
The Potato Food Systems' Stakeholder Platform

Dialogue Report

By

Lesotho National Farmers Union

18th August 2021

This document has been produced through FO4ACP project that is supported by EU, ACP and IFAD.

The dialogue facilitated by
Prof. Makoala V. Marake, Ph.D
CCEAD Consulting
Faculty of Agriculture
National University of Lesotho

1.0 Introduction

Basotho erg livelihoods from agriculture albeit constrained potential to achieve food security and economic development through agricultural production without other complimentary strategies. It is apparent that current food systems do not adequately support the farmers for the advancement of agriculture and food production, including on health and nutrition, welfare of farmers and people in general, as well as natural environment. It is common cause that farmers aspire to undertake agricultural activities for business and as such require some form of private-sector development to substantially and sustainably increase the profits of low-income, smallholder farmer's enterprises through both technical and institutional capacity building. This also requires an enabling environment allowing farmers to sustainably increase their production and have greater market engagement and efficiently restoring the environmental resource base.

The second National Strategic Development Plan (NSDP II) identifies agriculture as one of the economic drivers through commercial /entrepreneurship agriculture under the framework of climate smart agricultural investment initiatives. However, the support to the farmers has never been commensurate to the pronouncements of agriculture as the mainstay of the economy. Farmers increasingly experience difficulties to access financial assistance and appropriate technical capacity building. In addition, Lesotho agriculture in general is weakened by lack of supportive policy for value chain development compounded by poor road infrastructure, lack of irrigation systems and the lack of processing and storage facilities. While farmers are always willing to engage in farming and value chain systems to supply commodities to the markets, they face difficulties in accessing markets often due to poor quality of the produce, low volumes and erratic supplies relative to market demand. While farmers are free and independent players in the food systems sector, they do not work alone, as the agricultural business environment requires them to work and collaborate with other stakeholders in the food systems value chain. In particular, farmers operate in a complex and dynamic environment and are members of food systems value chain collectives including other farmers, suppliers, traders, transporters and processors.

The food system, therefore, encompasses both the basic elements of how food goes from farm to the plate, and all processes and infrastructure involved in the national food security. Systems can also exist within systems, for example, farming systems, agricultural ecosystems, economic systems, and social systems and within those are further subsets of water systems, energy systems, financing systems, marketing systems, policy systems, culinary systems, and so on. Thus, the food system is a complex web of activities involving production, processing, transport, and

consumption. Issues concerning the food system include the governance and economics of food production, its sustainability, the degree of food waste, agro-ecological and environmental effects of food production and the impact of food on individual and population health. The effective functioning of a food system, at any level, demands the fulfilment of a number of preconditions e.g. access to land, energy, water and other resources, the absence of environmental disturbances and disasters such as droughts, floods, soil erosion or the contamination of air, water and soils and lack of disturbances resulting from political and military conflicts (Sage, 2013[1]; Porter et al., 2014[2]; Dyball, 2015[3]; Morgan, 2015[4]; Olsson, 2018[5]). In a world of increasing uncertainty (Steffen et al., 2015[6]), the above preconditions are not guaranteed. Therefore, dependence on the global food system is jeopardising human food security irrespective of the scale, be it international, national or local. Farmers' participation in policy and food system development is very essential in Agriculture and Food Production System. It is thus urgent to organize the commodity stakeholders to discuss the main challenges hindering the development of the potato Food System in Lesotho and suggest possible solutions.

The general perception is that the overall potato sector growth is hampered by the inability of farmers to increase farm productivity, stabilize production and negotiate access to processing and marketing value chains with the private sector and business community of Lesotho. This can only be satisfactorily addressed when making solutions with but not for the farmers. To this end, the stakeholder platform sought to discuss collective challenges and latent potential amongst farmers and their collectives and with other stakeholders in the potato food system. Furthermore, the platform sought to enhance the understanding and capacity of producers and business partners in the private and public sectors for their effective participation in policy and potato food system development.

[1] Sage, C. 2013. The interconnected challenges for food security from a food regimes perspective: Energy, climate and malconsumption. Journal of Rural Studies 29:71–80

[2] Porter, J.R., R. Dyball, D. Dumaresq, L. Deutsch and H. Matsuda. 2014. Feeding capitals: Urban food security and self-provisioning in Canberra, Copenhagen and Tokyo. Global Food Security 3:1–7

[3] Dyball, R. 2015. From industrial production to biosensitivity: The need for a food system paradigm shift. Journal of Environmental Studies and Sciences 5: 560–572

[4] Morgan, K. 2015. Nourishing the city: The rise of the urban food question in the Global North. Urban Studies 52: 1379–1394.

[5] Olsson, E.G.A. 2018. Peri-urban food production as means towards urban food security and increased urban resilience. In Zeunert, J. and Waterman, T. (eds), Routledge handbook of landscape and food, Routledge, London and New York, 197–212.

[6] Steffen, W., K. Richardson, J. Rockström, S.E. Cornell, I. Fetzer, E.M. Bennett, R. Biggs, S.R. Carpenter, W. de Vries and C.A. de Wit. 2015. Planetary boundaries: Guiding human development on a changing planet. Science: 347, art. 1259855

In an effort to contribute to the development of the potato food system in Lesotho, LENAFU hosted a stakeholder dialogue platform on the 18th August 2021. The dialogue served as a forum to articulate challenges and act upon stakeholder aspirations especially to unmute the voice of the potato farmers in the shaping of the policy discourse.

2.0 The purpose and objectives of the Platform

The purpose of the dialogue was to bracket together the most relevant stakeholders in the potato value chain in Lesotho to discuss the challenges and opportunities in the subsector and to map the best possible ways for its development/ improvement. The goal was to create a platform for the stakeholders to share their current and future roles in the development of potato food system in Lesotho. The platform eventually enabled actors in the potato food system to identify the strengths, gaps and to inform planning for future interventions in development of the potato sector in Lesotho. Specifically, the objectives of the dialogue were to:

a) Establish the state of the potato food system in Lesotho
b) Highlight the key issues at stake for farmers and other value chain actors
c) Develop common positions and resolutions on the potato food systems transformation pathways from the perspectives of stakeholders.

3.0 Dialogue Facilitation Approach and Methodology

Table 1, outlines the agenda of the dialogue. The schedule was designed to efficiently and effectively guide the stakeholders and focus their contributions ahead of the plenary discussions.

Table 1. Schedule of presentations in the dialogue. August 18th 2021.

Name of Organization/ Project	About the Presentation	Time
1. Ministry of Agriculture and Food Security (MAFS) a) Department of Crops b) Department of Marketing	➢ Access to inputs and equipment ➢ Policy environment for the development of the potato sector ➢ Other production Support Services ➢ Facilitating farmers access to the markets ➢ Promoting local purchasing (Policies and legal frameworks)	➢ 10 minutes
2. Food and Agricultural Organization (FAO)	➢ The contribution of FAO to the development/ growth of Potato sector in Lesotho ➢ The gaps in the value chain which needs complimentary support to the efforts of FAO ➢ Any future plans on the development of the sector	➢ 10 minutes

Table 1. Schedule of presentations in the dialogue. August 18th 2021.		
Name of Organization/ Project	**About the Presentation**	**Time**
3. Agricultural Productivity Program for Southern Africa (APPSA)	➢ Research development on the potatoes (What has been done and the planned research studies). ➢ What are the research gaps identified that need attention?	➢ 10 minutes
4. Local Supplier Development Program (LSDP)	➢ The contribution of LSDP to the promotion of the potato sector in Lesotho.	➢ 10 minutes
5. Small Holder Agricultural Development Project (SADP)	➢ The contribution of SADP to improving the potato sector in Lesotho. ➢ Specific grands/ packages marked for the development of the potato sector ➢ Gaps and opportunities identified in the potato subsector.	➢ 10 minutes
6. Potato Lesotho Association (PLA)	➢ Challenges facing the potato producers ➢ Inputs, machinery and equipment ➢ Market security ➢ Financial support ➢ Lack of research findings to inform on-farm activities	➢ 10 Minutes
Facilitated Discussions: All interventions must address the question (s): ➢ Why is Lesotho not able to produce adequate potatoes to supply both the local and external market demands? ➢ What have we been doing, is it the right way or not? ➢ How best can we collectively promote the sector?		➢ 90 minutes

The rules of engagement were for each presentation to take no more than 10 minutes. Each presenter was expected to make one or two concluding statement (s) on the suggested resolution from their presentation to address the way forward with the identified gaps. All comments and questions were reserved to the end of the panel presentation where 90 minutes were reserved for open discussions on the potato food system.

4.0 Opening Statements by the LENAFU President and Facilitator

4.1 Background

The purpose of the platform was put as to discuss the challenges and latent potential amongst the farmers (potato producers) and with other stakeholders in the potato food system. The platform was meant to enhance the understanding and capacity of producers and business partners in the private and public sectors for their effective participation in policy and potato food system development. The concluding statements by both the President and the facilitator emphasized the importance of having the dialogues amongst the relevant actors in the Food System as that would reveal the unnoticed challenges and opportunities in the sector. It was further indicated that the platform will produce proceedings of the Dialogue Forum with a high level summary highlighting salient resolutions on the way forward and a position paper on the potato food system in Lesotho.

5.0 High Level Summary of the Discussions

Based on the outline in Table 1, eight (8) panel presentations of approximately 10 minutes each were facilitated. The panellists were composed of the MAFS with three departmental presentations, Department of Crops, Department Marketing and Department of Agricultural Research and two project presentations (APPSA and SADP) under MAFS. Two panellists represented the United Nations programs in Lesotho i.e. FAO and UNDP. Finally, the potato commodity farmers were represented by the Potato Lesotho Association. The full content of the presentations are detailed in Appendix 1. Below is a high level summary of the emerging issues.

5.1 Towards a shared Vision

The dialogue painted in broad brush strokes a clearly emerging vision of the potato system characterized by the following dimensions:

5.1.1 Increased and stable Potato Production promoting block farming along guided by land suitability and capability classification for potato in the short to medium-term.

a) Appropriate production technology investments
b) Seed Potato as a priority with biotechnology facilities at the National University of Lesotho (NUL) and field propagation and multiplication on-farm
c) Mobilization of input supply including seed, fertilizer and agrochemicals
d) Incentivizing mechanization in the potato value system

e) Appreciation and commitment to standards

5.1.2 Commitment to value chain development towards full scale commercialization through commodity specialization with a clear strategic plan.

a) Collaboration leveraging public-private partnerships and academia
b) Prioritizing product development
c) Coordination of the food system
d) Information management and sharing
e) Shift to contract farming arrangements with visionary champion farmers

5.2 Challenges

The presentation, in particular the Potato Lesotho Association (PLA) identified a number of challenges constraining the development of the potato food system. The following were flagged as key challenges:

5.2.1 Road infrastructure into farmlands
5.2.2 Power supply to support transition to irrigation in the croplands
5.2.3 Mechanization of potato production with appropriate equipment along the value chain
5.2.4 Value development challenges
5.2.5 Quality seed supply and development
5.2.6 Lack of standards
5.2.7 Consideration for organic produce for special niches

5.3 Emerging Windows of Opportunity from the Panel Discussions

The presentations and plenary interventions recognized emerging opportunities in the potato food system. These opportunities will help expedite the achievement of a fully developed and functional potato food system.

5.3.1 Research opportunities with the APPSA Initiative

APPSA presents an opportunity for research funding on critical aspects of the potato value chain as follows:

a) Research on various aspects of the production Node of the value chain
b) Research on breeding for various material improvement of the potato production materials such as variety development and characterization, drought tolerance, plant protection (disease and pest tolerance cum resistance)
c) Research on product development along the processing and value adding node of the value chain

5.3.2 Credit Facilities

- MAFS through the Ministry of Finance has agreed a Memorandum of Understanding with the Lesotho Post Bank to facilitate a credit line for farmers to purchase equipment and machinery.
- The SADP has a platform for farmers and farmer collectives in the following categories:
  - ✓ Small Grants: $US 10,000 TO $US 30,000
  - ✓ Large Grants: $US 30,000 to $US 100,000

5.3.3 Commercialization Opportunities

d) The APPSA provides opportunities for collaborative research between farmers, NGOs and the National Agricultural Research Institutions to create research and development projects which will pave the transition from subsistence to commercial production by exploring solutions and constraints along the transition scape.

e) The UNDP-LSDP and Green Value Chains initiative seeks to build capacity of stakeholders along the potato food system to make the critical transition from the CT towards the RL and ultimately the CZ scenarios (Fig. 2) of the Lesotho Climate Smart Investment Plan (2020).

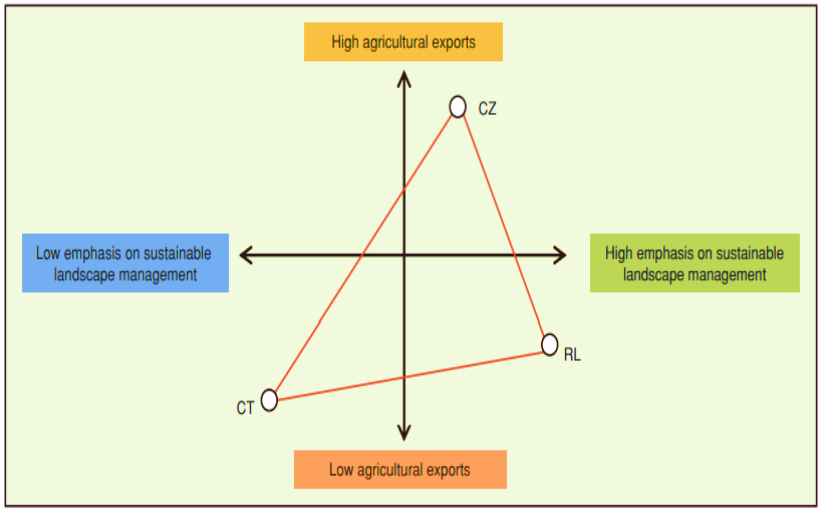


Fig. 2. Positioning of scenarios on the axes of drivers pf agricultural land change: CT – Current Trends; RL: Resilient Landscapes and CZ: Commercialization. Source: Lesotho Climate Smart Investment Plan (2020).

f) The coalition of LENAFU and Potato Lesotho Association are providing a window of opportunity organizing the producers at different levels of the commercialization drive making it possible for targeting different development interventions.

6.0 Brief Statement on the State of the Potato Food System in Lesotho

6.1 The Potato Food System

The long-term goal is to externalize production processes in order to ensure profit maximisation within sustainable limits of land and water resources for the benefit of current and future generation of farmers. Potato is a popular vegetable crop in Lesotho and is gaining momentum as a niche agricultural product in the foothills and highlands of Lesotho. Potato production is currently a small-scale venture using traditional farming methods. However, there is an emerging cadre of small-scale farmers under the auspices of the Potato Lesotho Association aspiring to make the hitherto difficult transition from subsistence to commercial farming with specialization on the potato commodity.

The potato food system is characterized by a range of players (Fig. 1) dominated by the South Africa which presents a challenge for the emerging potato sector in Lesotho.

System Property	Key Players	Challenges and prospects for Lesotho
Breeding/Propagation by breeders and seed growers	South African Institutions	NUL has a biotechnology laboratory with capacity for tissue culture. The intermediary greenhouse requires intensive maintenance
Soil and nutrient management	South African Fertilizer producers and processors	Research must explore potential for manure application and calibration of fertilizer application
Disease and pest management	Supply of agrochemicals dependent on South Africa	Lesotho has capacity for plant protection expects and technicians
Agronomy and husbandry by Practitioners/Farmers	Technical guidelines and manuals still borrowing heavily from South African experience and expertise	Technical advice driven mainly by DAR and Extension services in the MAFS in collaboration of practitioners /farmers
Mechanization of operations	Potato mechanization beyond primary tillage is rudimentary	There is potential for polytechnic schools and artisans in Lesotho to fabricate locally appropriate equipment for small fields and possibly ox drawn. There is a window of opportunity for procurement of mechanization tools through the Lesotho Post Bank and SADP
Harvesting operations	Manual operations mainly	There is a critical gap with a need to mechanize harvesting operations at least to the oxen technology levels
Product Transport	Private contractors available in Lesotho for bulk transport	The road infrastructure in the rural areas is a challenge
Storage	This is a critical need for Lesotho	Private sector investment must be explored
Processing by Nutritionists and Manufacturers	This node is undeveloped in Lesotho hence very little if any value addition to the produce	There is high appetite in the private sector and academia to explore product development
Marketing by Market Agents	This node is at infant stage in Lesotho. There is need to attract aggregators	There is need for investment in business training and linkage of farmers to business and markets through aggregator agents.
Wholesalers and Retailers	These nodes are also infantile	Need for aggressive actions to bring private sector and business into the sector
Consumption	There is high demand by households and institutions	There is need for product development to expand the consumer base
Recycling	This is a role of processors and manufacturers but currently undeveloped	There is need to attract private sector investment and academia for researching options

6.2 Constraints for Potato Production[7]

In the years ahead, Lesotho potato production is expected to grow significantly presenting opportunities for expanded utilization and opening up new market segments. To realize the full potential of this crop, Lesotho must address both supply and demand-side constraints.

6.2.1 Technical Constraints

Many constraints derive from the biological characteristics of the potato itself. These include the low multiplication rates of seed tubers, and the technical difficulties and costs associated with maintaining seed quality through successive multiplications, owing to the potato's susceptibility to soil and seed-borne insect pests and diseases. Seed tubers are also bulky as typically seed requirement is two to three tonnes per hectare. Stringent phytosanitary restrictions limit the movement of potato germplasm, seed tubers and fresh ware potatoes. Potatoes have high fertilizer requirements but low utilization efficiency. Post-harvest, fresh potato tubers deteriorate quickly in warm environments especially the Lesotho lowlands.

6.2.1.1 Lack of Efficient Seed Systems

Lesotho, like many developing countries, lacks efficient systems for the regular multiplication and distribution of certified seed tubers and the rapid deployment of new, improved varieties. Causal factors include the limited technical capacity of human resources, lack of managerial expertise and inadequate resource allocations to seed systems and the potato subsector in general. As a result, farmer-based seed systems are dominant, and have managed to supply planting material of limited quality over the years, and contributed to expanding cultivation of the crop. However, farmer seed systems face many challenges, but also offer an opportunity to improve seed supply, provided suitable training is available and links with the formal sector are established.

6.2.1.2 Diseases and Insect Pests

Diseases and insect pests are another major constraint especially as new strains of late continue to spread. Late blight constitutes the most serious threat to increased potato production. Second to late blight in importance, particularly in warmer, lowlands regions, is bacterial wilt. The impact of insect pests varies between significantly across agro-ecological zones in Lesotho. Major insect pests include aphids, tuber moths, leaf miners, potato beetle and potato weevil.

---

[7] Excerpts from: Lutaladio N., O. Ortiz, A. Haverkort, D. Caldiz. 2009. Sustainable Potato Production: Guidelines for Developing Countries. Food and Agriculture Organization of the United Nations.

6.2.1.3 Production and Management Limitations

Lesotho experiences limited access to technology from planting to harvesting through to cleaning, sorting and packaging. These are compounded by limited access to production finance and markets. Furthermore, productivity limitations are characterized by inadequate knowledge, poor mechanization. Profit margins are also limited by high post-harvest losses, poor husbandry and unstructured pricing protocols and lack of standards. The foregoing translates to serious farm livelihood limitations resulting from poor planning inadequate infrastructure and services. These are further compounded by environmental limitation which include uncoordinated bulk infrastructure, poor resource management and sanitation.

6.2.2 Socioeconomic Constraints

6.2.2.1 High Production Costs and Lack of Credit

Compared to other food crops, production of potatoes is capital-intensive, requiring the purchase of large quantities of bulky seed and the application of high-cost inputs such as fertilizers and pesticides. With limited access to credit and few means of mitigating the risks of taking out loans, small-scale farmers find it difficult to compete in potato production. The current COVID-19 crisis has precipitated a global financial crisis which could leave a great number of farmers with little money and no credit to invest in production. Thus the SADP, FAO and UNDP interventions are of critical significance in the current dispensation.

6.2.2.2 Price Instability

With potato becoming increasingly a cash crop, small-scale potato growers are vulnerable to abrupt changes in input and output prices. Seasonal and year-to-year price movements can affect individual small growers who lack the financial resources and resilience of larger producers and cooperatives.

6.2.2.3 Inefficiency of Local Markets

Potato prices are usually determined by supply and demand, not the vagaries of international markets as in the case of cereals. It is, therefore, a crop that can help low-income farmers and consumers to ride out episodes of food price inflation, such as that experienced worldwide in COVID-19 crisis. However, the profitability of potato depends on efficient local markets and measures to control overproduction. The latter, however, will not be an issue in Lesotho in the short-term.

6.2.2.4 Limited Access to Higher Value Markets

To be successful, small-scale potato growers need access to profitable emerging domestic markets such as emerging processing segment as well as to potato export markets. However, in Lesotho, access to domestic markets will be restricted by the marketing power of South African suppliers. Exports, on the other hand, are constrained by trade barriers in developed countries to processed products from the developing world although in the short-term Lesotho must strive to satisfy the local market demand. However, there are encouraging "success stories" that illustrate how small-scale producers can increase production and expand their market share. The success stories of the Potato Lesotho Association and experiences from the FAO and the Local Supplier Development Program must be used as a catalyst to ignite the fires of success. The Dialogue has exposed the appetite of the private sector, including small businesses, to launch potato products.

6.2.3 Policy and Institutional Constraints

6.2.3.1 Neglect of the Potato Subsector

Lesotho's Food Security Policy of 2005, despite its age say little, if anything about the potato sector. Thus like many developing countries, Lesotho's policies toward the potato subsector, and especially small-scale producers, can be best characterized as "benign neglect". Little or no public investment is targeted at integrated strategies for crop improvement, value addition and marketing schemes or the potato production-processing-marketing chain. Lesotho lacks adequate seed production systems backed by certification and seed laws. Breeding rights are non-existent and given our history of law enforcement would, even if they existed, not be respected. This culture is non-productive and reduce incentives to breeders to create new adapted and resistant varieties. Throughout the rural areas especially the highlands which are prime zones for potato production, poor infrastructural facilities and poor access to markets are major challenges to expansion of potato production and its profitability.

6.2.3.2 Inadequate Capacity Building Initiatives

The potato must attract private sector investment in the crucial area of seed multiplication and seed systems in Lesotho. Furthermore, support for programmes for the diffusion of new varieties and for the scaling up of existing integrated disease and insect pest management technologies and methodologies is generally inadequate. Programmes to upgrade the skills of potato growers need to be matched by government efforts to create, monitor and enforce regulations on pesticide use and the spread of pesticide or fertilizer residues into water supplies, which are major constraints to the sustainability of natural ecosystem. Generally, there is lack of extension services to support

with technical skills, the beneficiaries of development projects have a relative advantage in accessing such information over non-beneficiaries.

6.2.3.3 Lack of Support to Farmer Organizations and Entrepreneurs

Support for potato farmer groups and associations and for local entrepreneurship, in Lesotho, is not commensurate to the pronouncements of agriculture as the mainstay of the economy. LENAFU and PLA's lack of capacity to lobby represents the most serious obstacle to the development of a local farmer support initiatives including seed potato industry. The lack of research on potato is compounded by public and private sector's inability to incentivize seed quality and promote variety development, and to transfer technology for integrated crop management to farmers.

6.3 Potato Production Decision Factors

In potato-based systems in Lesotho, the good agricultural practice concept is associated with critical production decision factors and recommendations.

6.3.1 Environment and Production Zones

The potato is essentially a "cool weather crop", with temperature being the main limiting factor. In Lesotho, potato should be grown where the climate is tempered by altitude i.e. the foothills and mountains and ideally in the lowlands provided the crop is grown during the cool season. The ideal condition for tuberization is a night temperature of around 16°C, while optimum yields are obtained where mean daily temperatures are in the 18-20°C range. Loose, moist and well-drained slightly acid soil (with pH of 5.0-5.5) or upland soils are preferred. The water supply for the potato crop should be regular, especially from the stage of tuber initiation until the end of tuber enlargement. However, the agronomy of the potato crop in Lesotho has not been researched and is thus a key priority for future investments in potato agriculture. Fortunately, the APPSA RCoL-Horticulture program in Lesotho has already prioritized potato research along with other horticultural crops.

6.3.2 Potato Cultivation Methods

A successful potato crop depends on judicious cultural practices. These include good knowledge of variety purity and characteristics such as dormancy duration, the physiological condition of seed potato tubers (well sprouted and 30-80 g in weight, depending on variety) and resistance to the main transmissible potato diseases and nematodes. Potatoes are best grown in rotation either as a first crop in the rotation or after cereals and before legumes but not with crops (e.g. tomato and other solanaceae) that are susceptible to the same pathogens as the potato. Sometimes natural fallow

is necessary to prevent soil impoverishment and the build-up of potato specific diseases and insect pests.

Soil preparation for the potato crop should be adequate with minimum soil disturbance. However, in Lesotho, the soil potentially experiences high disturbance because of the lack of proper equipment. For example, the primary tillage operations are often followed by secondary operations to break the clods and maintain a fine seedbed. The third operation is one of opening the planting lines by opening a farrow either manually or using a an ox-drawn mouldboard plough. After seed placement, the final soil movement is for covering the seed with soil. If we had proper seeding equipment, there would only be a primary tillage operation followed by a mechanized seeding operation hence reducing the soil disturbance to the minimum. Naturally loose soils, and loamy and sandy loam soils that are rich in organic matter with good drainage and aeration, are the most suitable. Planting depth, density and spacing depend on the variety chosen and tuber size, and should allow for shallow inter-row ridging, when required. Usually, about two thousand kg of seed tubers are planted per hectare. To give the crop a competitive advantage, weeding should be performed after full crop emergence (about 4 weeks after planting) and after the plants have reached a height of about 20 cm. Shallow ridging is done subsequently to prevent the stolons becoming aerials, and to protect tubers against insect pests, disease infection and greening.

Crop rotation and careful chemical control with herbicides, applied at minimum lethal doses, may be part of an integrated weed management system but under small-scale fields, weed management is preferably carried out manually. A few basic precautions against insect pests and diseases can help avoid high yield and quality losses. These include crop rotation, use of resistant varieties and healthy, certified seed tubers (if available or at least seed from a reputed source or through positive selection), and integrated disease and insect pest management, which involves regular monitoring of aphid and thrips vectors, other insects and natural enemy populations, and chemical spraying only when necessary. Fertilizer application during the stages of pre-planting, planting or crop growth should be determined by soil nutrient availability, taking into account the potato's high demand for potassium, phosphorus and magnesium deficiencies in acid soils. The potato can benefit from the application of organic manure at the start of a new rotation as it provides a good nutrient balance and protects soil structure from compaction and erosion. As soil moisture must be maintained at a relatively high level in production of potatoes, compared to other crops, irrigation may be required where rainfall is limited.

6.3.3 Harvesting

For most commercial varieties, yellowing of the potato plant's leaves and easy separation of tubers from stolons indicate that the potato crop has reached maturity. To facilitate harvesting and stop tuber growth, potato vines should be removed two weeks before the potatoes are dug up. In Lesotho harvesting is triggered by similar indicators but the removal of the potato vines is not practiced and the harvest operation, regardless of the scale of production, is done manually with hand tools or oxen drawn plough to expose the tubers to the surface. Commercial potato harvesters that unearth the plant and shake or blow the soil from the tubers. Commercialization of the commodity requires enabling credit facilities for farmers to acquire such harvesters for both large blocks and small plots.

The tubers are subsequently, hand picked. Ideally, If the potatoes are to be stored rather than consumed immediately, they are left in the soil to allow their skin to harden because the hard skin also help seed potatoes to resist storage diseases. However, leaving tubers for too long in the ground increases their exposure to the fungal disease black scurf and increases the risk of losing quality and marketable yield. In Lesotho, this may also expose the crop to the additional risk of theft as the potato farms are often far from the villages.

During harvesting, especially if it is done mechanically, it is important to avoid bruising or other injuries, which provide entry points for storage diseases and reduce the commercial, processing quality and storability of the tubers. In suitable environments and where growing conditions are adequate, commercial yields are in the range of 40–60 tonnes per hectare. In many developing countries, however, they are far below this figure, with national averages below 20 tonnes per hectare. In Lesotho, under rainfed conditions, the target is tonnes per ha but the average is currently 15 tonnes.

6.3.4 Storage and Transport

Since refrigerated storage is not available in Lesotho, seed tubers should be stored under diffuse light in order to maintain their sprouting capacity and to encourage development of vigorous sprouts. Ware potatoes should be kept at a temperature of about 6 to 8°C, in a dark, well ventilated environment with high relative humidity (85 to 90 percent). For processing purposes, such as the production of potato chips, storage temperatures may range up to 10°C to reduce the risk of increasing sugar levels, which are responsible for a dark colour during frying. Potato darkening can also be caused by an excess of nitrogen in the fertilization formula. During transport of seed tubers

and ware and processing potatoes, it is important to avoid bruising by reducing drop height, lining containers with rubber or other soft material, and avoiding extreme temperatures. Tubers should be protected against unexpected rainfall and snow, which can occur at high altitudes.

6.4 Force Field Analysis of the Potato Food System

Starting from the current situation, the sector must respond effectively to the question: "Where do we want to see the Lesotho Potato sub-sector?

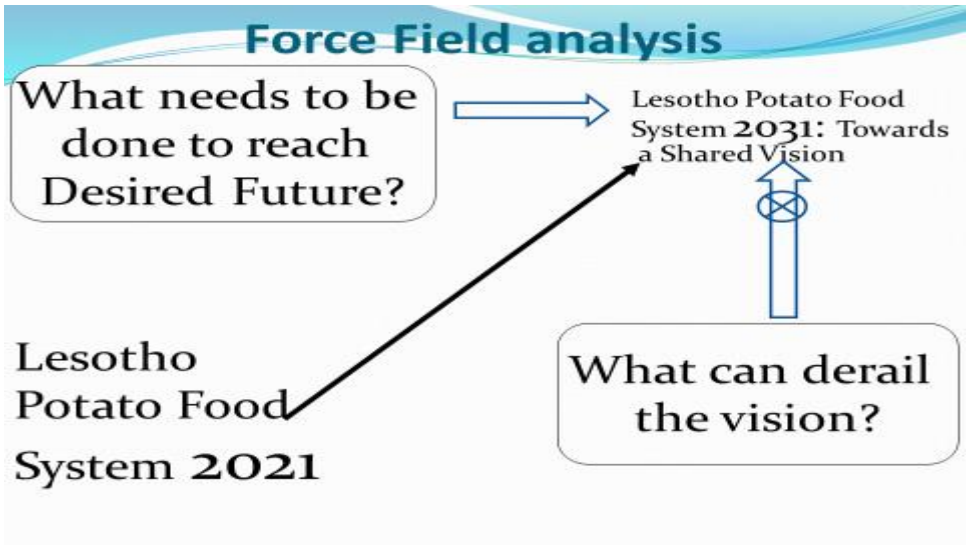


Fig. 3. Indicative Force Field Analysis of the Potato Food System in Lesotho

The emerging vision of the Lesotho Potato Food System is towards national surplus production, comprehensive processing, export to regional and international markets for wealth creation for rural communities. To stay on the trajectory and realize the visionary ideals, the sector must maintain its attitude and farmers must invest in appropriate mechanization, systematic marketing and technology generation and training. An equally critical question is: What factors can derail our vision if not addressed? Amongst other things inadequate support of the private sector, sub-optimal production and ethical standards and inadequate specialization will think the ship.

Appendix 1

7.0 Panel Presentations

7.1 Ministry of Agriculture and Food Security (MAFS)

7.1.1 Department of Crops (DOC)

In their presentation, DOC addressed the following key service and policy issues:

a) Access to Inputs and Equipment

The Government of Lesotho seeks to build a sound foundation for sustainable and commercial agriculture sector dominantly driven by the business sector. However, it continues to maintain its commitment to the use of systematic subsidies as a policy tool to help achieve poverty reduction and food security objectives. To this end, MAFS subsidizes agricultural inputs for various field operations such as fertilizer e.g. 2:3:2 (22), quality seed potato and agrochemical for potato crop protection e.g. insecticides and herbicide.

MAFS has an operating policy to enable farmer access to farm equipment at set charges to the farmers.

Operation	Recommended charge/ acre (M)	Recommended charge/ Ha (M)
Ploughing	380.00	950.00
Potato planting	220.00	550.00
Potato ridging	150.00	375.00
Potato digging	250.00	625.00

As an expansion to this policy, it has facilitated a memorandum of understanding (MOU) with the Lesotho Post Bank through the Ministry of Finance. The MOU allows the Lesotho Post Bank to financially advance the purchase of tractors and their implements for farmers. The objective is to improve access of farmers to tractors and implements for timely field operations. In addition, MAFS provides potato seed inspection and certification services as well as farmer training as part of the extension service provision.

In the policy environment, the following policies were highlighted:

- Lesotho Food Security Policy (2005)
- National Seed Policy: To provide guidance for the development of an effective, efficient and sustainable seed system capable of producing and supplying high quality seed to satisfy national requirements and tap into external markets.

- Subsidy Policy (2003): (Ensuring availability of good quality inputs as a foundation for sustainable agriculture)
- Plant Protection Policy (2021) – to ensure that imports and exports of plants and plant products are not a means of introduction of pests.
- Biosafety Policy: to ensure safe use of biotechnology in order to protect human health and ensure the well-being of the environment, while maximizing the benefits from biotechnology.
- National Irrigation master plan and investment framework(Ensuring that potential production sides are irrigated)

The foregoing policies notwithstanding, the presentation highlighted the following gaps in the policy arena:

- Seed Act – already under development
- Plant Variety Protection Legislation. However, at the regional level Government is yet to sign and ratify the SADC Plant Variety Protection Protocol
- Plant Protection act (phytosanitary)
- Biosafety act – bill already developed
- Pesticide Management act – under development
- Domestication and Implementation of the International Standards for Phytosanitary Measures (ISPMs) developed under Intergovernmental Panel on Climate Change (IPCC)
- Harmonised Seed Regulatory System (HSRS) domestication and implementation - sign and ratify the SADC Plant Variety Protection (PVP) Protocol

MAFS further admitted the core problem as the inadequate supply of high-quality planting material to meet the demand. To this end they pointed out the following barriers and weaknesses: low quality, low yielding seed; Poor seed /ware storage; and limited training capacity. Nevertheless, the Ministry noted the following as critical interventions for success of the potato food system:

- Rapid multiplication technology (plantlets/ tissue culture lab-minitubers)
- Timely availability of high-quality seed
- Appropriate farmer friendly seed quality control
- Good seed/ware storage be established at each of the potato growing site so as to facilitate linkages between seed suppliers and buyers
- Seed inspection/certification
- Production of market friendly varieties

In conclusion, MAFS acknowledged that potato is important for both consumers and buyers (provides higher income per unit area) because the industry has high potential to provide opportunities for employment. Moreover, potato production can ensure food security amidst declining arable land and changing climate hence an urgent need for development of a sound policy framework conducive for potato food system.

7.1.2 Department of Marketing

The Department is mandated to facilitate market development for agricultural products and to promote agricultural commercialization, value-adding, absorption of local products into global markets and development of efficient marketing systems. The ultimate goal is to attain national goals of employment creation, food security and poverty alleviation. The overall objective of the Department is to provide a marketing policy environment that promotes competitiveness, private sector participation, market oriented production and diversified output in accordance with comparative/competitive advantage and the development of marketing systems. It is functionally divided into the following divisions for operational efficiency and effectiveness:

The Department has the following key functions as follows:

- **Market Research:** The section is responsible for marketing research on various value chains and market information services.
- **Market Development**: This section is responsible for erection of marketing infrastructure and capacity building for farmers and other value chain actors.
- **Market Access:** This section facilitates development of market linkages between producers and potential market outlets, e.g. Buyer-seller meetings, direct marketing, trade fairs both locally and internationally.
  - ✓ Marketing controls and regulations: Responsible for the implementation of the Agricultural Marketing Act 1967
  - ✓ Organizes and conducts auction sales programmes throughout the country.
  - ✓ Development and implementation of comprehensive marketing strategies for local products.
- **Market Linkage:** Facilitates development of market linkages between producers and potential market outlets, e.g. Buyer-seller meetings, direct marketing, trade fairs both locally and internationally. Organizes and conducts auction sales programmes throughout the country. It is, in addition, responsible for development and implementation of comprehensive marketing strategies for local products.

The following were presented by the Department as the main challenges and gaps in the Potato Market system in Lesotho:

- Dishonesty of farmers .eg. They package /put damaged potatoes under the good ones.
- Inaccessible or lack of road infrastructure, resulting in difficulties in transportation of potatoes from the field to the storage or to the market.
- Poor record keeping by the farmers: Farmers do not keep records and update them regularly as may be necessary. The lack of production and harvest records/ reports make it difficult for the Department to assist the farmers access the markets.
- Value addition/Processing is minimal in the Country. Thus, the potato market in Lesotho is very thin as majority of the traders use potatoes for frying chips

There are two main operating legal frameworks guiding the Department of Marketing i.e. Agricultural marketing Act of 1967 and the Legal Notice no. 28/1992 mandates the Department to control importation and/or exportation of Fruits and Vegetable.

7.1.3 Department of Agricultural Research (DAR)

The Departmental potato sector improvement strategy identified key stakeholders and defined roles and responsibilities and areas of specialization around seed and ware. The idea is to mobilize necessary funding for implementation and research (both from government, private sector and international donors).

a) Varietal Evaluation, Seed Production and Availability

The Department has identified the following as opportunities for research in line with the development of the potato sector in Lesotho

- Varietal development and evaluation (for multiple uses, e.g, fries, pot, etc) at multi-location sites
- Breeding issues (mutation breeding – APPSA and IAEA to train a PhD student around improving potato using mutation breeding)
    - ✓ There will be research and development (R&D) sub-projects looking at varieties of potatoes (linking with international organizations and other research organizations)
- Basic seed/planting material (biotechnology applications)
    - ✓ There will also be sub-project to build capacity on propagation of basic planting material for seed multiplication and capacity on quality management aspects

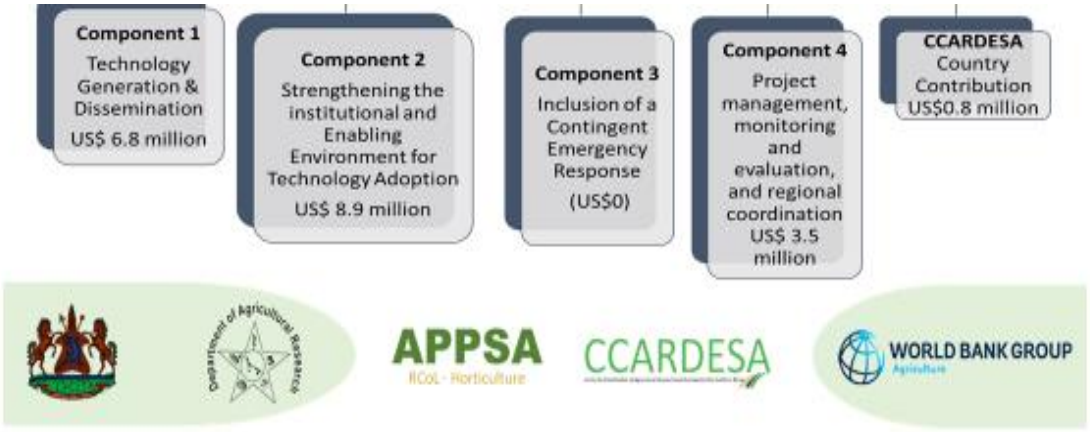
The presentation identified post-harvest handling (storage issues), agro-processing (development of food products) and many more from stakeholders.

7.1.4 Agricultural Productivity Program of Southern Africa (APPSA)

APPSA is a regional project supported by World Bank and coordinated by Centre for the Coordination of Agricultural Research and Development for Southern Africa (CCARDESA). It started in 2013 with three countries Malawi, Mozambique and Zambia. Lesotho and Angola joined in 2019, hence Lesotho is in the second (2) of six (6) years of operation. The development objective of the Project is to increase the availability of improved agricultural technologies in participating countries in the Southern Africa Development Community (SADC) region.

Lesotho is an APPSA Regional Center of Leadership Excellence (RCoL) for Horticulture. The objective of the RCoL-Horticulture is to increase productivity and production of safe and nutritious food within priority horticulture farming systems through increased availability and dissemination of improved agricultural technologies. This will be achieved through development of horticultural plant materials of high economic value, which exhibit desirable traits (in terms of yield; pest and disease resistance; drought tolerance and market value) and promote technology transfer through strengthening of institutional linkages both locally and regionally.

The APPSA Lesotho RCoL has the following components:



The project is targeting the following beneficiaries:

- **Primary beneficiaries**

These are lead and ordinary farmers, seed producing individual farmers/associations, Agro-dealers, commodity based organizations, women and youth who will benefit by participating in the set-up of R&D sub-projects, conducting demonstrations, participating in training activities, holding farmers' field days or by using the technology and knowledge generated.

- **Other stakeholders within the NARS**

Potential end users of the improved technology and knowledge generated and/or disseminated by the Project e.g. Agricultural researchers; academia, public and private extension agents and advisory service providers; processors, seed traders and input suppliers. In addition, APPSA seeks to build partnerships and collaborations both inter-country (Angola), inter-region (SADC), International Research Institutes and with local institutional partnerships. Locally the target is on academic institutions, Individual Farmers (Lead farmers) and Farmers' Associations (LENAFU), commodity based Organizations (Potato Lesotho Association), MAFS Departments (Crops, Field services and Marketing) and other relevant government Ministries and the seed traders. Moreover, Extension and Advisory service Providers are in the domain of the project partnerships and collaboration.

The mandate of APPSA – Lesotho is to establish a centre of excellence within the Department of Agricultural Research (DAR) responsible for the technical implementation of the R&D Subprojects, in the districts. These will be the Regional Research Stations and Resource Centres which will work directly with smallholder farmers at the district and Resource centre level. The approach is to promote:

- **Infrastructure Development**

Maintenance and Construction of new state of the art laboratories, Climate Smart Agriculture technologies – Greenhouses, shade nets, tunnels, irrigation facilities, post – harvest technologies, handling and Agro - processing and nutrition sensitive issues such as development of new food products and fortification. Security and protection by fencing of the research stations and Maintenance of access roads leading to the stations

- **Capacity Building**

Long-term and short - term training of scientists – Department of Agricultural Research (DAR) and National Agricultural Research Systems (NARS) thus; National University of Lesotho (NUL) and Lesotho Agricultural College (LAC). Targeted training for other stakeholders and/beneficiaries such as farmers, extension officers and other private extension advisory service providers, agro dealers and input traders etc.

- Strong Collaborations and Partnerships:

  - ✓ Lesotho RCoL - Horticulture seeks to enhance potential areas of collaboration for technology generation and dissemination around the horticulture farming system both locally and regionally in the horticulture value chain.
  - ✓ Lesotho RCoL – Horticulture is mainly focused on Fruit Trees, Potatoes and Vegetable Production. Other research priority areas will also focus on legumes (Beans) and Cereal (Sorghum); including.

- Harmonization of Lesotho's seed legal framework instruments with the SADC protocols e.g the Intellectual Property Rights (IPR) and Plant Health Policy

The following are the funding priorities for APPSA RCoL-Horticulture:

- **Crop genetic diversity improvement** - Exchange of the plant genetic material with desirable traits
- **Crop breeding and improvement** - Conducting varietal/cultivar adaptability studies for specific agro-ecological-zones, molecular and mutation breeding using biotechnology applications.
- **Development of postharvest technology and innovation techniques** – Assessment of viable technologies for reducing postharvest losses, processing, marketing and development of labour saving technologies, value addition to horticultural crops and for introduction of new food products in legumes and cereals.
- **Capacitating farmers on horticulture-based farming system** – Conducting On-farm sub projects R&D trials with farmers on potato, leguminous and sorghum crops, fruit trees and vegetables.
- **Dissemination and technology transfer** - Creation of awareness to Lesotho small-holder farmers on project released technologies through demonstrations on farmers' fields and farmers' field days activities, development of manuals, guidelines and publications of articles in scientific Journals etc.
- **Strengthening planting material systems** - Production of disease free plant material in the biotechnology laboratories and on-station nurseries.

7.1.5 Smallholder Agricultural Development Project (SADP)

The developmental objective of the project is to support increased adoption of Climate Smart agricultural technologies in Lesotho's agriculture, enhanced commercialization and improved dietary diversity among targeted beneficiaries.

The project promotes climate smart agriculture:

Amongst others, the following investment areas are prioritized for the development of the crop sector:

- Protected Agriculture – Shade nets , Low tunnels and Greenhouses
- Water Conservation – Irrigation systems and Water collection tanks
- Processing and Value adding initiates – Juice, Jam and Simba Production ,

The target groups of the project are Lesotho Nationals, Registered Individual Farmers
Registered Farmer Groups (Cooperatives and Association), Registered Agri-Businesses
The following grant requirements guide the funding process:

- $US 10,000 TO $US 30,000 –Small Grant
- $US 30,000 to $US 100,000 – Large Grant
- Beneficiary Contribution of 40% of the total project cost (20% in kind and 20% cash contribution.

The call for applications

The following is the procedure for the call for the application

- Information Dissemination workshop
- Information Dissemination workshop at Resource Centres
- Public Gatherings
- Radio Programmes
- Television Programmes

- Newspaper adverts
- Circulars to Farmers

Applications are submitted at district level with deadlines clearly communicated.

Application requirements are as follows:

- Applicants Passport copy or Identity document
- Proof of land ownership
- Traders License (Business Registration)
- Tax Clearance
- Budget
- Cashbook
- Curriculum Vitae of the Service Provider
- Quotations of Proposed equipment
- Detailed Application form
- Implementation plan
- Four Copies of bound applications

7.2 Food and Agriculture Organization of the United Nations (FAO)

FAO presentation was focused on the support to LENAFU on potato production. Recognizing that many households may not have sufficient income to procure seed for the main summer crop due to the impact of COVID-19, FAO procured potato seeds and fertilizers and placed to the farmers. The main objective of the intervention was to **s**upport the programming of agricultural inputs and technical support among farming households to help them recover from the impact of the COVID 19 pandemic. Specifically, the 400 farming households, medium scale farmers in the four (4) areas; Semonkong, Moitšupeli, Tlali and Matelile received 16 x 25 kg pockets of potato seed (Varieties - Allison and Panamera) each and 6 x 50 kg pockets of fertilizer each to plant a one hectare area.

The expected outome of the intervention was to the protection and restoration of agricultural based livelihoods among farming households impacted by COVID-19 pandemic, improved income sources through selling of the final produce and growth and expansion in the market functionality. The intervention was targeted at households who have access to land (≈0.40 ha) and a good farming background and history especially in potato production.

. The postharvest assessment indicated satisfactory yields despite the delayed arrival of the inputs. On average, each farmer was at least able to harvest 600 x 10 kg bags of ware potato.

The presentation highlighted the recurrent problem of potato seed scarcity as an opportunity for Lesotho to rethink strategies to leverage the much talked about potential for production of disease free potato seed ivied 30 x 25 kg pockets but could only procure about 50 percent of the requirement. FAO pointed out that the balance of the seed will be distributed in the current growing season.

FAO committed future support to potato farmers and the subsector in general to collaborate with MAFS in promoting the production of potato in the country by involving more farmers and increasing overall area planted. To the end, FAO would consider providing additional material support i.e. procurement of essential equipment including but not limited to potato planters, potato diggers, potato sorting and grading to accelerate their production. Most FAO seeks to strengthen systems capacity in the following thematic areas:

- Site selection and soil preparation
- Seed health and seed selection
- Fertilizer application rate
- Weed and pest management (adopting Integrated Pest management methods)
- Harvesting, sorting and grading
- Storage and post-harvest losses
- Pricing and marketing

In conclusion, the presentation highlighted critical issues for coming seasons in the light of their intervention experience as follows:

- Provision of inputs to the farmers on time.
- Mechanization (planters, harvesters and other necessary tools).
- Storage facilities : maintain the existing storage
- Sorting, grading and packaging facility.
- Strengthen Markets functionalities
- Capacity building

7.3 UNDP: Local Supplier Development Program (LSDP)

The overall objective of the initiative is to explore and expand opportunities for promoting local productivity and capacities to meet domestic and local markets for good and services. The proposed project is aimed at supporting the Government of Lesotho to initiate a value chain programme to consolidate efforts towards creating sustainable green livelihoods and jobs, through development of local value chains and supplier development systems and taking advantage of youth in the application of clean and digital technologies to increase quality and volumes of locally produced food. The specific objectives are to:

- Build capacity on business management, Quality Management System and productivity
- Facilitate access to markets
- Enhance local competitiveness and introduce quality standards
- Promote formation and growth edge among local Small Medium Enterprises
- Optimize access to finance

The project activities entail the following:

- Engagement of Global good agricultural practices to provide capacity building to Lesotho to adopt safe and sustainable agriculture
- Provide capacity building Webinars
- Capacity building of farmers, private sector and extension staff on horticulture and livestock

In order to establish the current status of the Potato Food System in Lesotho, the project has engaged a consultancy firm to:

- assess the supplier's capacity, market needs for the private sector in Lesotho
- Undertake a capacity needs assessment for the suppliers to help define the programme for capacity building and successful supplier development programme
- Address the implemental activities related to development of fruits and vegetables value chains in six districts, capacity building of farmers to adopt good agricultural practices, adoption of green and digital technologies to develop agricultural value chains Support financial inclusion and economic growth
- Support agriculture sector to access local, regional and international markets.

7.4 Potato Lesotho Association (PLA)

7.4.1 Nodes in the Potato Value Chain Structure

The presentation identified the following nodes on the potato food system:

(a) Breeding/Propagation by breeders and seed growers

(b) Nutrition by fertilizer producers and processors

(c) Health Care by Technicians and Practitioners

(d) Husbandry by Practitioners/Farmers

(e) Mechanization by Engineers, Technicians, Artisans, Operators, Practitioners/Farmers

(f) Harvesting by Operators and Practitioners

(g) Transporting by Transport Contractors

(h) Storage by Warehousing Specialists

(i) Processing by Nutritionists and Manufacturers

(j) Marketing by Market Agents

(k) Wholesalers and Retailers

(l) Consumption by households and institutions

(m) Recycling by Processors and Manufacturers

7.4.2 Analysis of Specific Issues on the Potato Food System

The presentation addressed specific questions of the dialogue as follows:

7.4.2.1 What are the factors limiting production, productivity, profit margins, farm livelihoods and the environment in the potato commodity?

(a) Production limitations

i) Limited Access to technology,

ii) Limited Access to Finance and

iii) Limited Access to Markets

(b) Productivity limitations

i) Inadequate Knowledge,

ii) Poor Mechanization and

iii) Limited access to Quality seed

(c) Profit margins limitations

i) Post-harvest losses,

ii) Poor husbandry and

iii) Unstructured Pricing

(d) Farm livelihoods limitations

i) Poor Planning,

ii) Inadequate Infrastructure and

iii) Inadequate Services

(e) Environment limitations

i) Uncoordinated Bulk infrastructure,

ii) Poor Resource management and

iii) Poor Sanitation

7.4.2.2 Where do we want to see the Lesotho Potato sub-sector?

(a) National surplus production,

(b) Comprehensive processing,

(c) Export to regional and international markets

(d) Wealth creation for rural communities

7.4.2.3 What do we need to do to grow the sub-sector and how?

(a) Appropriate mechanization

(b) Systematic marketing

(c) Technology generation and training

7.4.2.4 What factors can derail our vision if not addressed?

(a) Inadequate support of the Private Sector

(b) Sub-optimal standards

(c) Inadequate specialization

7.4.2.5 What resources do we currently have and how are they being utilized for the promotion of the potato sector?

Resource	Utilization	Constraint	Required Improvement	Responsible agency
Suitable soils	Underutilized	Poor planning	Well planned catchment management and river basin based farming	Ministry of Agriculture and Food Security
Suitable climate	Underutilized	Poor planning	Agro-ecological zone planning	National Planning Commission
Clean water	Wasted	Poor planning	Water resource management and commercialization	Ministry of Water and Ministry of Local Government
Bulk infrastructure	Uncoordinated	Disjointed planning	Integrated planning and implementation	National Planning Commission
Social capital	In disarray	Poor planning	Coordinated governance	Chieftaincy and Local Government
Human capital	Neglected	Misdirected education and training	Targeted education and training	Ministry of Education and Training
Physical capital	Disused and misused	Poor planning	Optimum use of available suitable buildings and machinery	Public and Private Sectors
Financial capital	Reckless	Poor coordination of financial services	Coordinated mobilization of local financial resources	Cooperative Movement