

Poverty and Social Impact Analysis of the Integrated Support Programme for Arable Agriculture Development in Botswana



Poverty-Environment Initiative Botswana



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Poverty and Social Impact Analysis of the Integrated Support Programme for Arable Agriculture Development in Botswana

Marumo D.S., Tselaesele N.M., Batlang U., Nthoiwa G and Jansen, R.ⁱ

ABSTRACT: Poverty incidence in Botswana is estimated at 19.3%, with rural absolute poverty at 8.4% of which one-third of household heads works on their own arable lands or cattle posts. Smallholder farming is the dominant livelihood activity in the rural areas, and a substantial source of food, employment and income. However, agriculture accounts for less than 2% of overall GDP. The Government of Botswana initiated the Integrated Support Programme for Arable Agriculture Development (ISPAAD) in 2008 to support and develop the agriculture sector by enhancing the farmers' access to essential inputs which include seeds, fertilizer, draught power, credit, cluster fencing, potable water and agricultural services. This paper assesses the performance of ISPAAD vis-à-vis its objectives and evaluates the poverty and socio-economic impacts of the programme. A total of 48 focus group discussions and 2,218 individual interviews were conducted with randomly selected ISPAAD beneficiaries from 30 extension areas and 13 sub-districts from all of the 10 agricultural districts in the country. Findings revealed that ISPAAD is not means-tested but rather universally accessible. About 27% of farmers in ISPAAD were over 65 years while the majority (63.3%) of the beneficiaries were over the age of 50. Only 7.7 % were youths aged 18-29 years. About 65% attained primary education or lower while 60% of the beneficiaries were women. The majority of ISPAAD beneficiaries (80%) earned incomes below the Poverty Datum Line (PDL). However, given that ISPAAD has not been able to increase grain production and yields, these individuals and households remain food insecure. ISPAAD, on its own, is not likely to alleviate these vulnerable groups from poverty. The stated objectives and service packages of ISPAAD seem desirable from an agricultural development point of view but the execution and outcomes of the programme have failed to achieve the intended objectives. ISPAAD has no programme design document with clearly specified outcomes, outputs, activities, inputs and assumptions of the programme. There are no objectively verifiable indicators, means of verification and assumptions indicating how the expected outcomes and outputs will be achieved, and there is no monitoring and evaluation framework. ISPAAD in its current form is not viable nor sustainable. The net present value (NPV) of benefits which accrued from ISPAAD operations is negative while the Benefit-Cost Ratio (BCR) was calculated at 0.6. However, the programme could be greatly improved by changing or fine tuning its design and benefit packages to make it more targeted, efficient and sustainable.

KEY WORDS: poverty - poverty and social impact analysis – PSIA – ISPAAD - agricultural development - input subsidy - agricultural service centres – Botswana - poverty-environment linkages – poverty eradication.

Introduction

Botswana is an upper middle income country with a human development index value of 0.63 (UNDP, 2013). Poverty incidence in the country (in 2009/10) is estimated at 19.3%, with rural absolute poverty at 8.4%; and high inequality with a disposable after-tax cash income Gini of 0.75 in rural areas (Statistics Botswana, BCWIS 2013). Agriculture accounts for less than 2% of overall GDP. The sector's contribution to GDP is low due to growth of other sectors, particularly mining sector, stagnant agricultural productivity, the semi-arid climate, low input use, poor uptake of agricultural technologies, limited use of mechanisation, land degradation, and lack of infrastructure and water in arable lands. The Government of Botswana introduced the Integrated Support Programme for Arable Agriculture Development (ISPAAD) to address the challenges facing rain-fed agriculture and horticulture. ISPAAD is implemented by the Department of Crop

Production in the Ministry of Agriculture. The Poverty and Social Impact Analysis of ISPAAD, undertaken under the auspices of the Poverty-Environment Initiative (PEI) in Botswana, focused on the rain-fed arable agriculture component. The ISPAAD agriculture development objectives are; (1) to increase grain production, (2) to promote food security at the household and national levels, (3) to commercialize agriculture through mechanization, (4) to facilitate access to farm inputs and credit, and (5) to improve agricultural extension outreach.

ISPAAD

ISPAAD offers several service packages to arable farmers who are 18 years and above. The packages include; free seeds of open pollinated varieties of major grain (maize, sorghum, millet, and cowpeas) and fodder crops (lablab), free fertilizer, draught power to plant a maximum of sixteen – hectares (packages required in excess of this are provided at

50% subsidy). Furthermore, the Government established Agricultural Service Centres (ASCs) across the country to assist farmers to plough, harrow, and row plant a maximum of 5ha for free. Excess up to 16 ha is provided at 50% subsidy. The ASCs rent out machinery and associated implements to farmers. They also provide skills and knowledge in the acquisition, proper utilization and maintenance of farm machinery and associated implements (MoA, undated). The Government also provides free goat proof cluster fences to arable farmers with cluster fields measuring 150ha - 3500ha. These enclosed cluster drift fences may be electrified in areas prone to crop damage by elephants.

ISPAAD includes a provision for free potable water for arable production clusters. Where possible, the programme could drill and/or equip boreholes, or purchase and equip existing boreholes, in order to provide free domestic water to the arable clusters. Maintenance of the cluster fences and the operations and maintenance of the boreholes is the responsibility of the cluster management committees.

Finally, ISPAAD facilitates access to seasonal loans by arable farmers by subsidizing interest rates through the National Development Bank (NDB). This credit facility covers agricultural inputs such as seeds, fertilizers, diesel, pesticides, farm machinery and implements repairs and maintenance, labour costs for planting, weeding, bird scaring, harvesting, threshing and packaging and transport costs to the market. NDB provides seasonal loans to farmers at a prime interest rate and claims the difference between prime and market interest rates from the Ministry of Agriculture. Given all these service packages offered to arable farmers under ISPAAD, small scale farmers are expected to produce a minimum of 1 ton/ha whereas commercial farmers should average at least 2.5 tons/ha of cereal grains.

The objectives of this paper are to assess the performance of ISPAAD *vis-à-vis* its objectives and evaluate the poverty and socio-economic impacts of the programme. Against this background the paper assesses whether the ISPAAD programme improved farm output and productivity by enhancing farmers' access to stated essential inputs and services.

Food security

The major challenge facing much of sub-Saharan Africa is food insecurity among the rural population which depend on agriculture for its livelihood. Clover (2003) indicated that chronic food insecurity in Africa affected 28% of the population or about 200 million people who are affected by malnutrition. Millner (2010) reported that from a total of 925 million people

in the world who were malnourished in 2010, 239 million were from Sub-Saharan Africa, representing the second largest number of malnourished people after Asia and the Pacific. In order to reduce this scenario, the food production will need to nearly double by 2050 in developing countries (IFAD, 2012) including in Sub-Saharan Africa.

The 1996 World Food Summit motivated countries to adopt food security objectives as a priority area in their development plans. For example, Botswana changed the objective of household self-sufficiency in food production to national food security during the seventh National Development Plan (NDP VII) (Ministry of Finance and Development Planning, 1997; Twyman *et. al.* 2004). The implementation of food security activities in Sub-Saharan countries experienced difficulties which related to a large numbers of resource-poor farmers; undeveloped rural credit markets; the small size of land holdings under cultivation; poor infrastructure; high transport costs; regular droughts, conflicts; and high incidences and levels of poverty (Dorward, Chirwa & Jayne, 2010; Clover, 2003; Wiggins & Brooks, 2010).

All these factors severely hamper the capacity of smallholder farmers to achieve food security at household level and thus national food security remains elusive. In order to increase the productive capacity of smallholder farmers, a deliberate effort was taken by various African governments to come up with programmes that would facilitate agricultural input subsidies.

Wiggins & Brooks (2010) indicate that agricultural input subsidies are more attractive than output subsidies because they are a political imperative as they are a visible gesture to rural voters and serve as an instrument of patronage, and they are able to meet a wide range of objectives spanning economic, social and political. They can lead to higher incomes, reduce poverty and improve food security when viewed from economic objectives of stimulation of agricultural production; compensation for high costs of transport; improvement of soil fertility, making inputs affordable to farmers who cannot buy them; allows for learning, adoption of new technologies and innovations; as well as creation of social equity.

In addition, some developing countries spend a large proportion of their resources to develop agriculture because it is an important contributor to their Gross Domestic Product (GDP), foreign exchange earnings and the sector is a major employer of labour (Olawepo, 2011). On the other hand, Wiggins & Brooks (2010) point out that agricultural input subsidies may be ineffective in enhancing the use of inputs and increasing yields. They potentially distort the relative costs of factors of production, leading to

inefficient allocation of inputs, with the subsidized inputs substituted for other factors, and they may be ineffective because of leakages to unintended target groups. Input subsidies may further suppress the development of private suppliers of inputs, take a substantial ratio of the national budget, and, once they have been put in place, they are difficult to remove.

Agricultural subsidies

One of the success stories of agricultural subsidies is the fertilizer and seed subsidy in Malawi. The agricultural input subsidy was introduced against the backdrop of the following situation: about 94% of the population reside in rural areas and the majority of them are poor. The majority of the poor people are food-deficit small-scale farmers who have limited land available for arable agriculture (Dorward, *et.al.* 2008). The continuous planting of maize on the same small piece of land lowered the nutrient capacity of the soil, which in turn affected maize yields and food security (Dorward, 2010). The fertilizer subsidy was introduced in the mid-1970s and briefly suspended in the 1990s out of pressure of the International Monetary Fund's (IMF) structural adjustment initiatives (Dorward, *et.al.*, 2008) which sought to reduce price distortions and promote diversification of the rural economy (Buffie & Atolia, 2009).

However, the Government of Malawi continued to introduce variants of agricultural input subsidies even after the IMF and World Bank structural adjustment initiatives because of the recurrence of droughts which led to food crises and resumption of maize imports. These agricultural input subsidies were variously called, Drought Recovery Input Program (1995); the Starter Pack Program (1998-2000) where fertilizers and hybrid maize seeds were distributed, and the current Agricultural Input Subsidy Program (AISP). The evaluation of the latter programme identified the following impacts: before the implementation of the project in 2005, Malawi experienced a 43% food deficit and three years after, she experienced a 53% food surplus (Denning, *et.al.*, 2009; Millner, 2010). In fact Millner (2010) argued that with that level of food surplus, Malawi achieved the Millennium Development Goal (MDG) of eradicating extreme poverty and hunger.

Dorward, *et.al.*, (2008) indicate that the evaluation of the Agricultural Input Subsidy programme revealed that maize inputs increased; household security improved, and private sector participation increased. The Malawian case is an example of the success of agricultural input subsidies as there was political and economic will to provide the input subsidies even amid resistance from the IMF and World Bank.

PSIA ISPAAD - study methodology

The data for the ISPAAD study were collected between May and July 2012. A multistage sampling procedure was used to select observation units. The agricultural extension area map in each district and sub-district (MoA, 2011) was overlaid with land suitability zones for rain-fed arable production developed by Radcliffe *et al.* (1992). Merging of the two maps created a single map showing agricultural districts / sub-districts / agricultural extension areas and their land suitability zones. All agricultural districts / sub-districts and agricultural extension areas were clustered by land suitability zones to generate 6 clusters and 30 extension areas across the country with varying potential for rain-fed crop production namely: (1) low to very low (Ghanzi and North East), (2) moderate (Kgatleng and Ngwaketse Central), (3) moderately low (Mahalapye and South East), (4) moderately high (Okavango and Chobe), (5) not suitable (Tonota), and (6) unreliable (Kweneng West). In each cluster, 33-40% of the sub-districts were randomly selected for data collection. At sub-district level, 15-20% of the agricultural extension areas were selected, resulting in a total of 30 extension areas selected to represent the country covering all ten agricultural districts.

The study used both primary and secondary data. A combination of four different methods (individual beneficiary interviews, focus group discussions, key informant interviews and personal observations) was used to collect primary data. Primary data was mainly cross-sectional. A total of 48 focus group discussions and 2,218 individual interviews were conducted with randomly selected ISPAAD beneficiaries from the sample of 30 extension areas. A pre-tested structured questionnaire was administered to individual respondents. The questionnaire included several modules and gathered data on attributes such as demographic characteristics, arable land characteristics, and utilization of packages and services centres, adequacy and timeliness of delivery packages, project social and economic impacts. Secondary data on income (poverty), agricultural production and trade, budgets, beneficiaries, and ISPAAD expenditures were obtained from the Ministry of Agriculture, Statistics Botswana, and the Ministry of Finance and Development Planning.

Descriptive statistics were used to analyse the socio-economic characteristics of beneficiaries of the ISPAAD. The Poverty Headcount Ratio Analysis was used to measure the incidence of poverty amongst ISPAAD beneficiaries by comparing average monthly income earned by beneficiaries to the current national poverty datum line. Cost-benefit

analyses were done using the discounted measures of project worth whilst the Estimated Annual Proceeds per Unit of Outlay, the Net Present Value (NPV) and the Benefit-Cost Ratio (BCR) were used to estimate the economic viability of ISPAAD.

Findings

Impact of ISPAAD: poor people, gender, vulnerable groups and youth

ISPAAD is open to all people who have access to a piece of arable land. There is no minimum size of land set except 16 ha which Government has set as the upper limit for the open pollinated seed subsidy. Table 1 reflects that approximately 70 percent of

ISPAAD beneficiaries earned less than P465 a month. The current adjusted national poverty datum line (PDL) for a household of four (4) is P880.29 (Statistics Botswana, 2012). On the basis of this PDL, beneficiaries of ISPAAD are predominantly poor, with approximately 80 percent of the beneficiaries falling below the PDL.

Gender distribution analysis reveals that there were more females than males who participated in ISPAAD in each of the cropping seasons. On average, women constituted 60 % of the ISPAAD beneficiaries in each cropping season for the period 2008 - 2012.

Table 1: Estimated Monthly Income of ISPAAD Beneficiaries

Monthly Income (BWP)	Percentage of Respondents
Less than 465.22	69.7
465.23 – 821.73	10.4
821.74 – 1,410.34	6.4
1,410.35 – 2,893.40	8.5
Greater than 2,893.40	5.0

Age distribution analysis showed that the elderly (mostly women) were the ones who were actively participating in ISPAAD. About 27% of farmers in ISPAAD were over 65 years old while the majority (63.3%) of the beneficiaries were over the age of 50 years. While 27.8% represented adults aged 30-49 years, and only 7.7 % were youths aged 18-29 years. The low participation of youth in dry land arable agriculture is evident and may in the long run negatively affect arable farming and the achievement of ISPAAD objectives, especially regarding food security. If no deliberate effort is undertaken to motivate the youth to move into arable agriculture, an age vacuum will be occur which will affect crop productivity as the already ageing farming population will naturally move out of production. This may prolong poverty.

It was also found that 17% of ISPAAD beneficiaries had no formal education. About 48% had primary level education while 14% had secondary level education. The lower the level of education an individual has, the higher the vulnerability to poverty. Farmers' low level of education is one of the major hindrances to successful transfer of knowledge, skills and technology adoption in agriculture (Haralambos, Holborn and Heald, 2000). The aforementioned findings show that the ISPAAD packages do reach

groups who are vulnerable to poverty. These include the elderly, the uneducated and women. However, despite ISPAAD, and based on the fact that ISPAAD has not been able to increase grain yield (as shown in later sections), these groups remain food insecure. ISPAAD is not likely to alleviate these vulnerable groups from poverty as envisioned in Botswana's National Vision 2016.

The major sources of income for ISPAAD beneficiaries were dry land farming (41.1%) and mixed farming (40.9%) while 15.7% had other sources of income such as the old age pension scheme and the *Ipelegeng* labour-intensive public works programme. Several economic indicators were used to measure perceived economic impacts of the ISPAAD on beneficiaries and their communities. On average, beneficiaries rated ISPAAD as having a "slight positive" impact on all economic indicators under consideration. This is a very poor rating for a support and free handouts-based programme like ISPAAD. This implies that ISPAAD is not significantly improving the income status of arable farmers or increasing their wealth and hence neither is the programme contributing much to poverty alleviation. ISPAAD has also not created enough decent jobs that can raise employees' and farmers' income levels above the

poverty datum line. Commercialization of agriculture is unlikely if ISPAAD remains unsuccessful in promoting business activities for arable farming.

Performance of ISPAAD *vis-à-vis* the programme objectives

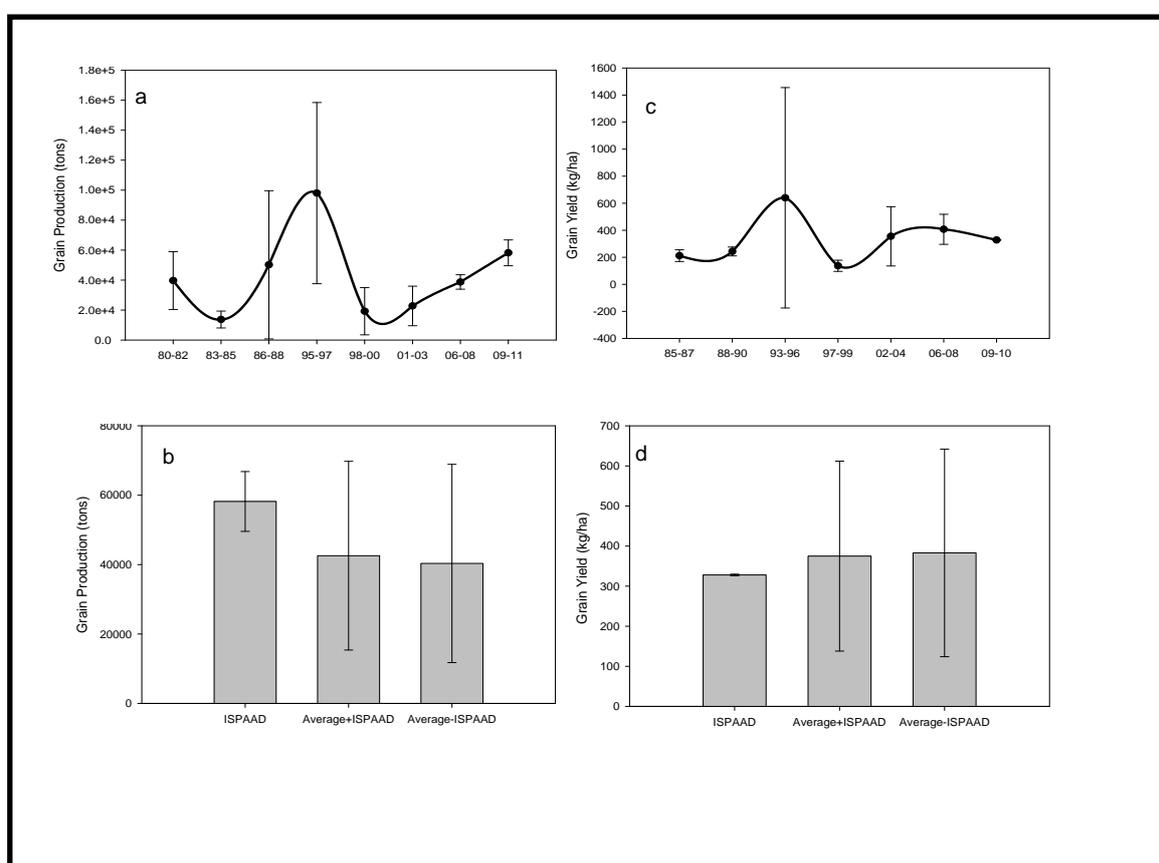
Performance of ISPAAD re Objective 1: Increase Grain Production

Figure 1a shows that grain production of field crops (sorghum, maize, millet and pulses) for the period 1979-2011) has been fluctuating over the years with a range of between 13,000 and 100,000 tons, while yield per hectare harvested was fluctuating between

130 and 410 kg/ha (Figure 1c and d). These fluctuations may have been caused by rainfall amounts, rainfall patterns and other climate factors over these years, which impact on production and yield per hectare.

The Food and Agriculture Organization has observed that in Botswana, crop production indicators predominantly depend on the rainfall during the growing season. The national production average for the period 1979-2011 was 42,554 tonnes (± 27185) including ISPAAD and 40,322 tonnes (± 28561) excluding ISPAAD. During the ISPAAD period the average grain production stood at 58,177 tonnes (± 8615).

Figure 1: Effects of ISPAAD on some Grain Crop Production Indicators (maize, sorghum, millet & pulses)



Analysis of yield revealed that between 1985 and 2010 period, the national average was 383 kg/ha, and 328 kg/ha when the ISPAAD period is included. This yield of 375 kg/ha during ISPAAD period is included in the analysis. Comparative analysis of the ISPAAD period production with the national average for crop production and yield indicates no significant difference (Figure 1a, b, c and d). A multi-year reference was used in this study, and as a result the

ISPAAD programme did not significantly increase both production and yields per hectare.

A comparison of actual yield per hectare for sorghum, maize, millet and pulses under traditional and commercial production systems to target yields specified under ISPAAD guidelines revealed that commercial farmers were achieving much better yields per hectare in all types of supported grains compared to traditional farmers irrespective of

whether yield is calculated on area planted or area harvested basis (See Figure 2) Traditional farmers (who were the majority beneficiaries of ISPAAD) have not been able to achieve the set yield targets in any of the cropping seasons since 2008. On

average, traditional farmers were only able to achieve about 20 percent of the ISPAAD target yield per hectare in all ISPAAD-supported grains.

Figure 2: Actual Yield per Hectare as a Proportion of Target Yield, 2008-2012

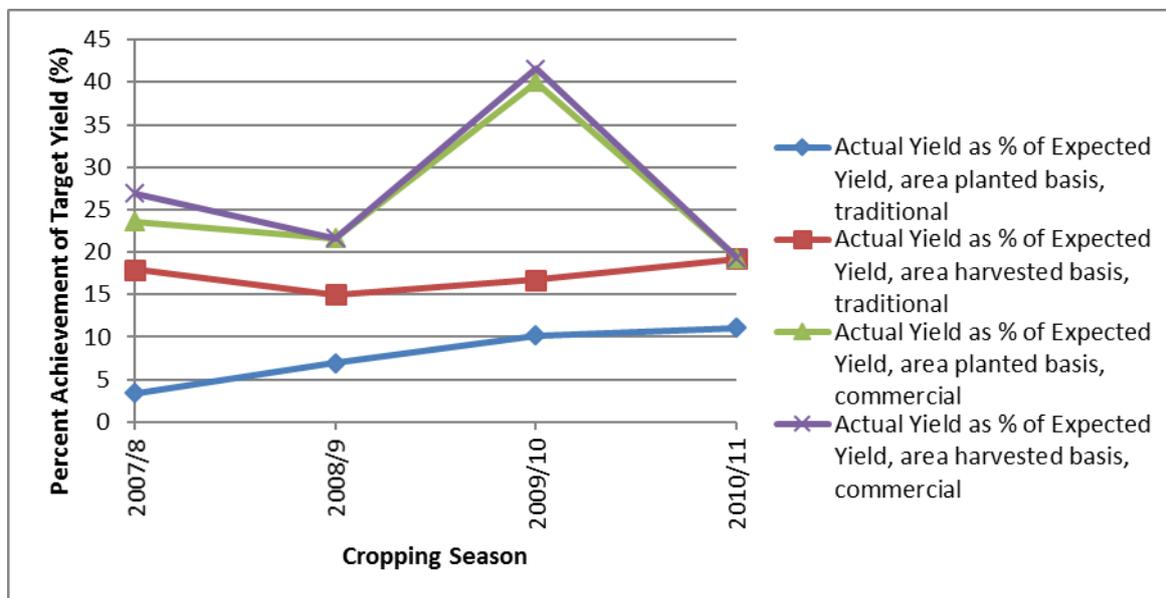


Figure 3 presents domestic grain production and grain imports for the period 2008-2012. Results showed that domestic grain production was far from meeting national demand for grain in Botswana. Domestic grain production satisfied only 10 percent of national demand. The supply gap was filled by imports, amounting to about 90 percent of the required grain annually. The ISPAAD has not increased grain production beyond historical production levels prior to its inception. This makes Botswana to remain a heavy net importer of grain and vulnerable to shocks on international food markets.

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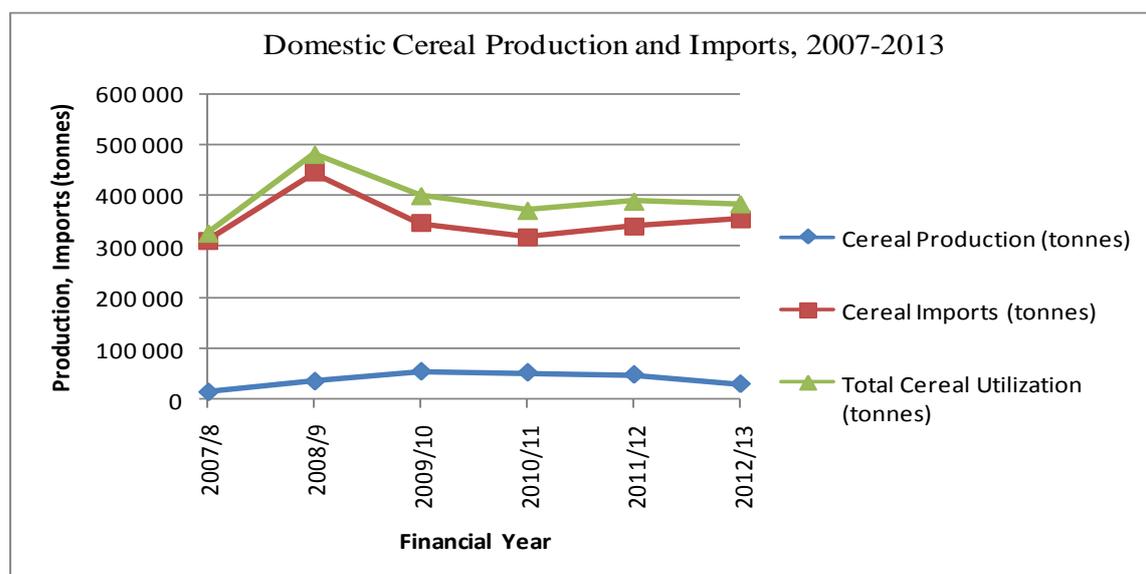
Performance of ISPAAD re Objective 2: Promote Food Security at Household and National Level

The majority of ISPAAD beneficiaries continue to experience increasing food insecurity at household level. The existence of government programmes such as the *Ipelegeng* programme which compete with ISPAAD for already scarce farm labour and destitute programs (where food hand-outs are distributed to able bodied people), make it difficult for household food security to be achieved through arable farming.

Figure 3 (next page) presents domestic grain production and grain imports for the period 2008-2012. Results showed that domestic grain production was far from meeting national demand for grain in Botswana. Domestic grain production satisfied only 10 percent of national demand. The supply gap was filled by imports, amounting to about 90 percent of the required grain annually. The ISPAAD has not increased grain production beyond historical production levels prior to its inception. This makes Botswana a substantial net importer of grain and thus

The ISPAAD records show that there has been an increase in the number of beneficiaries as well as the number of hectares ploughed/planted over the years since the programme was introduced. These increases have not translated into any increase in total grain production.

Figure 3: Domestic Cereal Production and Imports, 2007-2012)



Grain productivity per farm has not improved despite the provision of critical inputs through ISPAAD. The low productivity levels are an indicator that majority of the beneficiaries are unable to produce adequate grain to satisfy household requirements which in turn translates into failure to meet national grain requirement from domestic production. This has resulted in the rising imports of cereals, which account for 90% of total cereals utilized in Botswana annually as shown in Figure 3.

Performance of ISPAAD re Objective 3: Commercialize Agriculture through Mechanization

The majority of arable farmers still do not have the business mind-set to transform their subsistence farming to commercial farming practices. They own rather small pieces of land and the value of production from these small fields does not cover the costs of ploughing, harrowing and row planting using a tractor. It is thus not economic to use tractor power on small fields. The majority of ISPAAD beneficiaries are not into arable agriculture for commercial purposes but rather produce to sustain their families.

The commercialization of agriculture through mechanization has not been achieved through ISPAAD. The main components that facilitate the operationalization of this objective were the establishment of ASCs and the engagement of private contractors for ploughing, harrowing and row planting. The ASCs were meant to alleviate the shortage of primary and secondary tillage operations. However, in some instances this could

not be pursued as the ASCs had not yet been established.

Where the ASCs had been established, operations suffered from a lack of qualified tractor operators and facilities (such as flatbed trucks) to transport the machinery to the arable lands where they were needed. The ASC machinery was reported to be too large to manoeuvre through the narrow roads to the arable lands. In addition, the size of most arable lands was too small for tractors and machinery of ASC magnitude to operate efficiently and in a good number of cases machinery had broken down repeatedly and/or were awaiting repairs.

The breakdown of tractors and machinery from ASC was worsened by the hiring of unqualified farm operators who could not operate them to required specifications and standards. Planters used in these ASC are four-row planters which are not easy to transport to the arable lands because of their size and the insufficient width of the roads in the arable lands areas. Similarly, private tractor contractors hired inexperienced tractor drivers who lacked knowledge and skill to operate the majority of farm implements used in different farm operations.

About 60% of ploughing / planting operations were done by private tractor contractors. However, the private tractor contractors were reluctant to undertake harrowing and row planting because each one of these operations attracted a lower subsidy of P150/ha compared to a subsidy of P400 /ha received for ploughing.

It was observed that in some parts of the country, arable land was not well de-stumped which resulted in frequent breakdowns of machinery especially plough shears. In the northern parts of the country, especially in the North West district, the flood recession farming system (*molapo* or *dikhuti* farming) rendered it impossible to use the ASC machinery because of heavy black-cotton soils, dense grasses that grow on the flood plains and steep slopes. The machinery and equipment were not suitable for the farming system and conditions in the area and hence could not be utilised.

Performance of ISPAAD re Objective 4: Facilitate Access to Farm Inputs and Credit

The components which operationalize this objective are the provision of free seeds, free and subsidized fertilizer, ploughing, harrowing and row planting components as well as subsidized credit. ISPAAD beneficiaries accessed free seeds and free draught power more than any other service packages (See Figure 4). Maize is the most popular grain seed accessed. However, it needs to be noted that the choice and distribution of seeds was based on farmer preference and not on suitability of agro-ecological

conditions to good agronomic performance of the crops.

ISPAAD has provided machinery and farm implements through the Agricultural Service Centres (ASCs) and private contractors. However, ASCs have never been fully established and adequately staffed. About 60% of ISPAAD beneficiaries utilized tractor draught power mainly to produce crops for subsistence purposes.

Very few beneficiaries have utilized the fertilizer, harrowing and row planting components. The major obstacle to adoption of these practices has been shortages of fertilizer, draught power and secondary tillage implements. ISPAAD experienced seed and fertilizer shortages in all cropping seasons since inception. The deficit ranged from 20-120% for seed and as high as 1600% for fertilizer as indicated in Figure 5a and 5b. It is also worth noting that only one type of fertilizer (N:P:K) was issued and applied throughout the country. This means that fertilizer was applied regardless of the nutrient status of the soil, type of crop and stage of crop development. Therefore, the narrow range and type of fertilizer and the inadequacy thereof contributed to low production levels.

Figure 4: Access to Inputs during ISPAAD

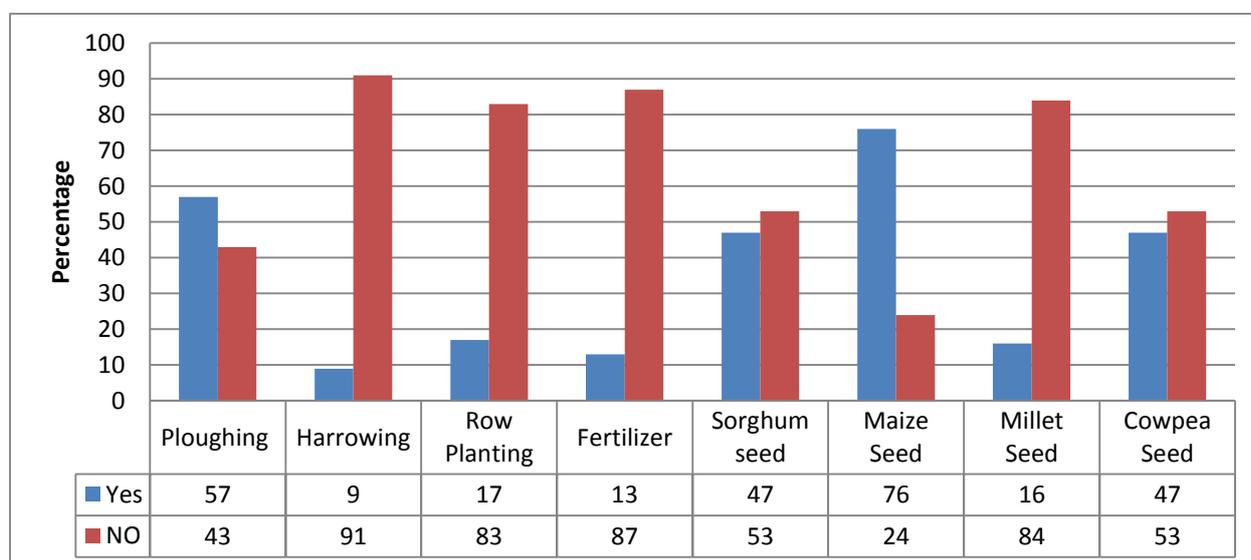
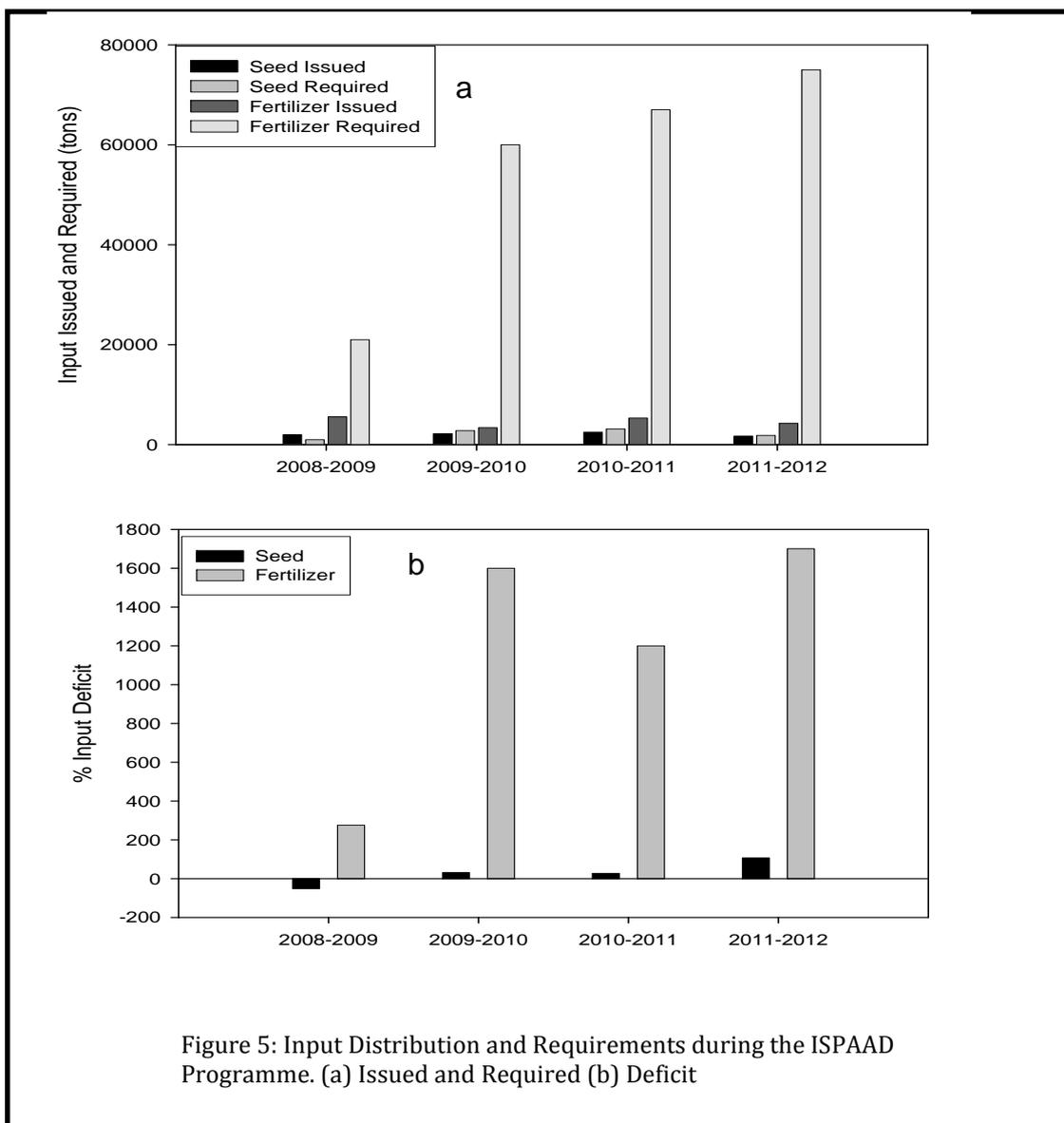


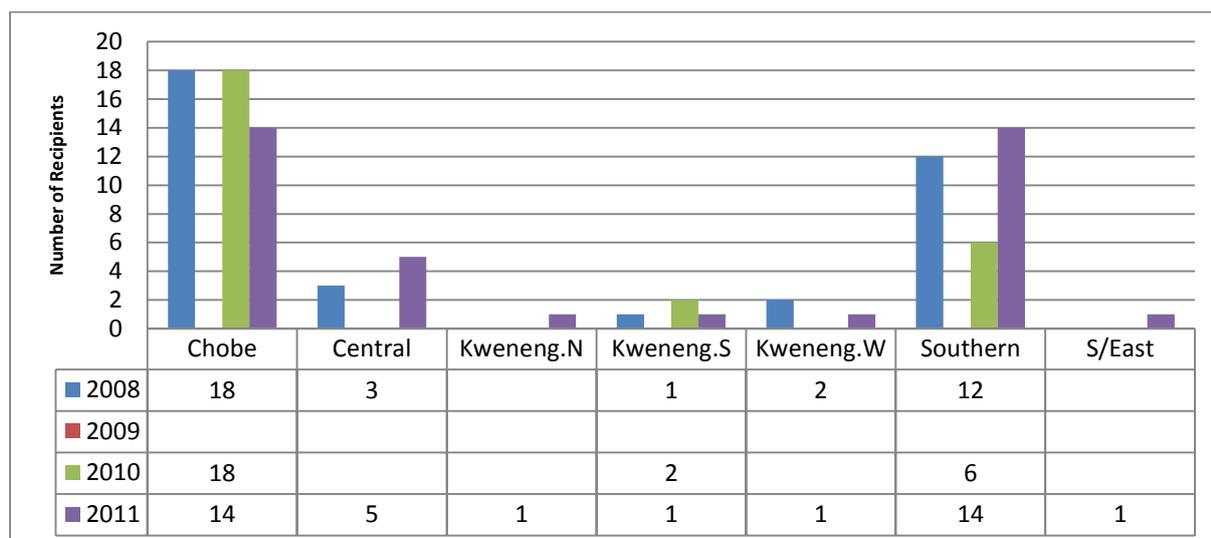
Figure 5: Input Distribution and Requirements during the ISPAAD Programme



ISPAAD records show that very few farmers utilized the credit facility (See Figure 6). ISPAAD paid an average of P2 million annually as loan interest subsidy on NDB seasonal loans for arable agriculture. Most of the loans were obtained by Pandamatenga, Mosi and Mmalore commercial farmers. The facilitation of credit through the National Development Bank (NDB) has, in most areas, not been well received by farmers. The main reason given was lack of knowledge on how to process and access the facility. Those who had knowledge of this facility expressed reservations based on the perceived understanding that if they were to take a loan from NDB and fail to repay on time, the bank may confiscate their (entire) property. Unlike other components which were facilitated by Village

Extension Workers (VEWs) through the Department of Crop Production, the NDB credit component was facilitated by NDB staff at district level. This made it difficult for the District Crop Production staff to monitor its uptake at Village Extension Area level. This arrangement has the potential for abuse because there is a likelihood of a loan recipient benefitting from other components without knowledge of the extension workers. For example, a farmer could acquire a loan from NDB with the intention to purchase agricultural inputs and at the same time register for free seeds, fertilizer, ploughing, harrowing and row planting through the VEWs' office.

Figure 6: Number of Recipients of NDB Credit Facility from 2009 to 2011



NB: Information was not available for 2009

One of the major problems of crop production in the country is unfenced or improperly fenced fields. The study revealed that less than 40% of the fields were fully wire-fenced, while a combined and large percentage (60%) were either unfenced, partially wire-fenced or bush-fenced. Utilization of the cluster fencing component of ISPAAD was almost non-existent across the country. This low uptake was attributed to the fact that it was difficult for farmers to group themselves into clusters that satisfied the eligible minimum arable land requirement of 150 hectares

Performance of ISPAAD re Objective 5: Improve Extension Outreach

Extension outreach indicates the provision of information or services to the farming communities which help them improve their standard of living. Therefore, the expectation is that extension workers at whatever level disseminate relevant technical information and advice to the farmers. However, ISPAAD has diminished the quality of extension delivery. Agricultural extension workers were largely engaged in clerical and administrative work involved in the implementation of activities of ISPAAD at the expense of technology transfer and agrological advice to farmers. ISPAAD activities have taken agricultural extension workers away from their core business of advising and teaching farmers on crop management practices such as planting, fertilizer application weeding, and pest and disease control, advising on post-harvest practices, and marketing of the produce. The ISPAAD has had a negative impact on the timely delivery of advice critical to the

achievement of increased grain production and promotion of food security. Farmers reported that visits of extension workers were either to measure fields or to follow up on ISPAAD packages. Agricultural extension services are thus operating below expectation since the inception of ISPAAD.

Costs and Returns of the ISPAAD Programme

Budget Allocations for MoA, DCP, and ISPAAD

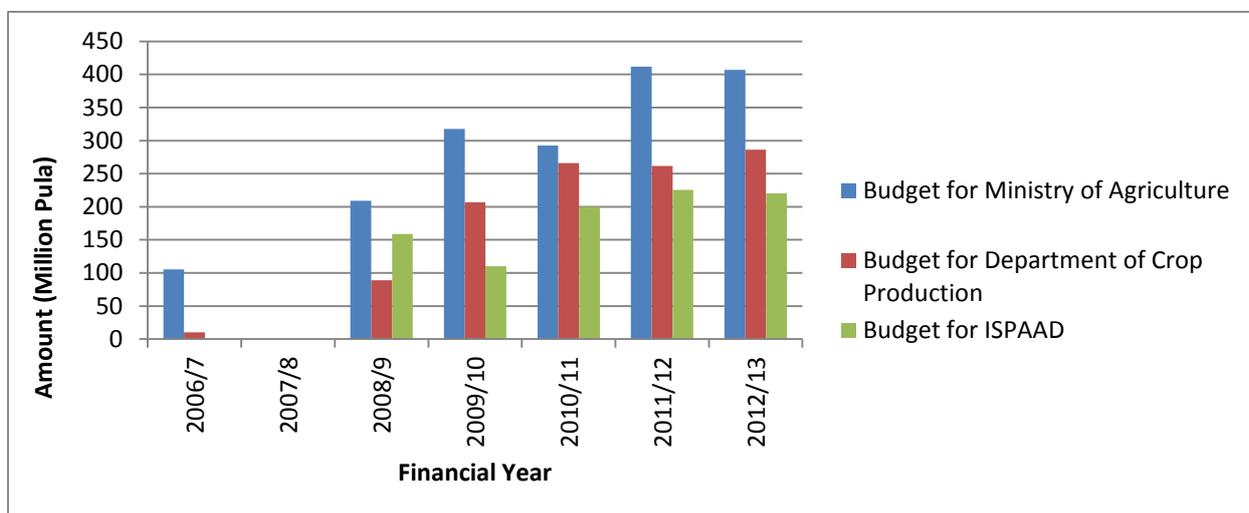
Figure 7 shows that budget allocations for MoA, the Department of Crop Production (DCP) and ISPAAD increased over the period 2006 - 2013. The MoA budget increased almost four-fold while the DCP budget rose exponentially (by a factor of 28) in the same period. The budget allocation for ISPAAD increased by 38 percent in the period 2008 - 2013. Actual annual expenditure on ISPAAD exceeded its annual budget allocations for three consecutive cropping seasons.

In 2011/12, the expenditure on ISPAAD was lower than available budget allocations for the cropping season because farmers did not plough as expected due to widespread lack of rain across the country. Yearly spending on ISPAAD operations consumed financial resources that exceeded the MoA budget in 2008/09. Though the percentage share declined to approximately 51 percent in the 2009/10 financial year, it rose to over 80 percent of MoA budget in the 2010/11 cropping season. Though spending on ISPAAD accounted for 46 percent of MoA budget in

2011/12, this share would have been substantially higher had the rainfall situation been better. Furthermore, spending on ISPAAD operations consumed financial resources which exceeded the DCP budget more than two-fold since inception.

However, the share remained at about 80 percent of the DCP budget for the subsequent financial years.

Figure 7: Budget Allocations for MoA, DCP and ISPAAD, 2008-2012



Expenditures on Various Components of ISPAAD

Figure 8 indicates that the largest share of expenditure on ISPAAD was attributed to ploughing,

harrowing, and planting components. On average, these three components accounted for 70 percent of ISPAAD expenditures each year.

Figure 8: Expenditure on Ploughing, Harrowing/Planting Components of ISPAAD

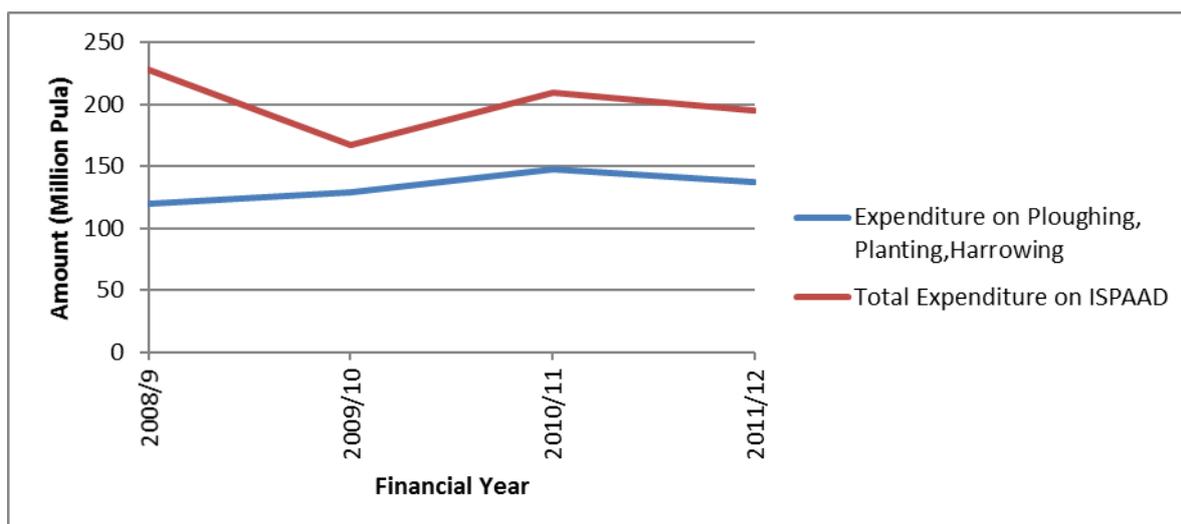


Figure 9 presents Government expenditures on fertilizer, seed and interest rate subsidies. Fertilizer subsidy accounted for 23 percent of expenditure on

ISPAAD in the 2008/09 financial year. The share dropped to about 8 percent in subsequent years. Since 2010/11, the fertilizer share of expenditure on

ISPAAD increased until it reached 14 percent in 2011/12. Expenditure on seed subsidy rose each year between 2008/09 and 2010/11. The seed share of expenditure on ISPAAD increased from 2 percent at inception to 9 percent in 2010/11. For reasons mentioned in the above, the expenditure on seed declined in 2011/12, accounting for only 5 percent of

total expenditure on ISPAAD. Government expenditure on interest rate subsidy was relatively low compared to expenditure on other programme components. On average, the share of interest rate subsidy of expenditure on ISPAAD accounted for about 1.2 percent over the period 2008 and 2012.

Figure 9: Expenditure on Fertilizer, Seed and NDB Interest Rate Subsidy, 2008-2012

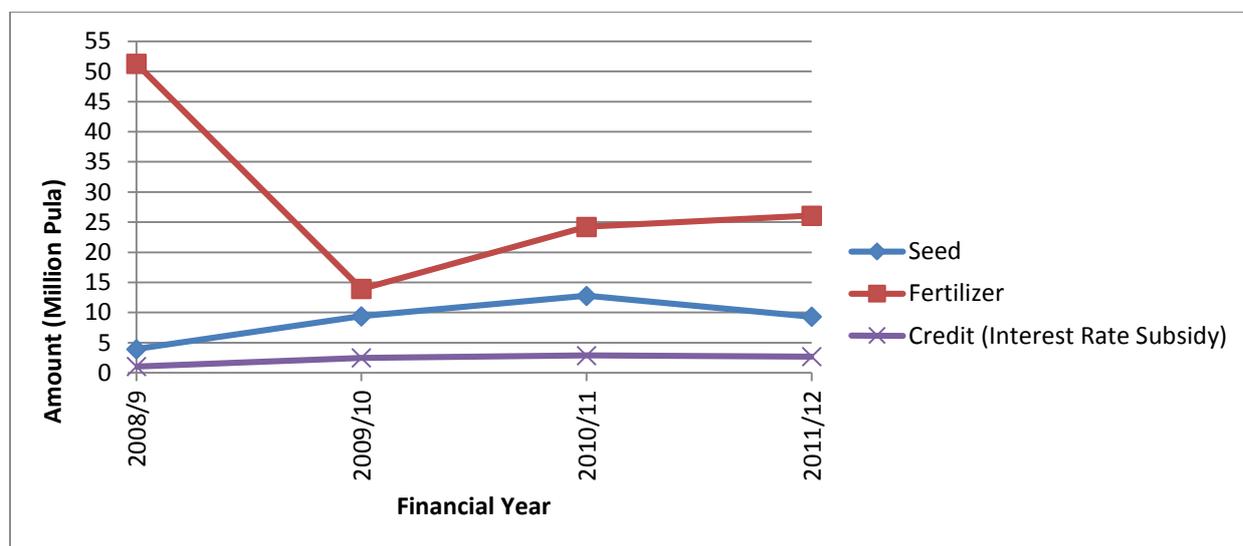


Figure 10 presents expenditure on cluster fencing, farm machinery and implements and horticultural components over the period 2008 - 2012. Results show that Ministry of Agriculture did not spend any resources on the cluster fencing component in the first two financial years since the inception of ISPAAD. However, a total disbursement amounting to approximately P10.4 million was made for the 2010/11 and 2011/12 cropping seasons. This represents about 4.8 percent of total expenditure on ISPAAD in the two financial years. Horticulture is a newly added component of ISPAAD which started in 2010. Available ISPAAD records indicate that expenditure on horticulture amounted to approximately P4 million in 2011/12. This level of expenditure accounts for about 2 percent of total spending on ISPAAD. The largest capital expenditure on farm machinery and implements was made in 2008/09 at a tune of P32 million. This accounted for roughly 14 percent of expenditure on ISPAAD that year. No machinery and implements were purchased in 2009/10 but expenditure on these items averaged P1 million for the following years.

Figure 10: Expenditure on Cluster Fencing, Machinery, Implements and Horticulture, 2008-2012

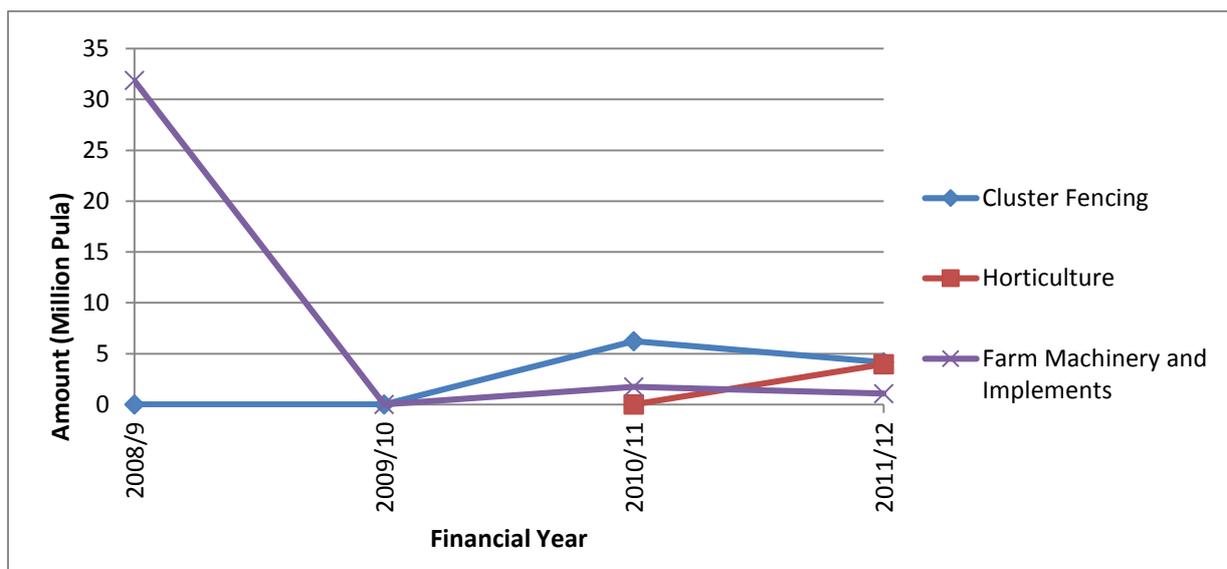


Figure 11: Administrative Costs of ISPAAD, 2008-2012

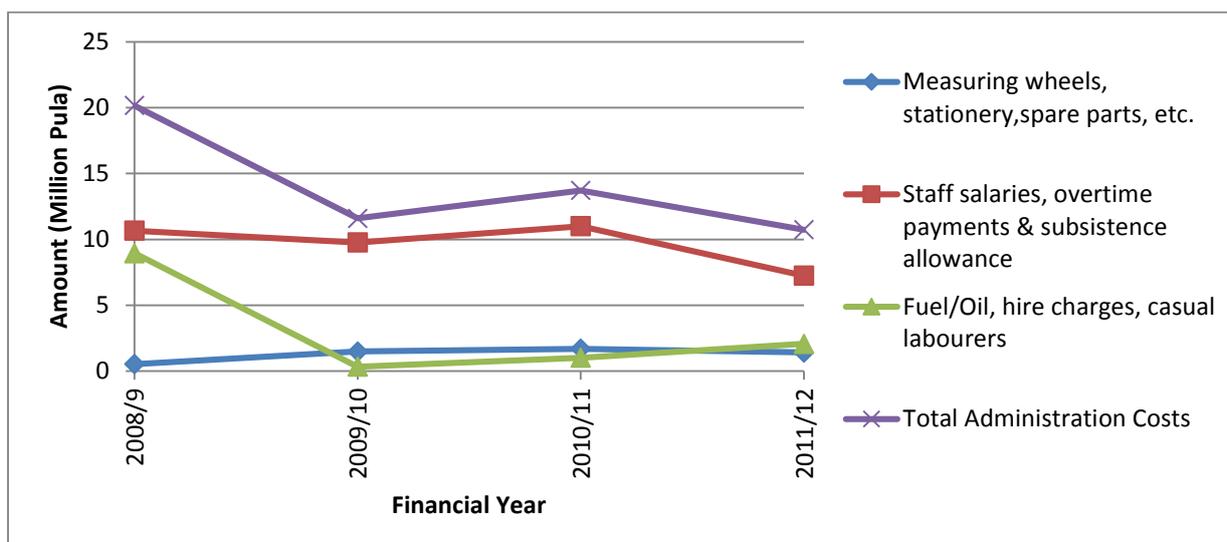


Figure 11 shows administrative costs associated with the ISPAAD programme over the period 2008 – 2012. At inception, administrative costs amounted to P20 million (about 9 percent of total spending on ISPAAD). These costs declined to an average of P11 million in the subsequent years, representing 6 percent of total annual spending on ISPAAD. Staff salaries, overtime payments and subsistence allowance accounted for 52 percent of administration costs in 2008/09. However, that share increased to an average of 77 percent in the subsequent years. Expenditure on fuel and oil, hire charges, and casual labourers has been increasing since 2009/10. This trend is likely to continue in the subsequent cropping

seasons given the regular increases in fuel prices and salary costs.

Expenditures on Various Components of ISPAAD

One of the objectives of ISPAAD is to commercialize agriculture through mechanization. This implies that farmers must be able to identify measures and value their costs and benefits of all their agricultural undertakings. Government in general, and the Ministry of Agriculture in particular, thus recognizes the importance of the value-for-money principle and encourages farmers to engage in commercial agricultural activities with the highest returns on

investment. In support of the above, a cost-benefit analysis of ISPAAD operations was undertaken using both undiscounted and discounted measures of project / programme worth.

Figure 12 presents estimated annual proceeds per unit of outlay for the period 2008/9 to 2011/12. The results show that annual expenditure on ISPAAD operations exceeded annual proceeds in all the years under review. The estimated annual proceeds per unit of outlay remained less than unity for the entire period. This ratio will likely continue to decline as the number of beneficiaries increases over time

while productivity remains as low as reported over the study period. The ratio would even be lower (i.e. worse) if data on all on-farm production costs were available and accounted for in the analysis. From an investment point of view, this outcome means that ISPAAD is not a viable venture in its current form. There is effectively no business case for the programme. The annual proceeds per unit of outlay approach employed in the study does not account for time value of money. Thus, we applied common discounted measures of project worth to determine the total economic worth of the ISPAAD programme.

Figure 12: Estimated Annual Proceeds per Unit of Outlay, 2008-2012

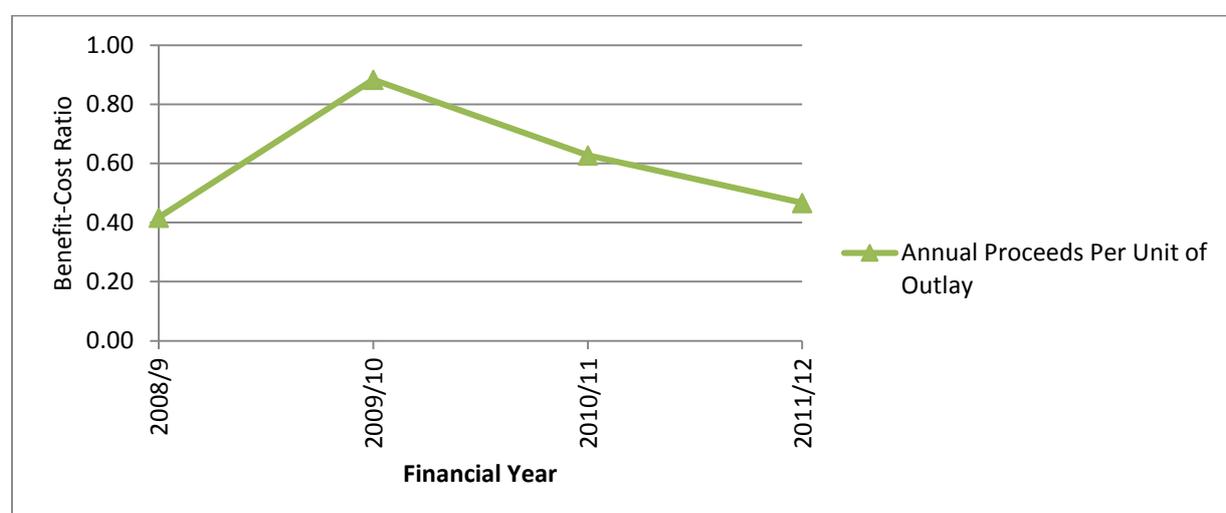


Table 2: Net Present Value and Benefit-Cost Ratio for ISPAAD, 2008-2012, 2008-2012

Year	Annual Proceeds (Pula)	Annual Costs (Pula)	Discount Factor @ 15.5%	Discounted Annual Proceeds (Pula)	Discounted Annual Costs (Pula)
2008/9	95,009,200	227,427,451	0.8658	82,259,048	196,906,884
2009/10	147,550,000	165,817,062	0.7496	110,605,124	124,298,317
2010/11	131,606,800	216,544,974	0.6490	85,414,652	140,540,714
2011/12	91,191,936	195,425,789	0.5619	51,242,286	109,813,046
TOTAL				329,521,110	568,411,458
				Net Present Value	-238,890,348
				Benefit - Cost Ratio	0.58

Table 2 shows both the net present value (NPV) and benefit-cost ratio (BCR) for the ISPAAD programme. The NPV is negative while the BCR is less than unity. Both measures suggest that the cost of ISPAAD operations fundamentally outweigh resultant benefits associated with such operations. These results reinforce the earlier finding which infers that from an investment analysis point of view, ISPAAD, in its current form, is not a viable venture.

Conclusion

ISPAAD is a universally accessible agricultural support programme benefitting the rural poor. The eligibility criteria allow all active persons with access to arable land to benefit. This makes ISPAAD principally non-discriminatory and inclusive of all marginalized groups such as the elderly, the uneducated, women and people with disability. However, these non-means-tested general eligibility criteria expose the programme to misuse, abuse and cast doubts about the long-term sustainability of the programme. Limited targeting allows situations whereby arable fields are subdivided into several smaller land parcels such that the entire land holding receives a 100% subsidy on seeds, ploughing and other packages. These subdivisions have allowed multiple family member beneficiaries and have artificially inflated the number of arable farmers benefitting from the programme.

ISPAAD packages reach marginalized beneficiaries including the elderly, the uneducated and women whose average monthly incomes are well below the national poverty datum line. However, given that ISPAAD has not been able to increase grain production and yields, these individuals and households remained food insecure. Despite the social protection effect of the programme, ISPAAD, on its own, is unlikely to provide any principal alleviation from poverty for these vulnerable groups.

Although the stated objectives and service packages of the ISPAAD programme are desirable from an agricultural development point of view, the implementation of the programme has failed to achieve the intended objectives and results. These outcomes make ISPAAD a sub-economical and inefficient support programme on the basis of financial resource investment and agricultural development considerations. Food security at both household and national levels has not improved during ISPAAD. Domestic grain production has not increased in terms of both total production and average yield per hectare, and ISPAAD has had only a marginal impact on commercializing arable agriculture in the country.

Although the programme has facilitated access to tractor draught power and farm implements for primary tillage operations, very few farmers adopted row planting or used inputs such as improved seeds and fertilizer which are characteristic of commercial farming because they either did not have or did not have access to the necessary equipment. The above was compounded by the fact that often seeds and fertilizers did not reach beneficiaries at the right time and/or in the right quantities.

ISPAAD facilitated access to credit in the case of commercial farmers. However, traditional farmers did not benefit from the credit facility because they did not meet the requirements for obtaining loans at the National Development Bank.

ISPAAD had a negative impact on extension outreach. The core business of agricultural extension workers has been overshadowed by clerical and administrative work demands of ISPAAD at the expense of technology transfer, farming systems and agrological advice to farmers. Although the numerical extension worker-to-farmer ratio increased under ISPAAD, the majority of the extension workers did not adequately cover the ever increasing number of arable farmers in their respective extension areas because of shortages of time and transport.

ISPAAD has no programme design document that spells out the outcomes, outputs, activities, inputs and assumptions of the programme. The outcomes and outputs of the programme are not clearly defined and there are no objectively verifiable indicators, means of verification and assumptions on the basis of which programme implementation can be tracked. The ISPAAD implementation guidelines are not very clear and explicit on outcomes, output, assumptions and performance criteria and there is no monitoring and evaluation framework.

ISPAAD is embedded in the DCP structure and implemented by technical and administrative staff who have established roles in the department, and the programme does not have its own staff. ISPAAD thus lacks a well-defined and coordinated implementation structure to deliver services to farmers and all other stakeholders in the programme. The Ministry of Agriculture is not well-resourced to effectively and efficiently implement the programme. ISPAAD record keeping, data and information management are poor. Some records are missing while others are unreliable and incomplete, at extension area level as well as at district and headquarter levels.

ISPAAD is not viable in its current form. Annual expenditure on ISPAAD rose from P159 million in 2008 to P220 million in 2013. More often than not, the actual expenditure on ISPAAD exceeded the budget allocation. It skewed budgets and expenditures as ISPAAD constitutes more than 80% of the budget allocation for the Department of Crop Production and more than half the budget allocated to the Ministry of Agriculture. These budget proportions are expected to increase while Government funding either remains unchanged or declines over time. Despite these generous investments the programme had a rather marginal effect on improved food security in the country.

Comparative analysis of average grain production for the period 1982 to 2007/08 and during ISPAAD (2008/09 to 2011) indicates no significant difference in average total production between the two periods. The largest annual share (70%) of expenditure on ISPAAD is funding attributed to ploughing each year, 60% of which are payments to private tractor owners. Thus, the objective of commercializing agriculture through mechanization seems to have largely benefitted individual tractor owners engaged in

service ploughing and not the smallholder farmers. Annual expenditure on ISPAAD operations exceeded annual proceeds (estimated total value of production) in all cropping seasons since the inception of the programme. The estimated annual proceeds per unit of outlay remained less than unity for the entire ISPAAD period. The net present value (NPV) of benefits which accrued from ISPAAD operations was negative while the Benefit-Cost Ratio (BCR) was 0.6 rendering the programme sub-economical and unsustainable.

ISPAAD distributes seeds according to farmer preference and not according to crop performance based on land suitability zones. The majority of farmers received maize seed and grew it in areas not suitable for the crop. This resulted in high incidence of crop failure and in substantial yield reductions. Youth participation in ISPAAD is very low. Only about 8% of beneficiaries aged 18 to 29 years participated in the programme. Therefore, ISPAAD, in its current form, is not fit for purpose. The programme, however, has the potential to be greatly improved by changing and/or fine tuning its design and benefit packages to make it more targeted, efficient and sustainable.

References

- Buffie EF, and Atolia M (2009). Agricultural Input Subsidies in Malawi: Good, Bad or Hard to Tell? *FAO Commodity and Trade Policy Research Working Paper*. Rome
- Clover, J., (2003), Food Security in Sub-Saharan Africa, *African Security Review*, Vol. 12, No1, pages 1-15.
- Denning, G, Kalambe P, Sanchez P, Malik A, Flor R, Harawa R, Nkhoma P, Zamba C, Magombo C, Keating M, Wangila J and Sachs J. (2009) Input Subsidies to Improve Smallholder Maize Productivity in Malawi: Towards an African Green Revolution. *PLoS Biology*, Vol 7. Pg 2-10
- Dorward A, Chirwa E, Boughton D, Crawford E, Jayne T, Slater R, Kelly V and Tshoka M (2008) Towards 'Smart' Subsidies in Agriculture? Lessons from Recent Experience in Malawi. *Natural Resource Perspectives* 116. Overseas Development Institute
- Dorward, A., Chirwa, E., Jayne, T.S, (2010), The Malawi Agricultural Input Subsidy Programme, 2005/5 to 2008/9. (www.worldbank.org) - viewed 10th September 2012
- Government of Botswana (GoB) and United Nations (2010). Millennium Development Goals Status Report 2010. Gaborone.
- Haralambos M, Holborn M and Heald R (2000). *Sociology: Themes and Perspectives*. 5th Edition. Harper Collins Publishers Ltd, London.
- IFAD (2012), The Future of World Food and Nutrition Security: Investing in Smallholder Agriculture – an International Priority (www.ifad.org) – viewed 4th September 2012
- Matambo. O. K. (2012). Budget Speech - 2012. Ministry of Finance and Development Planning. Government Printer, Gaborone
- Millner, D. A., (2010). The MDG Summit: Strengthening the U.S. Role in Accelerating Progress. Bread for the World Institute. Briefing Paper, No. 10

- Ministry of Agriculture. (2011), Land Suitability Map with Extension Areas. MoA, Gaborone, Botswana
- Ministry of Agriculture. (Undated), Guidelines for Integrated Support Programme for Arable Agriculture Development, Government Printer. Gaborone
- Ministry of Finance and Development Planning (2007). National Development Plan 8 1997/98 – 2002/03. Government Printer. Gaborone
- Olawepo, R.A., (2011), Food Security and Challenges of Urban Agriculture in the Third World Countries, In Aladjadjian, (Ed) (2011). *Food Production-Approaches, Challenges and Tasks*, InTech, Croatia.
- Radcliffe, D.J., ter Steeg, J.L., de Wit P.V. (1992). Land Resources Assessment for Agricultural Land-use Planning: Map of land suitability for Rainfed Crop Production. FAO. GoB and UNDP. Gaborone.
- Statistics Botswana (2011). Population and Housing Census Preliminary Results Brief. Government Printer, Gaborone
- Statistics Botswana (2013). Botswana Core Welfare Indicators Survey 2009 /10. Main Report Volume 1. Government Printer, Gaborone
- Twyman, C., Sporton,D., Thomas, D.S.G.,(2004), 'Where is the Life in Farming?': The Viability of Smallholder Farming on Margins of the Kalahari, Southern Africa. *Geoforum*, Vol. 35, pg 69 – 85.
- United Nations Development Programme (2013). The Rise of the South: Human Progress in a Diverse World, Human Development Report 2013.
- Wiggins S and Brooks J (2010). The Use of Input Subsidies in Developing Countries. *Global Forum on Agriculture*, OECD.

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