

Learning Note

Perspectives and observations on agricultural extension in Botswana

Scope and objective

1. The **objective of the learning note** is to **lay out the existing extension service structure in Botswana** and identify its impact on the performance of the Agriculture Services Support Project (ASSP). In addition, the learning note lays out the main takeaways from the evaluation team's observations of the extension system.
2. This learning note has been undertaken in the context of the Project Performance Evaluation of ASSP in Botswana. It encompasses the lessons and observations on the extension system in the context of implementation of the Integrated Support Programme for Arable Agricultural Development (ISPAAD) of the Government of Botswana and ASSP, financed by the Government and IFAD. **This is not an assessment of the ISPAAD or the extension system.** This learning note covers ISPAAD and the extension services only to the extent that they can provide lessons for IFAD from the implementation experience of ASSP.

Background information

3. The Department of Agriculture in Botswana was established in 1935 during the colonial period, to undertake research and extension activities. A Cooperative Demonstration Plot Scheme was initiated in 1947, then replaced by another approach called the Pupil Farmers Scheme in 1962 (initially adopted in Zimbabwe). Under the latter, farmers graduated through four categories, from "pupil" to "improved", "progressive" and eventually "master farmers".¹
4. Since its independence in 1966, Botswana has produced a series of National Development Plans (NDPs) and is currently implementing its National Development Plan 11 (2017-2023). The Ministry of Agricultural Development and Food Security (MoA) is charged with the implementation of all agricultural initiatives, guided by national policy frameworks. Since NDP 8, the annual budget allocation for agriculture has been between 4 and 6 per cent of total government expenditure.
5. In this context, from the 1980s onward, MoA has implemented projects and programmes in support of smallholder agriculture. Among them was the Arable Land Development Project, implemented through three phases from 1982 to 2008,² and the ongoing ISPAAD, launched in 2008 with the following objectives: a) increase grain production; b) promote food security at household and national level; c) commercialize agriculture through mechanization; d) facilitate access to farm inputs and credit; and e) improve extension outreach.
6. A similar, ongoing programme for the livestock sector, Livestock Management and Infrastructure Development, has the following objectives: a) improve livestock management; b) improve range resource management and conservation; c) alleviate poverty; and d) provide safe and hygienic poultry.

¹ Sources: "An overview of agricultural extension in Botswana and needed reforms", Flora Modiane Tladi-Sekgwama, University of Botswana, 2019; Botswana country page in "Global Forum for Rural Advisory Services/GFRAS", 2013 <https://www.g-fras.org/en/world-wide-extension-study/africa/southern-africa/botswana.html>

² The first phase (1982-96) was financed by ADB (African Development Bank) and IFAD. The second (1997-2003) and third (2004-2008) phases were financed by the Government of Botswana.

Introduction to the conceptual framework of extension services

7. It is recalled here, for the purpose of fine-tuning of basic concepts, the seminal definition of “agricultural extension” given by Maunder (1973).³ Extension is “a service or system which assists farm people through educational procedures in improving farming methods and techniques, increasing production efficiency and income, bettering their levels of living, and lifting the social and educational standards of rural life”. Though the language may have changed through the years and new concepts appeared, the fundamentals can still be found in Maunder’s definition.
8. The perceived failure of many public extension systems in different countries has produced a rich debate, and resulted in new frames of analysis, methodological approaches and models of implementation. According to the analysis of B. Swanson⁴ on the development of extension systems all over the world, the primary objectives of national extension systems addressing smallholders and rural households can be outlined as in the box that follows:

Box 1

Primary objectives of Extension Systems

- a.) Technology Transfer (particularly for staple food crops);
- b.) Human Capital development (technical and management skills and knowledge) for increasing farm/household incomes;
- c.) Social Capital development by increasing farmers organization to undertake more complex processes and initiatives (e.g. commercialization, irrigation schemes management, watershed management);
- d.) Improve Natural Resources management for sustainable farming (e.g. water and soil conservation, climate-change adaptation, sustainable interaction crop-livestock).

9. Technology Transfer has been traditionally a core function of public agricultural extension systems all over the world, and the basis of the so-called green revolution that massively increased the world’s food supply from the 1960s onwards. Technologies may include agrochemicals and production technologies (e.g. fertilizers and pesticides), mechanization technologies (e.g. tractors, equipment and irrigation technologies), information technologies (e.g. computers, cell phones and geographic information systems) and genetic technologies (e.g. new crop varieties, hybrids and biotechnologies).
10. Technologies are nowadays mostly private and marketable goods with an increasing role played by the private sector in both functions related to technology transfer: inputs supply, and knowledge transfer through advisory services. A large number of small farmers are still publicly supported, as in the case of Botswana through the ISPAAD programme.
11. Human capital development usually refers to expanding and improving the skills and knowledge of the farmers. Rural extension has always been regarded as a non-formal education for farmers, women and rural youth, well beyond the simple transfer of knowledge/technology. Human capital development may refer to capacity building for improving traditional crops, but also to the production, marketing or processing of a new and higher-value crop, to organizational and management skills, to more efficient and sustainable use of natural resources (e.g. water for irrigation and soil fertility), or to other skills such as family nutrition, health and hygiene. Most of these skills and knowledge are considered “public goods”, which suggests they should be publicly promoted.

³ A.H. Maunder, “Agricultural Extension: a Reference Manual”, FAO, Rome, 1973.

⁴ B. Swanson, “Global Review of Good Agricultural Extension and Advisory Services Practices”, FAO, 2008.

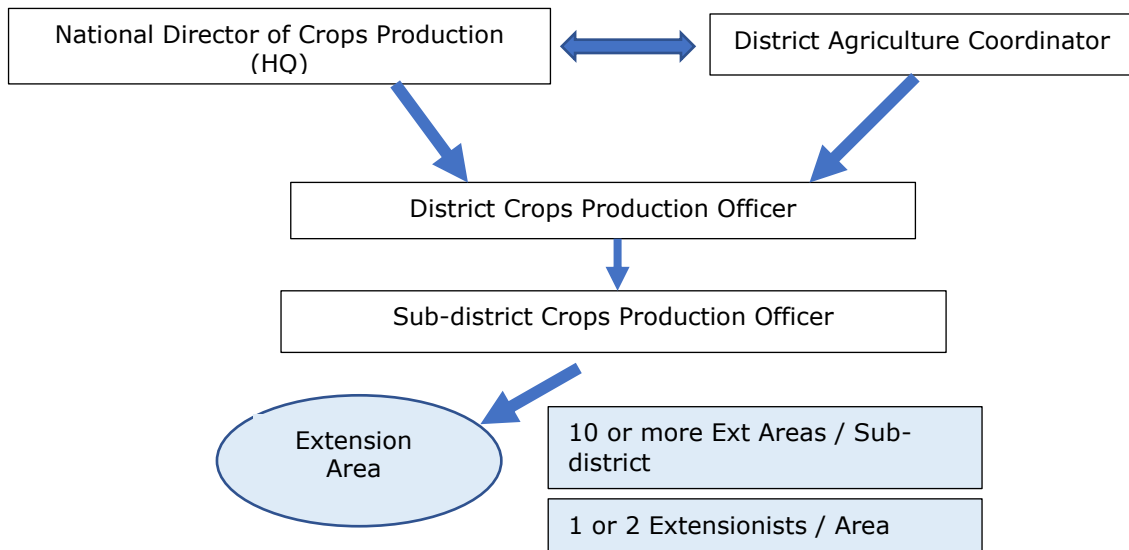
12. Social capital development is an increasingly relevant function of extension in almost all developing countries. It refers to the creation and/or enhancement of "social skills" mostly related to organizational and managerial skills, and to decision-making processes needed for more complex initiatives (e.g. joint commercialization, irrigation schemes management and watershed management). There is a large consensus among development professionals that the enhancement of social capital among small and medium-scale farmers is key "to achieve food security at the household level and transform rural communities in the development process" (Swanson, cited).
13. Improving natural resources management and sustainable farming are globally regarded as priority functions of extension services due to growing food demands; soil nutrients and fertility depletion in many tropical and subtropical countries; land degradation and progressive desertification in many dryland countries; and water scarcity or poor water management worldwide. Strengthening natural resources management is a complex process requiring an inter-disciplinary approach, multisector programmes, substantial investment in human and social capital, and new technologies (e.g. drip irrigation and integrated pest management).

Institutional and operational framework of extension in Botswana

14. As previously mentioned, extension initiatives gained momentum in Botswana during the 1980s, with several projects in support of smallholder agriculture and the promotion of technology transfer through subsidized inputs to the farmers, made possible by the booming diamonds industry. In that context, the MoA was reorganized during the 1990s and the former Department of Field Services was split into two parallel agricultural extension systems: one focused on livestock production and health, and the other on crop production. This separation persists today.
15. The structure of the MoA was revised after the launch of ISPAAD, which now falls under the Department of Crop Production alongside ASSP. The department includes eight divisions: land utilization, agronomy, horticulture, bee-keeping, plant protection, agricultural engineering, projects (ISPAAD, ASSP) and human resource management.
16. There are 10 rural districts in Botswana divided into 27 subdistricts. The field extensionists are operational in their extension area (an extension administration unit under subdistrict) under the supervision of the subdistrict coordinators for crop production. The same applies for the livestock extensionists who work under the supervision of the subdistrict coordinator of animal production, and for the animal disease control agents who work under the coordination of the decentralized veterinary services.
17. Each subdistrict has 10 or more extension areas under the responsibility of one (sometimes two) field extensionists, also known as "agricultural demonstrators" or "frontline extension workers", as visualized in the following diagram that shows the organizational design of the Department of Crop Production at decentralized level. There is, therefore, a large presence of field extensionists throughout the country, though their total number may vary as some of them are only seasonally/temporarily employed. The annual reports of ASSP indicate 357 field extensionists for crop production.

Figure 1

Organizational design of the Department of Crop Production at decentralised level



18. The institutional framework described above shows that there is no dedicated division of extension services within the crop production department. Having a dedicated extension service is important, with its emphasis on human capital and social capital development. These functions require specific knowledge and policy guidance in areas such as extension methodology, training and adult education, group dynamics and organization, and communication skills. This knowledge may not necessarily be present substantially among staff at the district, subdistrict or extension area level.
19. ISPAAD has progressively become the backbone of countrywide intervention by the Ministry in support of rainfed agriculture, with a particular focus on supporting small farmers through subsidized inputs supply. In this context, the extension service is instrumental to the delivery (planning, management and control) of a subsidized package of inputs in the field. According to extension officers and field extensionists, inputs supply represents at least 80 per cent of their worktime.⁵ At the ministry level, in 2019/20, the budget for ISPAAD was 567 million Botswana Pula, which was 42 per cent of the 1.34 billion Botswana Pula recurrent budget that was allocated to the MoA. This also demonstrates the importance of ISPAAD in terms of resources utilization.
20. The current institutional framework of the *extension system presents strong and weak points*. Recent work on comparative analysis of extension systems in the Southern Africa region⁶ points out some of those strengths and weaknesses. The table below highlights a few of these, integrated with new points from the evaluation team’s own observation and analysis in the field.

⁵ As mentioned by the extension workers themselves.

⁶ “An overview of agricultural extension in Botswana and needed reforms”, Flora Modiane Tladi-Sekgwama, University of Botswana, 2019, <http://www.academicjournals.org/JAERD>; “SWOT Analysis of Extension Systems in Southern African Countries”, O.I. Oladele, J. Lepetu, S.K. Subair, J.Obuh, Journal of Agriculture and Environment for International Development 2009, <https://www.researchgate.net/publication/268409105>

Table 1

Strong and weak points of the extension services in Botswana

<i>Strong points</i> ⁷	<i>Weak points</i> ⁸
➤ Decentralized services at subdistrict level and extension areas	➤ Lack of complementarity between programmes (e.g. agriculture/livestock)
➤ High number of extensionists and good area coverage (9 sq km/extensionist) ⁹	➤ Weak or inexistent research – extension – farmers linkage
➤ Reasonable average ratio of rainfed farmers/extensionists (250:300 farmers / extension workers) ¹⁰	➤ Lack of extension material (visual aids, brochures and posters) ¹¹
➤ Stable funding programme (ISPAAD) for smallholders	➤ Poor technical supervision of the extensionists
➤ Clarity of guidelines in implementing ISPAAD programme	➤ Inadequate in-service training
	➤ Inadequate transport
	➤ Poor offices and equipment in the extension areas

Source: Sekgwama Flora (2019), An overview of agricultural extension in Botswana and needed reforms.

21. The *strong points* outlined above show significant potential for delivering extension services in Botswana. The ratio of farmer/extensionist (250:300) is above average for sub-Saharan Africa, where most of the countries show an extensionist to farmer ratio of around 1:3,000.¹² However, as discussed in the next section, extension personnel are mainly absorbed by the administrative management of subsidized inputs delivered by ISPAAD, and are only sporadically engaged in delivering advisory services and in human and social capital development.
22. The poor linkage between research and extension, lack of on-the-job training of the extensionists, insufficient monitoring and supervision of field activities, and lack of training aids (visual and audio-visual) and transport represent crucial limitations, although these are similar to extension systems elsewhere. These weaknesses are also a manifestation of the focus of the extension system, which largely remains on transfer of inputs.

Scope and methodology of the extension services in Botswana by Government and IFAD

23. This section covers extension methodologies that either exist in Botswana and have been adopted during ASSP, or that have emerged organically in the course of implementation.

Transfer of inputs vs. transfer of technologies and knowledge

24. The extension service is essentially focused on inputs supply within the technology transfer domain mentioned above (inputs planning, management and control), within the framework of a largely subsidized programme (ISPAAD) for rainfed smallholder agriculture. ISPAAD provides smallholder farmers with inputs (e.g. standard quantity and types of seeds and fertilizers) and services (e.g. mechanized ploughing and spraying for weeds control), the latter mostly carried out by private contractors. ISPAAD and the extension system for crop production are organically linked and nearly synonymous: ISPAAD is the flagship programme implemented by the crop extension system, and the extension system involves a bulk of time and resources implementing ISPAAD.

⁷ Data provided by MoA during the field mission.

⁸ Main source: "An overview of agricultural extension in Botswana and needed reforms", Flora Modiane Tladi-Sekgwama, University of Botswana, 2019, <http://www.academicjournals.org/JAERD>.

⁹ Estimation: tot Arable Land ISPAAD 3.173 sq Km (average 2007-2018), n. of extensionists: 357 (2018).

¹⁰ Estimation: farmers in ISPAAD scheme 91.200 (average 2007-2018), n. of extensionists: 357 (2018).

¹¹ Observed during the field mission and also reported in some Project Supervision Reports.

¹² The Agriculture for Impact website (<https://ag4impact.org/sid/socio-economic-intensification/building-human-capital/agricultural-extension/>), a reference website for African smallholders groups and organizations, points out that "in Africa there is an estimated ratio of 1 extension worker per 4,000 farmers, far below the Food and Agriculture Organization (FAO) recommendation of 1 officer for every 400 farmers".

25. Botswana follows a rights-based approach to agricultural inputs whereby, subject to eligibility, all smallholders are provided with subsidized or free agricultural inputs. At the standard rates and current guidelines, the cost of subsidies is US\$300 per hectare. In the current context, since extension services in Botswana are mainly devoted to the management of inputs supply, the internalized extension institutional structure seems coherent with the flagship input subsidy programmes of the Ministry.
26. Consequently, other aspects of extension stated by Swanson, such as knowledge transfer through advisory services, *human and social capital* development, and natural resource management, are largely missing from extension's priorities. This approach and choice also influences and shapes the overall institutional design of the extension service, as well as its scope and methodology of intervention. The extension system is dense and is structured to ensure delivery of inputs and compliance with conditions of subsidy. This makes the case of Botswana peculiar in the global picture of extension services.
27. In fact, ASSP design itself says: "ISPAAD activities seriously impede the extension activities as they reduce the agricultural demonstrators (the extensionists) to input distribution and drought relief programme agents." The "Poverty and Social Impact of ISPAAD" (carried out in 2014 by the Poverty-Environment Initiative)¹³ concluded; "ISPAAD had a negative impact on extension outreach" (increasing extension outreach being one of the objectives of ISPAAD).
28. This kind of situation is not new in extension. Quite frequently, particularly in developing countries, extensionists are the only staff of the MoA working and living in the rural areas, directly in contact with the farmers and rural population. As B. Swanson had already remarked in his Reference Manual of 1984:¹⁴ *"In addition to educational responsibilities, extension personnel may be responsible for carrying out most ministry programmes and activities at local level. Therefore, they may sell and distribute inputs, perform regulatory functions, arbitrate disputes, collect agricultural data and handle subsidy programs. They, in fact, become the local agricultural representative of government rather than a full-time extension worker"*. This type of assignment, concludes Swanson, *"directly influences the extension worker's ability and capacity to perform his or her extension assignment, generally in a negative manner"*.

Farmer field school methodology

29. ASSP has supported the extension service in setting up farmer field schools (FFS), considered a suitable method of extension for testing new agricultural practices in rainfed smallholder agriculture and for increasing extension outreach. The fundamentals of FFS are synthetically outlined in the box below:

¹³ Marumo et al. "Poverty and Social Impact Analysis of the Integrated Support Programme for Arable Agriculture in Botswana", 2014, UNDP-UNEP-GoB

¹⁴ "Agricultural Extension – a reference manual", edited by Burton Swanson, FAO, 1984.

Box 1

Fundamentals of FFS

- a.) People-centred learning
- b.) Participatory methods
- c.) Practical field exercises using direct observation, discussion and decision making, and learning by doing
- d.) Community-based problem analysis as the entry point for developing the specific curriculum
- e.) Context of local ecosystem and socio-economic settings

30. The FFS approach was introduced in sub-Saharan African countries more than 20 years ago, and there is already a consistent record of field experience. The table below outlines some of the issues that are more frequently highlighted in different case studies, and assessments conducted in African countries where the methodology is significantly practised.

Table 2

Elements of analysis of FFS implementation through case studies in Sub-Saharan Africa¹⁵

<i>Pre-conditions for success of FFS</i>
<ul style="list-style-type: none"> Organized, committed and willing communities and participants Well-trained, motivated and dedicated facilitators with a good understanding of the local community environment and circumstances Well-defined prioritization of problems and availability of appropriate technologies to address these problems Adequate resources and logistical support for the facilitator Clear understanding of the concepts, principles and procedures of FFS by all stakeholders Support and goodwill of the authorities at various levels, especially civil societies at the local level and the research and extension administrators at all levels Capabilities of farmers and communities in internalizing complex knowledge systems and bio-physical relationships.
<i>Recurrent problems in FFS implementation</i>
<ul style="list-style-type: none"> Inadequate exposure of research and extension staff to the concepts and procedures of FFS Lack of national commitment (institutional and financial sustainability) in absence of external donors and implementing agencies/NGOs Predetermined content of the FFS (not always consensually decided by the farmers, top-down approach) Methodology is time-demanding for the farmers and the extensionist, in requiring assiduous and quite frequent "exchange and learning" sessions in the field school (distance, transport problems) during the growing season
<i>Lessons learned from FFS implementation</i>
<ul style="list-style-type: none"> Continuity and sustainability require effective integration of FFS concepts and principles into the academic curricula of learning institutions Financial sustainability may not be likely in the long run without funding projects. Farming community contribution is already taking place in some cases (e.g. some cases in Kenya) Farmer-to-farmer training has its costs (time compensation and logistical assistance for the "master farmer") and the issue has also to be addressed To be cost effective, the classical FFS approach should not deal with isolated components of production processes and, instead, should provide comprehensive and integrated crop/livestock practices Impact assessment of the FFS approach is critical and has to be increasingly conducted by farmers themselves. The abilities of extension staff to facilitate effective impact assessment by and with farmers are crucial Estimations of costs per farmer for FFS training have been attempted in several East African programmes and in Ghana, and indicate variable costs between US\$8 to US\$35/farmer.

31. It is widely recognised that FFS methodology can hardly be proposed from scratch as a standard approach at national level without the presence of one (or more) FFS "master trainers" in the country or region, and a consistent team of "national facilitators" (future trainers of trainers/extensionists) with: a) relevant technical expertise; b) strong facilitation skills; and c) organizational skills. FAO, which has played a key role so far in championing FFS programmes worldwide, believes that without these resources in place "the wide implementation of FFS approach should be discouraged in favour of other forms of training and extension".¹⁶ In the case of ASSP, FFS was piloted as one of the potential methodologies to promote conservation agriculture.
32. Notwithstanding the fact that FFS was hastily implemented towards the end of ASSP, virtually all the preconditions listed in Table 2 were absent at the start of FFS within ASSP in Botswana. Among the prerequisites mentioned in the table, Botswana lacks organized communities in the agriculture sector, with extension

¹⁵ Main sources: "Farmer Field Schools: An Alternative to Existing Extension Systems? Experience from Eastern and Southern Africa", International Food Policy Research Institute, 2007; "Farmers taking the lead - Thirty years of farmer field schools", FAO, 2019; "The Impact of Farmer Field Schools on Human and Social Capital: A Case Study from Ghana", S. David, C. Asamoah, 2011; Several evaluation reports and assessments including author's evaluations in Mozambique and West Africa (Senegal, Sierra Leone, Liberia, Ivory Coast).

¹⁶ see <http://www.fao.org/farmer-field-schools>, FAO "Farmer Field School Guidance Document - Planning for quality programmes", 2016.

being largely focused on individual farmers, extension services driven by transfer of inputs rather than transfer of technology and knowledge, and extension workers lacking transport and logistical support for follow-up on frequent training. ASSP faced constraints in the form of lack of sufficient knowledge among extension workers on the methodology, lack of mobility among frontline extensionists, and a general lack of awareness of FFS among different layers of policymakers, with subsequent lack of commitment to FFS.

33. In view of the lack of prerequisites and constraints above, the feedback received during the evaluation field visits has demonstrated that the activities followed the "classical" methodology of demonstration plots (with a control plot as well), rather than the FFS approach. They resembled extension group methodology, with no lead farmers or facilitators. In practical terms, the five "adaptive research trial sites" foreseen in the project were not established, and a well-structured process of interaction between research, training of trainers (technical officers, extensionists and lead farmers) and farmers groups through FFS did not occur. This is, in fact, one of the most recurrent problems in FFS implementation (see Table 2 above). This also stems from weaknesses of the extension system, such as lack of feedback loop between research, training and extension, as covered in Table 1.
34. The main learning opportunity for extension officers and farmers has been represented by study tours in neighbouring countries. However, these countries do not share the same ecological and socio-economic conditions of Botswana (e.g. Zambia, Mozambique, Rwanda and South Africa). More careful planning and preparation of the extension process, through a well-structured chain of "research-training-extension", would have identified problems of adaptability and feasibility of conservation agriculture in the Botswana context, and gradually tested some adaptive or alternative solutions.

Public-private partnership in extension service delivery

35. ISPAAD foresaw the establishment of *Agricultural Service Centres (ASCs)* to provide a range of services for arable farming, related to three sectors: mechanization, commercialization and provision of inputs. Among the ASCs established in the framework of ASSP, the centre in Tonota District, managed by a private company (through leasing), is implementing some initial extension activities for its clients.
36. The activities of Tonota ASC include advisory services on different agricultural areas (including livestock), demonstration plots both within the centre and in farmers' plots, soil analysis and advice on fertilizer application, production and selling of seedlings for horticulture, and maintenance and reparation of tractors and equipment. The centre is in its initial stage of development and can be relevant in *testing new initiatives of partnership and integration of private actors* into the implementation of public policies in the agricultural sector, including extension services.

Peer-to-peer learning

37. Peer-to-peer learning is not a methodology that is institutionalized into the extension services of Botswana. However, the evaluation team observed an interesting case of peer-to-peer learning in Palapye, where ASSP supported the setting up of an irrigation scheme using wastewater for horticulture. The pilot scheme shows a certain potential for creating and enhancing human and social capital among the users. A water-users association has been created, since it was a requirement for having access to the water of the treatment plant. Forms of incipient self-organization for joint commercialization of fresh products are also being discussed among the users, while the idea of creating a cooperative is taking shape.
38. The evaluation team found that knowledge and skills in horticulture and irrigation were uneven among beneficiaries/users of the irrigation scheme (around 30

farmers with, 30 per cent women and young people). However, building on the close physical proximity of lands and the water-users association, there is a visible, horizontal transfer of knowledge among them, benefiting those with less experience in terms of growing vegetables. In fact, new farmers have been learning from the experience of others who have started planting. On the other hand, the support of the extension service to the irrigation scheme is sporadic, due to lack of transport at the subdistrict office.

Key takeaways and concluding remarks

39. The extension service in Botswana is currently focused on assisting the inputs supply (planning, delivery and control) of ISPAAD, in support of the rainfed agriculture of smallholder farmers. Advisory services, programmes of human and social capital development, and specific initiatives for improving natural resources management and sustainable farming are scarcely represented in the extension activities. In light of the dense structure of the extension services, with their structured reporting lines and defined input targets (e.g. number of subsidy kits delivered), the high degree of standardization of operations appears well **suited to the implementation of top-down, compliance-based functions** such as in ISPAAD. This explains the failure of extension methodologies such as FFS and ASCs to take off. Any interesting initiatives in extension, such as the one on peer-to-peer learning, have emerged without the conscious intervention of ASSP or the extension system in Botswana.
40. Notwithstanding other factors such as a lack of integration between ISPAAD and ASSP (covered in the evaluation report), such a compliance-oriented extension structure was not conducive to implementing ASSP's activities, which required a reorientation of extension's role and focus. ASSP's activities demanded an extension system with a strong link to research, a feedback loop between various layers of the extension system, an output and outcome-tracking monitoring and evaluation system (as opposed to the current input-based tracking system), and an extension system with knowledge of various methods and methodologies for knowledge transfer and building human capital. Hence, the **extension system in Botswana is not oriented towards implementation of a typical IFAD programme** such as ASSP.