FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Pigeonpea's Rapid Expansion and USAID's Feed the Future Program in Mozambique

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Introduction

The purpose of this brief is to draw implications about the expansion of pigeonpea in Mozambique for the United States Agency for International Development (USAID) Mission's Investment in its flagship agricultural program, the United States Government's Feed the Future (FtF) initiative. Rapid growth in pigeonpea production is described and analyzed in a companion report by Walker et al., 2015.[1] The emerging success story of increased pigeonpea production by smallholders does not imply a significant departure from the way that FtF does business. The implications are transparent, and the proposed interventions are straightforward.

[1] Walker, T., Silim, S., Cunguara, B., Donovan, C., Parthasarthy Rao, P., Amane, M., and M. Siambi. 2015. Pigeonpea in Mozambique: An emerging success story of crop expansion in smallholder agriculture. Research Paper # 78E. Maputo, Mozambique: Directorate of Economics, Ministry of Agriculture and Food Security.

Summarizing the major findings relevant to pigeonpea's expansion in Mozambique

An analysis of seven years of nationally and provincially representative rural survey data from 2002 to 2012 and an assessment of pulse production and consumption in India gave the following major results:

1. Pigeonpea production has increased significantly faster than any of the 12 food crops continuously monitored in the USAID-supported National Agricultural Survey in Mozambique Rural surveys. Robust growth in production at 8% per annum has made pigeonpea potentially more important to the Mozambican small- and medium-sized holder sector than any other crop except for maize and cassava, the major staple food crops. By 2012, more one million rural households were producing pigeonpea on about 250,000 hectares rivaling groundnut and rice in economic importance. Globally, Mozambique was the 5th largest producer of pigeonpea and the 3rd leading exporter of the crop in 2014.

2. More households cultivating pigeonpea has been the dominant force driving increasing pigeonpea production in Mozambique. Increasing area per growing household is a secondary driver. Rising productivity has not figured prominently in the expansion of

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production. Even with negligible inputs, pigeonpea is one of the most stable-yielding crops in the smallholder sector in Mozambique. This extensification strategy suits Mozambican production conditions of relative land abundance.

3. Rising import demand from India was the dominant source of growth in pigeonpea production in Mozambique. In 2014, India imported 300 consignments from Mozambique equivalent to 60,000 metric tons valued at about 40 million USD. Although per capita consumption of pulses is declining in India, both the value and volume of pulse imports is increasing. The gap between domestic consumption and production is widening. By 2025, import demand for pigeonpea is projected to double from its current level of 0.5 to 1.0 million metric tons.

4. About 95% of total imports of pigeonpea into India in 2014 were in the form of raw, whole pigeonpea; only 5% were split (processed). All of the principal exporters including Myanmar, Tanzania, Malawi, and Mozambique exported small amounts of split pigeonpea to India in 2014. The import market for India will continue to be dominated by whole grain exports for many years to come. As evidenced a low unit value premium for split pigeonpea, processing in the export countries does not appear to be competitive to dehulling and splitting pigeonpea in India.

5. Tanzania is now and will be into the foreseeable future Mozambique's main export competitor. The bulk of African pigeonpea exports to India occur from September to January prior to the harvest of India's rainy-season crop. The availability of African production is synchronous with the seasonal incidence of high prices in the Indian market. Exports from September to December fetched a high price premium of at least US$150 per metric ton compared to the seasonal low price in February in 2014. Price premia for quality are substantially smaller than seasonal differences.

Making the case for an expanding role for pigeonpea in USAID's investment in Feed the Future

The expansion of pigeonpea in Mozambique fits squarely into USAID's FtF strategy. It responds directly to the program's first objective of inclusive agricultural growth. Indeed, it is hard to think of an example of inclusive agricultural growth in Mozambique that is more apt than pigeonpea's expansion, which has been fueled by burgeoning numbers of small farm households growing the crop. Income from pigeonpea sales is prized by farmers in July through September during the height of the dry season when food insecurity can take a heavy toll on human nutrition.

The emphasis in the FtF Program on the involvement of the private-sector in agricultural development coincides with pigeonpea's growth narrative that has been driven by export demand. Private-sector participation by the Export Trading Group (ETG) and other trading companies opens up opportunities to leverage new private-sector investment, via FtF, to widen and deepen sustainable pigeonpea exports in Mozambique. The geographic focus on the Nacala and Beira Corridors is also conducive to the assembly of output and subsequent export.

Most importantly, the Mission's FtF Zone of Influence includes many mid-altitude districts that are highly suitable for pigeonpea production, namely in Zambezia, Nampula, and Manica provinces. Pigeonpea looms large in the 35 districts encompassing FtF's Zone of Influence (Payongayong, 2013).[2] At 52%, it ranked third in terms of incidence of farmer households growing the crop (behind cowpea (53%) and maize (74%)) among 13 food crops in FtF's Zone of Influence in 2011/12. Pigeonpea was third in mean production of households producing the crop, second in sales volume per

[2] E. Payongayong. 2012. Report on the Implementation of the Gross Margins Survey of 2012, MSU, Maputo, Mozambique. 23 pages.

household, second in total production, and third in total area. Pigeonpea ranked fourth in yield and fourth in the size of yield advantage between households receiving interventions and households in the general population that were not members of an association. Pigeonpea productivity was 20% higher in Agrifuturo and Multi-Year Assistance Program (MYAP) households compared to those in the Zone of Influence in the national rural household income survey in 2011/12.

With the exception of Swiss Agency for Development and Cooperation's smallish seed investment in Innovation for Agribusiness (INOVAGRO), the expansion of pigeonpea and its development-related possibilities have largely escaped the attention of donors other than USAID. Unlike soybean, donors, such as the Bill and Melinda Gates Foundation (BMGF) and Norwegian Agency for Development Cooperation (NORAD), have not targeted support for commodity-oriented research and development on pigeonpea in Mozambique. USAID has contributed to improved varietal change in pigeonpea in the 2000s through its support of WorldVision in Zambezia and other MYAPs, National Agricultural Research Center in Mozambique (IIAM), and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and, most recently, via its investment in Platform for Agricultural Research and Technology Innovation (PARTI). Greater allocation of resources on pigeonpea in Mission's FtF program would build on those earlier investments and would be carried out in an environment of few if any other institutional suppliers of funds. Institutional attribution to USAID would be more transparent than in most other crop-related activities in FtF.

Two other aspects related to donor support help to strengthen the case for selective investment by FtF to fortify Mozambique's competitiveness in pigeonpea exports. In principle, export crops should not require much if any selective investment from the public sector or from donors. It is in the self-interest of producer associations and groups to finance their own research, extension, and seed production of export crops. In practice, there will be few if any large-scale producer associations of pigeonpea in Mozambique emerging in the near to medium-term future because pigeonpea is still very much a secondary food cum cash crop that is not amenable to large-scale monocultural production for reasons that are detailed in Walker et al. 2015. Producers in 2012 with more than one hectare of area sown to pigeonpea were rare. No producers exceeded three hectares of planted area in the national agricultural survey of smallholder and medium-sized farm households.

Additionally, pigeonpea is a crop that has been difficult to intensify. Productivity per hectare has not changed significantly in India since 1960. Yields in Myanmar, the most productive major global producer, only approach 1.4 metric tons per hectare. Both the nature of production and the lack of potential for rapid intensification reinforce the case for continued public-sector support by the Government of Mozambique and its donor partners. Medium- and large-scale producers cannot be relied on to drive exports.

Other competing countries with donor support have invested more heavily in pigeonpea research and development than has Mozambique. For example, in Phase 1 of the Bill and Melinda Gates Foundation's Tropical Legumes Project, production of breeder's, foundation, and certified seed approached 200 metric tons in Malawi and 300 metric tons in Tanzania from 2008 through 2010. Mozambique was not a priority country for pigeonpea in BMGF-funded projects Tropical Legumes I and II. In the future, it will be more difficult for Mozambique to compete with Tanzania and even the Sudan, an emerging exporter, unless the past environment of benign neglect is redressed. In particular, production of pre-basic or breeder's seed has lagged way behind other crops in Mozambique and other pigeonpea-

producing countries in the region. If means cannot be found to produce breeder's seed in Mozambique, it will be necessary to expand imports of pre-basic seed from Malawi because the opportunity cost of not planting the new earlier medium-duration varieties is potentially very high in terms of foregone productivity.

Implicitly, Mozambique is characterized by an extensification strategy for exports of pigeonpea. Although benefits per producer and yields are low, the number of farmers and hectares affected is high. Therefore, investing in pigeonpea seed and extension can have a large impact on two important FtF Indicators: farmers and hectares. For example, under current average conditions, an investment that produces 100 metric tons of foundation seed has the potential to reach 20,000 farmers on 8,000 hectares. Pigeonpea has a very high participation rate in terms of number of farmers who potentially can and are growing the crop in response to attractive market prices and also has a high multiplication ratio (output:seed) for a pulse crop.

Lastly and most importantly, selective investments that simulate pigeonpea production will not result in a decrease in the price farmers receive for pigeonpea because export demand is elastic. India is a very large market; Mozambique is a relatively small producer. Successful investments will help to maintain and increase Mozambique's market share. Unlike most other crop-related activities in the FtF portfolio, demand is assured and not a concern in the foreseeable future.

Identifying selective Investment options for the FtF Program

Mozambique's export competitiveness hinges on continuing public-sector investments in road and market infrastructure and selective investments in seed supply and decentralized extension activities.

For FtF, the rapid expansion of pigeonpea underscores the need for two simple and straightforward interventions. First, seed availability of the new medium-duration varieties ICEAP 00554 and 00557, released in 2011, should be markedly increased and distributed to farmers in the FtF priority districts. These shorter-duration varieties have the capacity to escape terminal drought and can increase productivity by several hundred kilograms per hectare. At a minimum, 20-40 metric tons of breeder's seed is needed annually to fill Mozambique's competitive profile in pigeonpea production. The current miniscule amounts of pre-basic and foundation seed production will not even be sufficient to maintain the status quo.

International Agricultural Research Centers and other FtF partners are experienced in the design of cost-effective seed schemes that are suitable for pigeonpea. The new varieties do not require any change in crop management practices. Nor are they vulnerable to new sources of risk or crop loss. Intensive extension approaches, such as Farmer Field Schools, are not required. What is needed is rigorous monitoring of any seed scheme that intends to generate two to three hundred metric tons of certified seed in a two to four year period. Because the market is assured, seed needs to be sold above the prevailing export price, otherwise it runs the risk of being stored and re-exported later in the season even in lots as small as 5 kgs. The varietal demand for seed warrants a routine annual assessment in targeted villages and in neighboring, outlying areas.

Secondly, the vast majority of farmers in the FtF priority districts should have access to information on how to sow pigeonpea as a row intercrop with maize during the planting season and on market prices for pigeonpea during the long period of seasonal exports beginning in May and ending in January. Production of timely new extension materials, including farmer leaflets and radio messages, and the conduct of demonstration trials in mid-altitude sub-regions of higher production potential should be sufficient to reinforce agronomic activities relevant for sustaining pigeonpea's market-oriented expansion. Demonstration

plots should not be based on sole-cropping of pigeonpea in monoculture which has limited prospects for success. Rather farmers should be introduced to the new earlier medium-duration varieties via maize/pigeonpea row intercrops that make efficient use of available resources and imply only small changes in their current cropping systems.

The absence of transparent quality premia in exports make for fuzzy value chains value chains with no clarity on grain quality that could better inform the grading and handling by farmers to obtain better value. Moreover, traders do not provide information on when the buying season will start and at what prices to help the farmer plan their activities better. More market research and linking farmers to markets is required so that no one buyer is dominant.

Farmers should be thoroughly aware of the profitability of growing pigeonpea without the need for hardly any investment other than seed and their family labor in sowing, weeding, and harvesting. In that regard, the FtF program should be able to capitalize on USAID's long-standing investment in Agricultural Market Systems (SIMA), the market information wing of the Ministry of Agriculture, to assist in the broadcast of weekly pigeonpea prices in the main markets of the FtF priority districts.

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