donor funds has often led the Ministry of Agriculture (MAEP) to make hasty decisions on project design and implementation. Although some feasibility studies might be commissioned for large-scale interventions, findings are sometimes overlooked for the sake of accessing donor funds for a specified period. This explains decision-makers' low interest and uptake of research findings. In addition, the competencies available in other ministries dealing with food issues are rarely engaged. This lack of a holistic approach to food and nutrition issues has led to scattered, poorly coordinated and foreign aid-dependent PHM interventions pertaining to low-impact policies. The National Council for Food and Nutrition (CAN) was created in 2012 to address this problem. A useful contribution to this effort would be to identify promising PHM technologies that are worth policy interventions for wide-spread adoption by smallholder farmers and small- and medium-scale food enterprises.

[6] SPVCP/DAGRI, 1989/90.
[7] Reported by Fandohan (1999). INRAB research project reports.

Scaling-up promising technologies and/innovations through cost-effective extension and policy actions

Many PHM research and development projects have been implemented in Benin over the last two decades[x]. They have dealt with (a) the identification and dissemination of different storage technologies (silo, warehouse, bags, etc.) and grain conservation methods (biological control, traditional and chemical insecticides), (b) equipment to reduce time consuming activities related to post-harvest processes (thresher, sheller, etc.), (c) enhancement of grain processing methods, (d) control of grain quality and (e) promotion of the 'warrantage' system[xi]. Most of these projects were focused on storage techniques and grain conservation. Very few dealt with food processing, which is key among PHM techniques for grain.

Out of the existing technologies available, the most promising ones, which are appropriate for the smallholder farmers and for large-scale farmers and merchants respectively, are:

- Technologies with potential for high impacts on the smallholder farming sector:
  1. The Purdue Improved Cowpea Storage (PICS) bag. Economic evaluations pointed out a net benefit estimated at 96.6 %[xii]. Local manufacturing of these bags should be promoted with attractive fiscal provisions.
  2. The improved storage-hut: these have been successfully implemented in many countries; they are efficient for maize storage and conservation[6]. Attention should be paid to farmers needs for in-compound storage as opposed to the open-air, highly visible facilities that have been installed on farms. Indeed, smallholder farmers specifically want storage systems that are not visible to the public.
  3. The bamboo-made improved storage-hut for maize storage: this is a circular storage-hut, height >3m, long-lasting (8 years), and very efficient for maize storage[7]. For sustainability, community agroforestry strategies should promote the growing of bamboo tree species in order to make quality raw material available at affordable prices for local storage-hut craftsmen.
  4. Application of chemical pesticides, such as Actellic CE, Sofagrain, and K-Othrine CE for large-scale maize storage: as far as local tastes and food preferences are concerned, grains for home consumption should be distinguished from grains for commercial exports, and adequate attention should be paid to bio-concerns.

- Technologies with potential for high impacts on the large-scale farming sector:
  1. Locally made maize thresher « Aziza » (Cobemag, CFTS, and APROMAH)[8]: this thresher has a capacity of processing more than 2 tonnes per hour, with a minimum broken grain rate of 0.9%.
  2. Banco-wall improved maize storage-hut: this hut has a strong structure and is resistant to the weather, making it long-lasting. This storage-hut should be accompanied with a user guide for construction and use[9].

Benin will not need to start from scratch to cost-effectively address grain post-harvest losses. However, serious challenges still remain. Political will and better informed policy decisions and interventions are required, for example by strengthening PHM-specialized extension services and implementing demand-driven projects in farmers' fields. Greater attention should be paid to regional climate specificities and market outlets, especially in meeting the needs of trans-border trade. There is a need to move the national agricultural policy framework (PSRSA) from a paper commitment to more focused PHM interventions for effective development of the food sector in Benin.