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**Southern Africa Region**

**Legumes and Pulses**

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**Appraisal of the Prospects and Requirements for Improved Food Industry Value Addition and Technical Efficiency of the Regional Food Legumes Industry**



**December 2011**

**The Client**

**Food and Agriculture Organisation of the United Nations**

**Rome Italy**

**Value of food legumes** The seeds of many genera of the plant family *Fabaceae* are the most versatile of foods for people and their livestock. When young the whole pod can be picked green and eaten raw or cooked. Alternatively, the seeds can be harvested with the pods, separated mechanically or by hand and cooked and eaten. When sufficiently dried, the seeds can be stored for long periods and used for food in times of shortage. Food legumes have been cultivated since the earliest recorded times of human settlement – with people gradually domesticating wild species. Food legumes are valued for high energy and high protein content, and also provide significant amounts of fibre. In recent times the recognition of health value has seen a resurgence of interest in production to meet culinary demands in the industrial countries.



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**Peter Steele**

**Consultant Agricultural Engineer**

**December 2011**

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**Food and Agriculture Organisation of the United Nations**

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**Executive Summary**

**Summary in one paragraph**

*Given the paucity of time available with which to search, collate and analyse findings, the report briefly focuses upon opportunities for national food legumes industries in Southern Africa in the context of regional issues. On the one hand – there are the industrial realities, expanding populations and per capita consumption of food legumes that is slowly declining, but not sufficient to negate imports which continue to climb. And, on the other hand, there is lack of productivity, yields that have remained unchanged for >25 years, lack of public and private sector support and familiarity with legume crops/foods that borders on neglect. Every country in the region has a value chain for food legumes, but they have become entrenched within traditional life such that they are barely recognized for the potential that exists – and thus this potential remains under-exploited. There is no discernable regional value chain. The South African economy dominates the region; and the nine other countries included within the study work largely in partnership with and/or through South African services, expertise, facilities and/or finance in support of regional development – and if not directly, then indirectly.*

**Focus of the study**

Food legumes are grown in all countries in the region. Five countries have been scrutinized for the extent of the national food legumes industries that exist – Angola, Malawi, South Africa, Zambia & Zimbabwe. Implicit with choice has been focus on potential – seeking to boost production, raise quality, improve marketing and, as appropriate, process raw materials into more valuable goods – noting opportunities for adding value throughout the production/processing value chain.

**Value chains**

Value chains for food legumes in all regional countries are poorly understood by local people and little supported. There is a paucity of services in support of growers, markets and processors. Productivity in the region is similar to that of producers elsewhere in SSA, but less than half that of producers in the industrial countries who regularly harvest 2 tonnes/hectare (t/ha). This represents a considerable loss of potential, and one that is unlikely to change in the short-term given industrial performance that continues to focus upon minimum risk, limited investment and lack of coordination. Production is smallholder-based; fragmented, disorganized and low quality. A boost in production would help with import substitution, but this is unlikely with the lack of industrial support available - governments generally fail to provide more than limited resources for R&D, extension and market information support, and none at all for agro-industrial investment.

**Role for the private sector**

National food industries in most parts of the world are dominated by the private sector – all production, all services, all management and all markets. This contrasts with food production

in Southern Africa, where the traditional responsibilities of the public sector continue to prevail. The reality of food production in the region, however, is dynamic commercial-scale modern agro-production-industries that are largely self-sufficient - and the rest. South Africa typifies this parallel system of food production, but similar if smaller-scale models exist in other regional countries. Across the region, however, smallholder production continues to feed the masses. The key issue is one of producing to market demand – choice of crop and variety, production to set quality standards and delivery to set schedules. Much of smallholder production remains home-based for domestic consumption.

**Client making priority choices**

*The client is recommended to consider industrial sector planning, post-harvest handling/storage and agro-processing investment that will boost returns to the main players.*

**Fig. 1. Southern Africa: a variety of food legume crops are grown in the region**

**

*Source: UNEP/GRID (2008)*

Topographical and political images that describe the reality of Central and Southern Africa - a region that covers >5,931,000 km2 and is home to estimated 110 million people. The region is well-placed geographically on international trading routes between Europe and Asia, but lacks the industrial production potential with which to take advantage of modern commercial opportunities. Outside of South Africa, facilities and infrastructure are strictly limited, and smallholder production dominates. Larger-scale and/or organized smallholder production systems are beginning to develop in the other nine countries that make up the region.

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**Measurements and Conversion Units**

|  |  |
| --- | --- |
| **Unit** | **Full text** |
| B | Billion (x109) |
| ha | hectare (10,000 m2) |
| kCal | kilocalorie |
| kg | kilogram |
| m, km | metre, kilometre |
| M | Million (x106) |
| MJ | Megajoule (joule x106) |
| t, Mt | tonne (kg x103), million tonnes |
| t/ha | tonnes/hectare |

**Abbreviations and Acronyms**

|  |  |
| --- | --- |
| **A&A** | **Full text** |
| ACTESA | Alliance for Commodity Trade in Eastern & Southern Africa |
| ADMARC | Agricultural Development & Marketing Corporation *(Malawi, now defunct)* |
| AGP | Plant Production & Protection Division *(of FAO)* |
| AGS | Rural Infrastructure & Agro-Industries Division *(of FAO)* |
| AGSF | Agricultural Management, Marketing & Financial Service *(of FAO; now defunct)* |
| ASARECA | Association for Strengthening Agricultural Research in Eastern & Central Africa |
| CGIAR | Consultative Group on International Agricultural Research |
| CIAT | Centro Internacional de Agricultura Tropical *(Colombia) (CGIAR)* |
| COMESA | Common Market of Eastern & Southern Africa |
| DFI | Direct foreign investment |
| DfID | Department for International Development *(of the UK)* |
| DPC | Democratic Republic of Congo |
| EAC | East African Community |
| EAGC | Eastern African Grain Council |
| ECA | East & Central Africa |
| ECAPAPA | Eastern & Central Africa Programme for Agricultural Policy Analysis |
| EU | European Union |
| FAO | Food and Agriculture Organisation *(of the United Nations)* |
| FISP | Farm inputs subsidies programme *(Malawi)* |
| FMB | Farmers Marketing Board *(Malawi; now defunct)* |
| GAP | Good agricultural practices |
| GDP | Gross domestic product |
| GMP | Good manufacturing practices |
| GTZ | Gessellschaft fur Internationale Zusammenarbeit (GmbH) (*Germany*) |
| HACCP | Hazard analysis and critical control point |
| IAMA | International Food & Agribusiness Management Association |
| ICARDA | International Centre for Agricultural Research in Dry Areas *(Syria) (CGIAR)* |
| ICRA | International Centre for development orientated Research in Agriculture *(CIRAD)* |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics *(India) (CGIAR)* |
| IITA | International Institute of Tropical Agriculture (*Nigeria) (CGIAR)* |
| IPM | Integrated pest management |
| IPPC | International Plant Protection Convention |
| ITC | International Trade Centre *(Geneva, Switzerland)* |
| MAPP | Multi-country agricultural productivity programme *(of SADC)* |
| MENA | Middle East & North Africa *(countries)* |
| PPP | Public private partnership |
| RATIN | Regional Agricultural Trade Intelligence Network *(of EAGC)* |
| SADC | Southern African Development Community |
| SATH | Southern Africa Trade Hub *(USAID)* |
| SME | Small and medium enterprise |
| SPS | Sanitary and phytosanitary *(agreement on regulations & guidelines of the WTO)* |
| SSA | Sub-Sahara Africa |
| SWOT | Strengths, weaknesses, opportunities & threats *(model analysis)* |
| TA | Technical assistance |
| UNEP | United Nations Environmental Programme |
| WTO | World Trade Organization (*of the United Nations)* |

**Section 1**

**Introduction: Food Legumes Industries in Context in Southern Africa**

**1.1 Historical perspective**

Production of food worldwide must increase of the order 70% during the next 50 years to match expanding populations, changing dietary demand and the needs of rapidly urbanizing communities everywhere. Production systems are required that will have minimum impact upon existing agro-ecological environments, yet continue to provide livelihoods for >40% of world populations that depend upon agriculture. With estimated world population reaching seven billion before the end of 2011, the challenge will be one of feeding the additional two billion people expected before 2050 on the basis, largely, of existing resources.

Much can be done to boost food security with expansion of production of food legumes.[[1]](#footnote-1) A mix of cereals and food legumes has provided the basis of organized agriculture for >7,000 years - all regions and all continents, with the choice of grains and pulses that best suited local conditions. Thus, in Africa, staple grains and legume crops, respectively, finger millet, pearl millet and sorghum have been domesticated alongside cowpea and jugo bean since the times of early settlement (Biodiversity Explorer, 2011).

All the basic cereals and food legumes that have originated in other parts of the world have subsequently been introduced into African agriculture on the basis of trading, settlement and, more recently, demands for different foods as shown in Table 1.1. Maize and groundnuts, for example, have subsequently come to dominate traditional diets/culinary tastes in part of Africa and sometimes to the exclusion of the original foods. Modern trends in consumption continue apace as people across the continent shift into towns and adopt the urbanized lifestyles required.

Food legumes are eaten throughout Africa as one of a mix of foods with the main staples – typically cereal (i.e. maize, millet, etc.) and/or roots (i.e. cassava, potatoes, etc.). Food legumes are secondary or tertiary crops within those smallholder crops that are produced for home and/or community consumption. The poorer the society in terms of resources of land, water, expertise, cash, etc, - the greater the quantities of food legumes consumed. Thus continent-wide, food legumes dominate traditional cuisines in West Africa, and they are widely grown throughout SSA into and including the northern parts of the Southern African region – Malawi, Mozambique & Zambia, for example. They are less popular the further south people live. Annex A1 provides an introduction into those countries of the region in which potential has been recognised for promoting and developing food legumes industries.

**Table 1.1 Regional origins of selected staple cereals and food legumes**

|  |  |  |
| --- | --- | --- |
| **Region** | **Grains domesticated** | **Food legumes domesticated** |
| West Asia & Europe | Wheat & barley | Peas, lentils, broad beans & chickpeas |
| Central America | Maize | *Phaseolus* beans |
| South America | Maize | Groundnuts |
| Africa | African finger millet, pearl millet & sorghum | Cowpeas & jugo beans |
| Asia | Rice, common millet & foxtail millet | Soybean (China), mung beans, pigeon peas (& others in India) |

*Source: Biodiversity Explorer (2011)*

**1.2 Value of food legumes**

From ancient times through to the present, the agronomic and nutritional value of food legumes has been well-known. In summary this is food legumes as a source of proteins and essential amino acids in human diets and, equally important, the use of legumes as a source of soil nitrogen.

First nitrogen fixation. The majority legume crops develop a symbiotic relationship with *Rhizobium spp* bacteria associated with the host’s root system – nodes develop that capture and convert atmospheric nitrogen. Nitrogenous compounds are excreted into the surrounding soils and/or released when root tissue decomposes. In addition, nitrogen is supplied from above-ground litter fall, by leaching from rainfall and from manure provided by grazing livestock. The nitrogen fixation properties of legumes thus provide the basis for boosting soil fertility and the protein levels of food/feed materials.[[2]](#footnote-2)

Then, value as food for people. Legume plants have the ability to convert nitrogen captured by the *Rhizobium spp* and to synthesis amino acids and proteins, and this makes edible legumes a valuable low-cost alternative food to meat and animal products. The protein of food legume seeds is typically high in the amino acids lysine and methionine and, crucially, this makes them a valuable nutritional complement to cereal foods which are deficient in these essential amino acids. Further, pulses are rich in dietary fibre and usually contain small amounts of edible oils.

Table 1.2 provides an indication of the protein and energy content of selected popular legume foods (and, for comparison, also those of the major cereal staples). Key points to note from the crops listed is that food legumes and cereals have similar energy content, but that food legumes contain typically 20-25% protein when compared to the major cereals at around10% protein. Soybean is also listed in Table 1.2 showing energy and protein content that is higher the other legumes and cereals shown – as one indication of worldwide interest in soybean production and the reason behind the phenomenal expansion in cropping area in recent years.[[3]](#footnote-3) Apart from promotional interest in West Africa led mainly by the International Institute of Tropical Agriculture (IITA), however, the crop/food has generally not expanded into traditional culinary use in other parts of the continent according to Akibode & Maredia (2011).

**Table 1.2 Energy and protein content of selected legume and cereal crops**

|  |  |  |  |
| --- | --- | --- | --- |
| **Crop** | **Common name** | **Scientific name** | **Value (100 g)** |
| **kCal** | **Protein** |
| Pulses | Kidney beans | *Phaseolus vulgaris* | 341 | 21.60 |
| Cowpeas | *Vigna ungiculata* | 336 | 23.52 |
| Faba beans | *Vicia faba* | 341 | 26.12 |
| Chickpeas | *Cicer arietinum* | 364 | 19.30 |
| Lentils | *Lens culinaris* | 353 | 25.80 |
| Pigeon pea | *Cajanus cajan* | 343 | 21.70 |
| Cereals | Wheat, bread | *Triticum aestivum* | 340 | 10.69 |
| Maize | *Zea mays* | 365 | 9.42 |
| Rice | *Oryza sativa* | 360 | 6.61 |
| Millet | *Pennisetum glaucum* | 378 | 11.02 |
| Sorghum | *Sorghum* | 339 | 11.30 |
| Barley | *Hordeum vulgare* | 352 | 9.91 |
| Legume oil crop | Soybeans | *Glycine soja* | 446 | 36.49 |

*Source: Akobode & Maredia (2011).*

Food legumes are the ideal crop for diversification of smallholder production in Africa and elsewhere – with three-fold complementarity for home-grown use: for poverty reduction and food security, for boosting nutrition and human health, and for providing/maintaining the resilience of agro-ecologies. The focus of the report remains Southern Africa, but India continues to dominate worldwide production and consumption – mainly as a food for food insecure/impoverished people. The most dramatic increase in consumption in recent times, however, has been in the industrial countries and as a substitute for meat products – by vegetarians and by those seeking to reduce consumption of meats. This represents a shift in consumer preferences for foods that are recognized as more healthy – helping to prevent heart disease, cancer and obesity. Interestingly, the corollary with development trends of this kind will see middle and high-income people the world over (including Africa) following trends of this kind. The main difference, however, will be demand for processed/industrialized foods and not for foods in their original form (Kapitan Trading, 2009).

**1.3 Opportunities for expansion and/or higher productivity**

Cereals and legumes (e.g. maize, soybean and cowpea) are important food and cash crops, and grown throughout SSA. Maize is the preferred staple food and source of calories for more than 300 million (M) people. It also provides an important source of feed for livestock and an industrial material for processing. Cowpea is the main source of protein for >200 M in Africa, and >90% of global production (estimated 4.3 Mt) is grown in West-Central Africa. Cowpea haulm is a valuable livestock feed during the dry season. Soybean is emerging as an important food and agro-industrial crop and grown on >1 Mha across the continent according to IITA (2008).

Cereals and legumes in combination and separately are typically grown by smallholders. Expanding populations, land fragmentation and demands for increased wealth creation and higher agro-productivity have led the drive for greater intensification. This brings additional pressure upon finite resources with shift from low- to higher productivity systems; with additional demands on land and crop management, use of higher yielding cultivars, attention to crop care, adoption of good agricultural practices (GAPs) and for some understanding of the principles of agro-business – that growers and others are able to balance accounts, make profits and boost employment and wealth. Commercially successful ventures also comply with environmental neutrality but, for best, aim to leave the natural resources – soil, land, water, etc. – in *improved* condition.

Intensification requires access to materials, equipment and services – of all kinds; and for resource poor communities and the governments to which they turn for assistance, this raises issues for delivery of resources. Implicit and de facto, intensification requires access to technical and financial services – the technical and commercial people who service growers with a host of supplies, equipment, advice and information. This interaction between growers and services continues to remain dynamic and complex.

Two inter-related factors have been driving the intensification of food crops production in Africa in recent times – urbanization and population growth – with a host of sub-factors that link to transition from agrarian-based production in most African countries to the provision of services, manufactures, tourism and other sources of national income. Agriculture continues to dominate in most countries but, increasingly, people are adopting the urban-based development models that are synonymous with industrialization. Agriculture is intensifying, modernizing and mechanizing – and if this is fragmented on the basis of the land available, level of education and, importantly, the demands of people everywhere for higher standards of living, then the shift to novel and/or processed foods production is simply one indication of the inter-connectivity of people everywhere and the strength of the private sector.

Modern communication industries have become established across the continent – people have become aware of the opportunities that present themselves for boosting their lifestyles, for exploring new opportunities and for making a reasonable living for themselves and their families. Food crops production will continue to expand as countries industrialize.

**1.4 Overview of industrial performance**

Notwithstanding the *‘value chain’* as a basis for focus – industrial performance provides the basis for comparing food legume industries between countries and, concerning security of food supplies in-country, for boosting production as a supplement to other food crops. It is not as if this information is not already well-known and relatively easy to highlight, but the reality of fragmented production belies the difficulties with which local people are able to make improvements.

Inadequate rotations, lack of understanding of disease control and insufficient certified/high quality varieties seed severely restrict yields. Off-farm the issues are those of poor handling, poor storage, lack of standards and limited services that result in low-quality seeds offered to markets, defaulted contracts and predatory trading. Value chains remain fragmented and disorganized.

Food legumes production is typical of most smallholder food crops in SSA – low priority attention, low-input/low output production systems, marginal lands and focus upon crop consumption in the home. Only a small proportion of these crops enter into domestic trade, and smaller quantities are selected for export. Notwithstanding buoyant markets for a range of different food legumes – lentils to dry beans – producer countries make little effort to capture the industry of the many hundreds of thousands of smallholders involved. Only in the more intensively farmed areas – Malawi, Rwanda, Swaziland and others – is it possible to appreciate the industry of growers producing to the higher standards required. Malawi features in the current study as one of the more efficient food crops producer countries in SSA.

**1.5 Regional focus food legumes production**

The Southern Africa region is well-endowed with land, water and mineral resources, it is well-placed geographically and it has a handful of strategically placed urban centres with which to base a network of trading hubs including deep-water ports – mainly on the Indian Ocean. English language, high quality tertiary education facilities and extensive levels of literacy in all countries provide the basis for future investment. Compared to similar regions of low-middle-income countries (e.g. in West Africa, MENA countries, South Asia, etc.) opportunities for socio-economic growth into the middle-future are good. Table 1.3 provides summaries of people and land in the region.

Quite apart from the mineral wealth of the region, the key points to note from Table 1.3 are the extensive areas of land available in six of the 10 countries listed and the potential of this land. National populations are constrained by the historical location of earlier communities – main towns, ports, lakesides, river crossings, etc. but also, and importantly, by the dominance of deserts and dry-lands in central and western parts of the region. By the standards of regions elsewhere (and particularly in Asia) Southern Africa region remains relatively empty of people. Four countries – Angola, Mozambique, South Africa and Zambia – make up almost 70% of the area with combined populations of the order 80 M. The agro-production/industrialization potential of these countries is, realistically, staggering.

**Table 1.3 Southern Africa – population and land area by country**

|  |  |  |
| --- | --- | --- |
| **Country** | **Population (million)** | **Area (x1,000 km2)** |
| Angola | 5.65 | 1,247 |
| Botswana | 1.68 | 528 |
| Lesotho | 1.88 | 30 |
| Malawi | 13.07 | 118 |
| Mozambique | 20.53 | 802 |
| Namibia | 1.83 | 824 |
| South Africa | 44.89 | 1,221 |
| Swaziland | 0.95 | 17 |
| Zambia | 9.34 | 753 |
| Zimbabwe | 11.63 | 391 |
| **10 countries** | **110** | **5,931** |

 *Source: United Nations (2009)*

The Southern African region may have enjoyed different colonial ownership for >130 years during the late 19th and early 20th centuries with mixed politico-economic and social management experience, but the reality of the 10 countries that make up the region today face many of the same development issues – they have much in common.[[4]](#footnote-4) The challenge for national governments will be one of attracting investment that will help focus both upon the reality of agricultural development (including food security, etc.) and, importantly, for establishing the institutional and physical elements required – providing power, infrastructure, finance, education, social stability and a confident private sector. Increasingly, this will lead to region-wide investment at the expense of separate national interests. The region is slowly creeping towards common services, tariff-free trading, dismantling of cross-border infrastructure and intra-regional self-interest.

**1.6 Scope of the study**

The terms of reference provided for the study are described in Annex A3 - to make an appraisal of the food legumes sub-sector in Southern Africa based upon access to published material, and to seek to identify opportunities for boosting the technical efficiency of discrete sub-sectors that may result in improved value addition to the subordinate food industries involved. Food legumes/Southern Africa was one of a number of options provided for choice of food crop/geographical location. Should initial reporting prove interesting and/or offer potential for intervention, there may be scope for extending the preliminary nature of the current investigation – to better position the client and others, and to encourage further agro-industrial investment.[[5]](#footnote-5)

**1.7 Outline of the report**

The report is in six parts with support findings from the study contained in a number of annexes. From a brief introduction to food legumes production in Southern Africa and identification of choice of focus countries, the report leads into national and regional performance with some of the major challenges facing producers and, importantly, the many opportunities that exist for boosting productivity/efficiency. Findings are summarize in a SWOT analysis, but the essence of industrial performance in the region is the need to boost productivity, and to produce higher quality goods that will command higher prices/returns, fulfil the requirements of markets/processors and help reduce expanding imports from more productive foreign producers. Considerable opportunities exist for replacing imports.

Value chains have been analysed – they exist, but are little recognized and poorly supported by the main players. This leads logically into some understanding of the challenges facing national industries and, importantly, the role of these industries within a *regional* context. Geo-politically and economically, the countries of the region are working ever-more-closely together, and this reflects in the way in which services *(of all kinds – for food crops and other sectors*) should be provided – within countries and between countries.

The report concludes in Section #6 with recommendations for an action plan – aimed specifically at the options available to the client *(for whom the report has been prepared),* but this should be considered in context of what is best for the national food legume industries in the region and how the client and others can make a contribution to the socio-economic development of local people and their livelihoods.

**Section 2**

**Performance of Food Legumes Production in Southern Africa in Global Context**

Establish the extent of national food legumes industries in Southern Africa and the production and logistical challenges facing investment and expansion, and consider the opportunities that may prevail for inter-action with global industries including service industries and, importantly, for access to markets – for fresh and processed foods, and for industrial services. The challenges for Southern African industries are considerable.

**2.1 International food legume industries**

Production of food legumes has been rising slowly during the past 25 years on the basis of two inter-related factors – increases in population in regions of the world for which food legumes are a basic staple (e.g. in India, Middle East and SSA) and, importantly, the shift into healthier diets typical of the industrial countries. For the first time ever, in 2004, world production exceeded 60 million tonnes (Mt) – reflecting trends in increased production of the order >3.5% annually. Production by crop type remains largely based upon the traditional choices of the people growing them and their culinary preferences but, in 2004, production by crop in order of magnitude was dry beans (31%), dry peas (20%), chickpeas (14%), dry broad beans (7%), cow peas (6%), lentils (6%) and pigeon peas (5%). Other food legumes made up the 11% difference (BenBelhassen, 2005).

On global-scale, estimated 60% of food legumes produced are consumed by people with the remainder used for livestock feed. Global production has been mixed, however, with the greatest increase in productivity in recent times from commercial producers in the *industrial* countries. Production in the *developing* countries remains largely smallholder-based, but this sector continues to dominate global production with estimated 70% production. Productivity has remained largely static at around 750 kg/ha. Of the order 95% of production in the developing countries is consumed domestically. By contrast, production in the industrial countries has expanded on the basis of market demand – increased land area and higher productivity, with average yields approaching 2 t/ha (FAO, 2005).

World exports of food legumes have more than doubled during the period from the mid-1980s-on from 4.5 Mt to estimated 10 Mt in 2003 with value US$3B. Of the order 15% of global production is traded internationally, compared to 10% 20 years earlier. The proportion of food legumes entering international trade reflects the popularity of the different crops grown with dry beans, dry peas, chickpeas and lentils – in that magnitude of quantity – making up 80% tonnage and 87% value of exports. And, of these crops, dry beans and dry peas dominate choice at 50-60% tonnage/value – the key factor being the ease with which dried legumes can be handled, stored and shipped.

Trade continues to increase and particularly in the Middle East, SSA and Latin America primarily on the basis of expanding populations and the failure of domestic industries to meet market demand. The international food legumes market is a relatively fragile one, however and, apart from soybean, the volumes traded are likely to remain volatile. Trade is expected to continue to increase with demand rising in the Middle East, South Asia and Latin America primarily on the basis of expanding populations and the failure of domestic industries to meet market demand. Elsewhere, and particularly in India – the largest producer/consumer of food legumes – per capita consumption is either static or falling slightly, and mainly as a result of shift to alternative foods as one indication of rising living standards according to BenBelhassen (2005).

Trends in production into the next period are expected to be similar to those of recent years – with higher production from the industrial countries and static production in the developing countries; and with the latter regional groups of countries importing to meet domestic market demands. FAO (2005) highlighted the iniquities of these production/trading models, and the logic of investment required in national industries in developing countries – in policy initiatives, pro-food legume investment, new varieties, grower education, market developments and more. FAO (2005) summarized this in messages to national governments to: *‘provide an enabling environment’*.

**2.2 Food legumes production in Southern Africa**

Apart from relatively well-organized smallholder production of food legumes (and a host of other food crops) in Malawi, these crops are not widely grown in the region. Low population densities, urbanization, unreliable rains and a preference for industrial crops and livestock production tend to militate against the small-scale/subsistence nature of food legumes production. And this, notwithstanding relatively buoyant demand for crop imports in South Asia. The one exception is soybean which is being exploited on small-scale for oil, food and livestock feed value locally, and for which markets continue to expand. More than 85% of the crop is processed; little is consumed fresh. Exploratory crops are being introduced into all countries of the region – wherein crop production is practical. Long-term this is likely to become commercial on large-scale – to the detriment of smallholder production.

Food legumes industries continue to show development potential in five of the main six producer countries within the region – Mozambique excepted wherein most production remains domestic-scale for domestic consumption. Other countries in which production is strictly limited include Botswana and Namibia given the deserts and/or dry-lands covering large areas of these countries, and the small size of national industries in the hill countries of Lesotho and Swaziland.

A brief resume of national industries is provided for five agro-producer countries in Annex A1 with brief summaries below.

Angola. A country of great agricultural potential that has, as yet, largely failed to re-invest in the infrastructure, services, skills and finance required of agro-production but which has, in the short-term, pragmatically come to depend upon oil and mineral extraction with which to balance the national economy. The buoyancy of agro-production pre-independence is unlikely to be regained in the short- to middle-term given lack of investors, expertise and confidence.

Current priorities of government are to re-build the coffee industry as a source of employment and export earnings and, crucially, to replace >50% imports of food staples with domestic production – all food crops. This is likely to include food legumes. The preferred staple smallholder crop, however, remains cassava.

Estimated 60% of people live below the poverty line with little prospect of change. Limited confidence in government largely precludes FDI for agro-production and other sectors. There is public sector dominance in all national decision-making, with negligible private sector involvement.

Malawi After maize and root crops, legumes and pulses are the most important source of food in Malawi at estimated 15% of crop production. Productivity has remained largely unchanged during the past six year at 0.75-0.9 t/ha. *(Only maize has shown real change – doubling yields to 2 t/ha.)* Production is smallholder based, and value chains are weak and/or non-existent with the majority production consumed in the home or community. Small quantities of groundnuts and soybean are produced for export, but the country also imports quantities of these and other food legume crops. By regional standards agro-production in Malawi is reasonably efficient and the potential, for soybean for example, has been highlighted by government for the cash profits available – of the order US$235/ha (TechnoServe, 2011).

South Africa The most productive and industrially-advanced economy in SSA has, during the past 15 years, expanded commercially into countries across the continent with stated objectives of boosting food security, food production and agro-industrial processing. South Africa has identified Africa as an international food producer to rival that of other regional global players. Agro-production is characterized by parallel large-scale commercial and smaller-scale/mixed farming sectors – both, in practical terms, remain buoyant and profitable. Investment in agro-production reflects a general slowing in national GDP performance in recent years – part domestic and part international economic downturn – and government will focus investment during the next period in new infrastructure, human skills enhancement, improving the performance of the public sector and boosting regional economic ties. These initiatives will eventually filter into agro-production.

The high-input/high output systems typical of the country tend toward higher value enterprises – fruits, vegetables, wines, livestock products, etc. Apart from soybean production – for oil, livestock feed and processed foods – food legumes play a minor part in agro-production in the country. Imports from countries to the north provide the pulses required. Expansion of soybean production is likely, perhaps linked to regional industries.

Potential or not – national economic policies are not stimulating investment in the country when compared to others in Africa. FDI fell 70% in 2010 with the country listed #10 in the top-ten African recipients.

Zambia Agro-production remains under-capitalized and under-appreciated for the extent of contribution to the national budget; it has, since the earliest times pre-independence been considered second-level priority to mineral extraction industries. And this, notwithstanding the considerable potential of the country to grow the traditional cereals, food legumes and plantation crops typical of the region. Scope for large-scale commercial development continues to be promoted, but the majority smallholder sector remains impoverished and unable to share in ventures of this kind without association with larger-scale partners.

In recent years agro-production has out-performed mineral industries, as a reflection of the fluctuation of markets for minerals and provides of the order 20% of GDP. Agro-production is dependent upon annual rains, notwithstanding extensive surface water resources that could literally irrigate the country. Outside a minority of rich urban-based people, the majority population remains impoverished and un-(under) employed. For a population with estimated 50% of people below the age of 15 years, the challenges for the future remain of concern.

Maize dominates food production industries with large quantities of other traditional foods – including food legumes – produced mainly for home consumption – although small quantities of groundnuts and food legumes of mixed types produce surpluses that are traded. The small national population enables commercial agro-producers to focus mainly upon agro-industrial crops – tobacco, cotton & sugar.

Zimbabwe Once the dominant agro-producer and food supplier to Central Africa, Zimbabwe post-independence has declined economically on the basis of skewed socio-political decision-making that has destroyed rather than built. The productivity of agriculture as a sub-sector has fallen dramatically on the basis of 15 years of land redistribution and re-settlement. The new systems/models of small farm production have yet to capture the dynamism of the old order, and may not do so given the dry-nature of the ambient climate that ultimately determines productivity. Climate change forecast for the next period is expected to result in less reliable rainfall in Southern and Central Africa.

The once plentiful food surpluses have been replaced with production-on-demand subsistence systems that barely feed existing rural populations. The public sector has come to dominate as the private sector has declined. All food crops are grown including food legumes for home consumption with surpluses entering local markets. Added value industrial production dominates much of the larger-scale lands that once comprised the commercial sector – tobacco, sugar, livestock products and more.

**2.3 Interdependency of regional food legumes production with global services**

There has been relative stability of demand worldwide during a period of >10 years, but also divergence in the different markets as shown in Table 2.1. Traditional high demand markets such as South Asia, the MENA countries and Latin America have shown minor changes; expanding populations everywhere have consumed slightly less food legumes per capita, but national demand has continued to rise. These are typically countries with a high proportion of poor people, but they are also home to industrializing societies in which dietary tastes are changing – the two trends provide a measure of balance on global-scale. SSA has bucked this trend – showing the only real growth in the world (ignoring the small quantities consumed in Central Asia) – with almost 30% increase per capita consumption. This reflects in demand from Zambia & Malawi northwards – in all SSA countries with high density mainly rural communities with access to small blocks of land. These are people pragmatically eating the best least cost foods that can be grown.

The other key feature of Table 2.1 is composition of food legumes by type – the table simple combines total pulses - dry beans, chickpeas, cowpea, faba bean, pigeon pea and lentils – notwithstanding that there are significant production and culinary preferences from region to region, and especially in SSA.

**Table 2.1 Per capita consumption of food legume crops by region**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Consumption** | **SSA** | **MENA** | **SE Asia** | **E Asia** | **S Asia** | **C Asia** | **LAC** | **RoW** | **World** |
| 1995 (kg/pc/year) | 10.05 | 8.56 | 3.28 | 2.28 | 10.65 | 0.46 | 11.87 | 3.09 | 6.43 |
| 2007 (kg/pc/year) | 12.98 | 8.25 | 5.54 | 2.14 | 9.70 | 0.68 | 11.58 | 2.67 | 6.82 |
| Change (kg) | 2.93 | -0.30 | 2.25 | 0.15 | 0.92 | 0.22 | -0.29 | -0.42 | 0.39 |
| Change (%) | 29 | -4 | 69 | -6 | -9 | 47 | -2 | -14 | 6 |
| Growth/year (%) | 2.16 | -0.30 | 4.45 | - | -0.76 | 3.28 | -0.21 | -1.22 | 0.49 |

*Source: Akibode & Maredia (2011).*

*Notes: SSA: sub-Sahara Africa, MENA: Middle East & North Africa, LAC: Latin America, RoW: rest of the world.*

Per capita consumption in terms of regional consumption is shown in Table 2.2, with the trends of the previous 20 years projected forward into the next 20 years. Again, whilst growth in the Americas remains static, consumption in Africa and Asia continues to increase with the fastest rates of increase likely to be in Africa. Both regions depend upon imports to meet current demand – dependency that is likely to remain. Therein are opportunities for Southern African countries – with resources of land and water in plenty, and relatively short coastal shipping routes serving African importers and/or Indian Ocean routes to India.

**Table 2.2 Food legumes consumption by region (Mt)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Region** | **1990** | **2000** | **2010** | **2030\*** |
| Africa | 9 | 12 | 18 | 22 |
| Europe | 17 | 9 | 9 | 8 |
| North America | 4 | 4 | 5 | 5 |
| South America | 3 | 3 | 5 | 5 |
| Asia | 25 | 27 | 30 | 36 |
| World | 58 | 55 | 67 | 76 |

*Source: Akibode & Maredia (2011)*

1. *Data rounded*
2. *\*Extrapolated on the basis of trends 1990-2010.*

Recognizing the intrinsic value of food legumes for people and their livelihoods but also lack of performance by growers in developing countries as a function of services available to them (and their host governments), a consortium of CGIAR R&D centres has proposed a programme of investment during the period 2012-2020 that may eventually extend upwards to US$500M[[6]](#footnote-6) (ICRISAT, 2011)a. In an effort to encourage national governments in developing countries worldwide where food legumes are a component part of traditional farming practices, CGIAR R&D centres – ICRISAT, CIAT, ICARDA & IITA and partners in a host of leading agro-producer countries – Brazil, Ethiopia, India, USA and others will attempt to redress lagging interest in food legumes with a host of innovative and techno-socio-economic activities. They reason that growers in developing countries should be able to take advantage of the techno-agronomic progress made with food legume crops by the industrial countries during the past 25 years.

The proposed *‘Grain Legumes’* programme has been constructed on the basis of six strategic objectives – four of which are agro-production based and the other two, crucially, represent *‘Value Chains’* and *‘Partnerships’*. Describing the former ICRISAT (2011)a take the position typical of the client with focus upon boosting efficiencies within the value chain – making every node/player count, capturing fair shares for those traditionally in the weaker position (i.e. agro-producers, small-scale traders, etc.) and boosting productivity that losses are reduced, markets are fully exploited, value is added by targeting high quality and agro-processing, and wealth is created. Within *‘Partnerships’* ICRASAT (2011)a are seeking national and regional (and, presumably, international) networks through which *‘research for development (i.e. R4D)* routes can be channelled and/or encouraged.

The programme is the most significant global initiative to arise from the current study on food legumes/Southern Africa. Given the considerable resources of this region, the familiarity that the majority rural people have with food legumes and, importantly, the nutritional role that these foods hold in regional culinary traditions, it is logical that regional partners will be required, that projects/training/capacity building and more will be shared with regional institutions and that the new varieties, recommended GAPs and GMPs and other techno-initiatives will filter into everyday use. The Central African plateau lands from the Orange River in South Africa through to Lake Victoria in Tanzania have always been recognized for agro-industrial potential – all crops/all livestock – of which food legumes are no exception; the Grain Legumes programme may help shift the investment required for vision and developments of this kind.

**2.4 Market opportunities in Africa and elsewhere**

With >65% of global output dependent upon producers in developing countries, production worldwide into the next period is likely to depend largely upon consumption/local demand at point of production with Asian/Indian producers and consumers dominating markets. Projections into the next period suggest that the trends of the past 10 years will continue with global trade rising on the basis of expanding populations in the lower-income countries/regions. SSA producers provide of the order 15% of world production – sufficient for regional requirements, with small surpluses available for trade. Relatively small hikes in productivity, for example, from 0.75 t/ha to 1 t/ha would provide an estimated 2.5 Mt additional exports valued (in mid-2000s US dollars) at US$0.75B. As it stands, however, productivity of this kind and the additional earnings available will likely revert to the more productive producers in North America, Australia and/or Europe.

Forecasting trends for what remains largely a low-priority crop is not without risk. Domestic information from the majority producers in developing countries is notoriously difficult to obtain – and once available – qualifying it remains a challenge. Further, food legumes are grown exclusively under rain-fed conditions and, as higher prices are received for cereals and other food crops, food legumes are shifted further into margin lands. Thus yields depend on the vagaries of rainfall and on the natural fertility of the soils – and this determines the quantities entering domestic markets and surpluses available for foreign trade.

Trends of this kind reflect on prices in markets. When gradual increases in demand are not matched by similar increases in the quantities of food legumes traded internationally, then prices should rise. Consistency of markets, however, tends to confound this basic principle. US prices for a selection of food legumes – dry beans, green peas, yellow peas and lentils – during the mid-2000s showed static and/or slight declines in prices – around US$200/t. The single exception was dry beans which shifted from US$400/t to US$600/t during the same period.

Forecasting trends and prices is essential – but challenging, and particularly when the competition for SSA producers will be the major industrial producers – Australia, USA, France, etc. The efficiency of large-scale production, bulk handling, storage, freight, financing and trade of the industrial producers cannot easily be matched by the fragmented smallholder production systems typical of SSA and the export services available to them – and, ultimately, they come to depend upon the relative power of the international traders. Importing countries (such as India or the poorer MENA countries, for example) may face additional issues with lack of foreign exchange. Freight rates and service charges add further to import costs – and this may have adverse impact on the volume and flow of trade (BenBelhassen, 2005).

Given the relative success of Malawi – as a major producer of food legumes on global-scale – therein are opportunities for neighbouring countries in Central Africa to follow the respective models of agro-production and trade, and to boost regional output. The Southern Africa Region may be largely self-sufficient in food legumes, but opportunities for competing with the best of the industrial countries remain real. Freight handling costs as a result of poor trans-regional roads, the inadequate infrastructure of East African ports and the limited shipping available can be off-set to some extent by the shorter sea distance involved to Asian markets. The other key factor is one of choice: *‘which’* of the food legume to produce/target – what are the preferred foods in South Asia – lentils, chickpeas, dry peas and/or dry beans? And for this, regional producers and traders in Southern Africa need to monitor the production trends of the other producers – what crops, areas and, crucially, what stocks have been carried-over from previous years?

Working in cooperation one-with-the-other across the main producer countries in Southern Africa, herein is scope for specialized traders to establish and take a global position.

**2.5 Logistical issues in Southern Africa**

Compared to other regions in Africa, the Southern African road and rail network is good – the best on the continent. Main road haulage routes hub into South Africa and service Botswana, Namibia and Southern Mozambique – major sea ports are available at Cape Town, Durban and Maputo with a host of smaller but no less efficient ports available. The further north geographically, the more challenging the road network becomes – in Zimbabwe, Zambia and Malawi – but pavements are permanent and generally remain in good condition, and strategically extend throughout Central Africa. On the periphery of the region – into Central and Northern Mozambique, Northern Zambia and throughout Angola – road transport becomes more challenging – inadequate infrastructure and slower more expensive travel. That said, regular long-distance freight truck transport links Johannesburg with Luanda via Windhoek.

Political stability has largely returned to the sub-region from the mid-1990s on, but this has not reflected in investment in improved infrastructure to meet demands; access to investment capital, for example, remains challenging. Similarly, Zimbabwe no longer holds the position of sub-regional hub that it once enjoyed, and this disrupts north – south trading links. Land-locked countries such as Malawi and Zambia continue to depend upon sometimes fragile road and rail links to historically important sea ports that have not been able to attract the investment funds required of modern international shipping. Thus inter-regional and foreign trading becomes that much more difficult – and expensive.

Rail transport is good throughout South Africa and through into Botswana, but further north inadequate investment in track, rolling-stock, locomotives and handling facilities makes road transport more practical. Rail networks are notoriously difficult to manage in partnership with neighbouring countries, and particularly when investment has not kept pace with demands for services. Historically, the region depended on rail transport for all long-distance freight and passenger traffic - logically, this will eventually be re-established as one outcome of movement towards greater politico-socio-economic markets/trading developments.

Costs of transporting goods have been scrutinized by the Southern Africa Trade Hub (SATH) (2008) and considered to be a major impediment to increasing trade in the region. For example, transport costs have been estimated 14-15% of landed costs – of the order twice that of global standards. The further from the coast, the higher these costs become, for example, transport costs for the landlocked countries – Malawi and/or Zambia can be 50% the price of the goods.[[7]](#footnote-7)

Given the industrial strength of the South African economy, domestic infrastructure and the extent of public and private institutions in the country - all regional countries will inevitably become absorbed into a regional trading/economic bloc that will be led/dominated by the South African private sector.

Movements of food legumes within the region is much like that of the main food crops such as maize – outside of South Africa there is no bulk handling as such; all crops are bagged and handled manually on and off road transport. In dry condition, the seeds will take a measure of robust handling with minimum damage. Cross-border shipment is less common than internal transport, with small quantities entering regional and/or international trade. Regional development of industrial food legume industries, for example, with boost in soybean production/processing would provide further opportunities for long-haul bulk transport.

**Section 3**

**Key Elements of Success: Developing Competitive Advantages**

Comparative advantages can be considered after domestic industries have met the demands of local markets for supplies of sufficient fresh foods and, as appropriate to national socio-economic development, for processed food products. Pending this – recognition of constraints/issues will take priority; and here the challenge becomes one of providing technical information, funding and investment.

**3.1 Productivity of Food legumes production**

Consider improved productivity on the basis of better smallholder production, more accessible markets, greater transparency with prices of foods ex-farm-gate and/or with added value processing. Then encourage growers to store surpluses to match market prices, provide ‘*informal’* markets with support, work within fair and easy-to-implement national grain policies, and boost the validity of the value chain including investment in infrastructure. These points and more have been highlighted in reporting by MSU (2010). Given the small-scale nature of much of food legume production in the region, these issues ultimately determine the viability of boosting organized smallholder production.

Smallholder-led strategies. Given increasing populations within the region and the sub-division of land into ever smaller blocks, productivity becomes an issue wherein the typically low-input technologies and low-output materials/foods systems that apply are no longer sustainable. De facto changes in per capita land available in four Southern African countries over a 50 year period are shown in Table 3.1 - and then projected into the next 40 years. Strategic planning is required that will boost productivity – higher production/unit area, shift to higher productive crops (e.g. fruits & vegetables) and/or re-development of land areas and/or rural communities. Ultimately, all these moves take effect should populations continue to expand – with the shift towards higher productivity per worker/person required.

**Table 3.1 Ratio of cultivated land to agricultural population (ha/per capita)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Country** | **1960-1970** | **2000-2007** | **2050\*** |
| Malawi | 0.62 | 0.30 | 0.15 |
| Mozambique | 0.39 | 0.25 | 0.16 |
| Zambia | 1.37 | 0.78 | 0.44 |
| Zimbabwe | 0.73 | 0.48 | 0.32 |

*Source: MSU (2010)*

*\* Estimated on the basis of ratio of change during the 50 year period 1960-2007.*

More accessible markets. Traders dominate post-farm-gate activities and, typically, growers are approached by ten or more traders as food crops are ready for harvesting. Apart from casual farm-gate sales, most growers do *not* venture into markets; issues are those of remuneration, market cartels, transport and lack of familiarity. Appreciating the value of their assets, exploring trading options and changing attitudes will be required.

Fair share trading. Growers typically have no firm idea of what constitutes a fair price at the farm-gate, and traders will make the lowest possible offers (that will, in turn, maximize their margins). Some knowledge of retail prices in regional markets enables growers to boost farm-gate prices for food crops within the range 60-90% market prices.

Fair share added value processing Margins between the farm-gate and the selling prices of processed foods (i.e. those with added value post-production) can be even further from the grower’s farm-gate prices. Growers typically receive <35% the value of the retail price of processed foods and, thus, >65% of the retail price of the processed food is attributable to marketing and processing.

Inadequate storage Intra-seasonal trading is limited because storage facilities on-farm or in rural communities are not available. Storage requires investment, but provides opportunities for sales at times when supplies are short and prices correspondingly higher. Storage brings risk, however, from damage and/or theft, from the unpredictability of prices that may change and, in times of national shortage, of having stored foods confiscated by government. For much of local production, however, issues of storage remain largely irrelevant – apart from quantities kept for home consumption - storage facilities are *not* typical, and growers sell their surplus food crops from the field.

Capturing added value Most growers sell their surplus foods into the informal sector – traders visiting the farm. Others sell direct to a quazi-public-owned ‘marketing board’. Either way, value is added to raw materials – transport, grading, handling, milling, etc. and this is re-directed back into retail markets. The additional 65% or more costs involved are hidden within retail prices. Process these materials within the home/community, however, and costs can be absorbed and/or local people are employed and the value addition can be captured.

Informal food supplies Informal trading tends to work within smaller margins when compared to the formal trading sector. Marketing sectors tend to operate in parallel, except that informal produce frequently ends up in the formal sector, with margins that benefit the formal traders and processors. Formal sectors have more resources and can typically out-perform the informal sector. The end result is higher retail prices for consumers.

Stability of public sector support Notwithstanding a national grains/seeds policy – typical of many producer countries, ad hoc policy interventions will frequently erode the benefits for which the original policy was first established. The may affect, for example interpretation of meaning, practical application and use and understanding, and this will vary to the detriment of the private sector. This reduces investment in markets and the smallholder remains the loser.

Weak value chains Lack of coordination between the main players in the value chain typically results in inefficiencies with chain operation. For example, transporters and traders need to work closely one-with-the-other. This is particularly important for the larger-scale transporters working international routes wherein markets differ from country to country (and this notwithstanding common markets and inter-regional tariff-free trading).

Lack of public investment Governments can be notoriously slow to invest in public infrastructure that will boost productivity. This includes ports, roads, power utilities market/storage structures and more. The ports available to Eastern & Central African countries, for example, are in poor-average condition, and have not kept pace with modern investment required for materials handling structures and equipment. The higher costs of shipping that result are simply passed on to the client.

**3.2 Improved handling and storage post-harvest**

Commercial producers of food legume crops in South Africa, Zimbabwe and elsewhere in Southern Africa are aware of the care needed with which to handle pods and seeds from field to store to markets, and avoid the losses typical of smallholder production. Southern Africa has commercial crop handling facilities and systems that match the best in the world. This is not the case with much smallholder production – notwithstanding the presence of (sometimes large-scale) commercial production in-country – with parallel production systems but with little overlap between the two. Smallholder producers in all countries in the region generally lack post-harvest handling and storage facilities. Grower are usually aware of the limitations of on-farm harvesting, post-harvesting handling and storing pre-markets, but have neither the quantities of crop available nor the funding with which to invest in improved infrastructure. Thus it is that high crop losses sometimes occur; and this has resulted in yields that have remained largely unchanged from year to year according to Odogola (1994).

Harvesting and post-harvest handling is labour-intensive. Pods shatter naturally in-field in crops that are over-ripe, mature pods also shatter when handled poorly and seed is lost to the ground. Staggered harvesting – to catch a maturing crop – requires 3-4 harvesting sequences; again, this is time consuming and expensive. Lack of crop-care in field results in pods and seeds that become infested with insects; and this is carried over into store where it typically intensifies – and quickly. Depending on location, maturing crops may be attacked by birds, rodents, baboons and other wildlife. Crops can also be stolen.

Food legumes can be kept for long periods when stored correctly – six months or more but, depending upon the crop, this may later affect cooking and palatability – the longer the period of storage, the more likely this will affect traditional tastes and nutrient value. It may also extend the period of cooking required – with increased demand for fuelwood. The same holds true for naturally occurring toxins that develop in stored legumes and which will reduce nutrient value and, in some cases, result in unpalatable foods and/or foods that are dangerous to eat (Odogola, 1994).

**3.3 Regional compliance for standards of quality and hygiene**

Food insecurity within many of the countries of Southern, Central and Eastern Africa, the paucity of surpluses of the main foodstuffs that are produced annually and, importantly, the limited buffer stocks held-over each year to compensate for decreased production provide a measure of national security tends to skew inter-regional trade.

In a study seeking to derive trade indicators that would better determine the reality of trading undertaken between regional countries, Gbegbelegbe, *et al.* **(**2010) described the speed with which governments place bans on trade in basic foodstuffs – the result of a single failed harvest, for example – the impact of the vagaries of climate and the considerable discrepancies that continue to occur between data collected from the different industrial players, and how this related to decision-making on the part of governments; how this eventually impacts upon policy implications.

The issues are obvious - trade bans between neighbouring countries with porous borders typical of many countries in the region, ultimately results in smuggling, and markets are disrupted. Notwithstanding the stated aims of inter-regional market developments, for example those included within COMESA agreements by signatory countries, food security issues in the home country always take priority over market demand elsewhere. For example, Gbegbelegbe, *et al*. (2010) compared exports of selected foodstuffs from Malawi and Zambia during the two year period 2008-2009, and found volume of trade that had fallen, respectively, 79% and 35% according to official data.[[8]](#footnote-8)

Informal trade between the countries in the northern section of the Southern African region – Angola, Malawi, Mozambique & Zambia (and those further north – DRC, Tanzania & others) – with movement of people, goods and materials by road/lake transport - is difficult to monitor, and all but impossible to control. The larger the bulk loads, however, the more likely that main haulage/trucking routes will be used. All countries have legislative policies and regulations in place to control the movement of planting materials – that aim to restrict/control obnoxious plants, pests, diseases and viruses. All countries are covered by international standards such as those established by the IPPC and WTO Agreements on sanitary and phytosanitary (SPS) regulations/guidelines.

Inspection, laboratory and quarantine facilities in all countries are strictly limited and this is particularly disrupting at points of entry, where border staff are sometimes faced with difficult decisions wherein delays in shifting biological materials in non-refrigerated trucks can result in high losses. Quarantine road entry between the northern countries – Malawi, Mozambique & Zambia is particularly weak.

In regional context opportunities for *‘other pulses’* and *‘dry beans’* were ranked in the *‘Top 20’* products by a combined ITC & FAO screening methodology that explored the potential of 78 agricultural products grown in the 16 countries that make up the Southern and Eastern African countries – this included *all* the countries of Southern Africa.

‘Other pulses’ and ‘dry beans’ were rated for their *‘proven supply capacity and efficiency of production’* (i.e. high production index). Others within the same group included cassava, other roots and tubers, and millet. Dry Beans and dry cow peas were also rated for their *‘importance of imported products’* (i.e. high import index) together with maize, sorghum and oil palm fruit. There was neither listing for food legumes within export indices nor within world market indices, but the messages for local producers and traders are clear - local productivity of edible legume crops is reasonable, but more can be done to boost productivity and, crucially, regional markets continue to depend upon imports to meet regional demands. Population growth across the region will continue to outstrip demand into the foreseeable future (ITC & FAO, 2008).

**3.4 Horizontal coordination for boosting efficiency**

Staple foods that hold secondary or tertiary place within local agro-production tend to be taken for granted, and this means little or no focus upon production levels, inadequate information to record trends in production and little in the way of R&D and/or technical investment. Thus it is with food legume industries in the Southern Africa region. The major foods are recorded, tracked and supported, but not the supplementary commodities (and this notwithstanding their crucial role with food security – cassava is a case in point – and notoriously difficult to track on rural community basis). Issues of this kind are further complicated by the large number of private traders involved – following the demise of earlier quazi-government marketing boards that once dominated regional trading.

Value chains for the main food legumes – groundnuts, chickpeas, lentils, etc. – are difficult to determine from a distance; so little information is published and shared. Horizontal linkages at producer and marketing levels are generally weak, and the availability of food legume-focused associations remains unknown. Associations of growers and/or of millers exist in the more technically-advanced agro-producer countries such as South Africa and/or Zimbabwe (e.g. Commercial Farmers Union of Zimbabwe) but the extent of their services, membership and/or rational in support of food legumes remains to be determined.

Similarly, vertical linkages at all levels remain extremely weak with, again, the probable exception of the larger-scale cereal producers who may have contract/business agreements that link directly to millers/traders.

Given the limited value of national food legume industries (when, for example, compared to the major staples) and the small quantities of food legumes that are traded (when compared to consumption within the home community), the savings in efficiencies by booting horizontal and vertical linkages remains doubtful. More to the point would be prevention of losses post-harvest, that greater quantities can be kept for longer periods to cover issues of food security between crop harvests.

Issues of efficiency would arise, however, with the ‘industrialization of production’, for example, should national nascent soybean industries be integrated into a sub-regional and/or regional industry wherein large quantities of seeds and oil would need to be produced, marketed and shipped. TechnoServe (2011) covered issues of this kind with focus upon boosting production in Malawi – and integrated national production into a *‘roadmap’* for Southern Africa.

There is scope for harmonization of standards between the countries of the Southern African region – adopting uniform seed classes, varietal identification certificates, genealogy and traceability, labelling, etc. of biological materials. Public services in support of quarantine, crop protection and similar require more investment. Issues of this kind will become crucial should the countries of the region begin exporting significant quantities of food legume seeds whether for fresh consumption or industrial processing.

Providing material of known quality to growers – whether improved food legume seed or other farm inputs is a long-term aim for an industry that receives little in the way of focus investment. Issues of this kind apply equally to processed foods manufactured from crops grown in all regional countries. Issues of this kind are unlikely to arise into the near-middle distance, but an expanded industry that seeks to compete on a world stage has to begin by adopting the most basic of principles required of good manufacturing practices (GMPs).

**3.5 Comparative advantages in context**

Given the extent of the constraints facing those seeking to boost food legume production in Southern Africa (and elsewhere when seen, for example, from the macro-position of the ICRISAT-led programme *‘Grain Legumes’*), the issues are not so much *‘developing competitive advantages’*, but recognition of the major challenges that continue to prevail - all of which have to be overcome before productivity can be improved and, with yields and production climbing, sufficient surpluses are available to provide for sales into external markets.

The Southern Africa region has advantages in plenty when considered on the basis of the *‘natural environment’* in which these crops will be grown (and when compared with the ‘*industrial’* production systems employed by the industrial producer countries). The challenge for the region is one of production to meet market opportunities – first self-sufficiency within the region, then selling into African-wide markets, and finally competing in the industrial markets of the North. Develop a brand, nurture an image and, should the opportunity arise, target *‘organic markets’* on the basis of the many thousands of smallholder producers across the region (and in Malawi, Mozambique & Zambia in particular). This will require vision and organization – but the challenges are do-able. Region-wide soybean production/markets, for example, are already in advance discussion stage.

Planning, financing, encouraging growers and establishing industries of this kind require visionary private sector entrepreneurs with the contacts and ability to motivate growers; and this is done by guiding crops developing and, crucially, purchasing them cash-in-hand at time of harvest. Value chain development thereafter can be managed that the best possible quality seeds are despatched to markets. Productivity will eventually increase on-the-farm, but this will require industry-wide effort and considerable change within regional value chains. The key issue will be one of *‘ownership’* that smallholder growers are encouraged to consider themselves ‘*partners’* with the development of these novel agro-industrial developments.

**Section 4**

**Analysis of Food Legumes Value Chain in Southern Africa**

**4.1 Value chains and the main industrial sectors**

Agricultural value chains typically consist of three inter-linked sectors: groups of actors, linkages between the actors and, importantly, the support environment. This is illustrated in Fig. 4.1 wherein the different actors are grouped on the basis of their position within the value chain. Based upon reporting by ICRISAT (2011)b and depicting a model value chain for pigeon peas in which smallholders were encouraged to form groups in support of collective action and business training. Value chains comprise the basis for shortening market channels, reducing transition costs, boosting quality and introducing improved technologies.

Direction of flow of produce/materials is from input suppliers to smallholders to consumers. The corollary of value chains is one of flow of funds back along the value chain – from consumer to input suppliers. This is not shown. Also missing is the ‘*environment’* in which the value chain operates – supported by the institutions, agencies, services and others that supply R&D, credit, infrastructure, regulations, information and more.

**Fig. 4.1 Agricultural value chain – food legumes (pigeon peas)**



*Source: ICRISAT (2011)b*

*Note: PMG – producer marketing group.*

Value chains vary in concept and reality, and there are many smallholders who sell small surpluses directly to consumers in their local communities or at roadsides and/or larger growers/smallholder groups who contract to distant processors or restaurants, thus negating the need for intermediaries.

Input suppliers provide seeds, fertilizers and other agro-chemicals to growers, who then produce the crop. Depending upon markets, traditions and the quantity of the food legumes grown, growers may sell their crop post-harvest or store part or all of it for sale at a later date. Typically, crops are sold to traders/transporters for deliver to markets, but they can also be sold directly from the farm – for markets that are close by. Traders link growers with markets, and markets represent the connection between supply and demand. Traders add value to the crop simply by making them available to consumers but traders may also grade and/or pack to boost presentation and, by so doing, raise the value of the seeds further. Wholesalers and retailers are positioned between traders and consumers, and add further value by offering the seeds for sale to consumers in the place, at the time and in the quantities required and, importantly, at prices that reflect competitive marketing.

Small quantities of traditional seeds are processed further within agro-industries that specialize in a variety of products, for example, peanut butter from groundnuts and/or oil from soybean and/or groundnuts. Snack food industries prepare easy-to-eat street foods for casual purchase. Many of these represent cottage and/or informal producers.

The value chain operates on the basis of physical and institutional elements that make up the agro-industrial environment established by the public and private sectors. Thus the various actors in the value chain are typically dependent upon credit, communications, public infrastructure, legislation and policies, market information and agricultural R&D. Finance typically remains dependent upon the private sector, on the credit worthiness of those involved within the value chain and the extent of risks taken.

**4.2 Value chain characteristics**

The legume and pulse value chain in Southern Africa is typical of many other smallholder food crops, and can be considered on the basis of six key characteristics, as shown in Table 4.1. These characteristics notwithstanding, value chains in the region lack organization, feature low productivity and high inefficiency and, given the nature of much predatory trading, tend to be destructive – further alienating growers from clients. Notwithstanding co-dependency, the individual nodes/players remain poorly connected – much of this due poor information exchange.

Operational and industrial constraints overwhelm the food legume value chain. And not withstanding the traditional importance of these plants/seeds as food for people. Much the same is true for all second- and third-level priority crops the bulk of which are eaten in the home. Growers are poorly serviced with essential inputs – and particularly access to appropriate varieties and to good quality seed. Use of agro-chemicals, as required, is inadequate and as a consequence yields are below potential. Harvesting and post-harvest handling can be poor, and losses can be high.

Growers individually sell small quantities and this places them at a disadvantage to traders. Transport costs are higher given the small incremental loads purchased. Rural roads are typically inadequate and more so during the rain season. Wholesale markets purchase on the basis of quantity, with few price incentives for high quality supplies. This reflects in choices available for retail sales to consumers, and opportunities for exploiting niche markets for higher quality seeds become lost.

**Table 4.1 Characteristics of food legumes value chain**

|  |  |  |
| --- | --- | --- |
| **No.** | **Name** | **Function** |
| 1. | Create value | Each node/group of players adds value to the final product. |
| 2. | Product flow | Food legumes move from grower to trader/transporter, to wholesale & retail markets and thus to the consumer. Intermediate stages may provide services – adding value. Processors provide parallel value chains that service markets for processed foods, and thence to the consumer.  |
| 3. | Financial flow | Each stage of the value chain results in additional value to the product. Money and/or value changes hand, and profits/losses are made. |
| 4. | Information flow | Information moves back and forth between nodes/players in the value chain. Information is dominated by finance (i.e. costs, earnings, etc.), but technical and/or logistical information is also shared. |
| 5. | Key driver(s) | Drivers ‘*steer’* the direction of the value chain. Drivers can be directly involved (e.g. growers, traders, etc.) or outside the immediate value chain (e.g. processor, R&D/technical development, exporter, etc.). Drivers help boost efficiency, control costs, reduce risk and develop new markets. Individual drivers can ultimately dominate the value chain. |
| 6. | Governance | Mutual self-interest in the viability of the value chain leads to a measure of self-governing, and sufficient to promote cooperation and shared interest. Sub-sectors develop (e.g. processing, sales to kiosks, etc.) and these remain linked to the main value chain as new markets evolve. |

*Based on reporting by Cressman (2002).*

**4.3 Analysis of the food legume value chain**

A typical approach to analysis of the food legume agro-food chain may take into account its strengths, weaknesses, opportunities and threats – this is known as a ‘*SWOT’* analysis; and it is widely used to identify the major factors that determine performance according to da Silva & de Souza Filho, (2007). A SWOT analysis is relatively quick and can be undertaken at nodes within the value chain, by different people and at different times – there is an element of dynamic change involved given the variation of opportunities available and the different threats that may present themselves.

A review of what can be done (i.e. strengths) with what cannot be done (i.e. weaknesses) provides an indication of the current influences that may impact upon the value chain and, further, projecting them into the next period helps to gauge future developments (i.e. what *may* take place). The analysis places the value chain in context of success or failure of a particular course of action and/or environmental impact, and whether there are key obstacles that need to be matched or overcome. In the scenario of opportunities and threats that exist, information is provided that will help with making choices of what to do next.

A SWOT analysis of the food legume value chain in Southern Africa is shown in Annex A4, and can be summarized:

* Strengths Well-known socially-acceptable food with high nutritional value. Excellent smallholder crop, compatible with home use and/or off-farm sales. Legume crops fix atmospheric nitrogen - excellent rotational/farming systems crop. Resilient producer. Ready market for high quality seeds in local markets. Stores well for long-periods (in high-quality infrastructure).
* Weaknesses Low productivity by international standards. Growers remain fragmented. Notwithstanding experience/traditions, failure of growers to adopt good agricultural practices (GAPs) – provide sufficient fertilizer, agro-chemicals and/or supplementary water (as appropriate). Highly susceptible to insect attack and losses from birds/wildlife as crop matures. Insect infestation carried over to storage. Crop losses high when handled poorly during harvest and post-harvest. Failure of markets to pay for high quality. Value chain disorganized and poorly supported by the main players. Regional production fails to meet market demands.
* Opportunities Good. Re-organization of national value chains and strategic planning within regional markets is required. Domestic markets show potential for growth - with production lagging. Export markets little explored. Establishment of regional R&D services, agro-industrial and farm-service entities required – most of which can be private sector led.
* Threats Production has expanded without due concern for provision of services. Increasing quantities of high quality seeds are imported to make up for domestic deficits. Yields static as reflection of poor husbandry, poor storage, post-harvest/transport losses and lack of markets for high quality produce. Industry requires leadership, guidance and technical and financial support. Potential for livelihoods, food security and exports may be lost. Industry lacks *‘ownership’*.

**4.4 Coordination mechanisms – producer/trader/processor linkages**

It is difficult to rate priority value on the three components that make up value chains – actors, linkages and environment – but scrutiny of linkages producer/consumer, producer/trader and markets/industries helps conceptualize the challenges that have to be overcome to boost the efficiency of food legume value chains in Southern Africa. Inadequate services, static yields, low quality, the fragile nature of pods/seeds and susceptibility to poor handling, long distances and lack of infrastructure in the region result in inefficiencies that are difficult to overcome given limited appreciation of national value chains. Value chains remain fragile, skewed and little supported. Crop remains second/third level priority for most growers/industrial sectors.

**(a.) Producer/consumer networks**

Low priority by smallholders reflects in the quality of crops offered for sale – mixed food legumes (i.e. mixtures of *different* crops), seeds from same type of crops (but *different* seasons), different sizes, whole, broken and/or shrivelled seeds. Other crops offered may be insect damaged, mouldy, damp and/or contaminated with tare, weed seeds, rodent droppings, stones, soil and other materials. This reflects low priority but also limited facilities, materials and/or understanding of the best practices that should be followed when presenting seeds for sale. Infestation by insects and/or rodents is symptomatic of poor storage and will result in rejection or down-grading at point of sale, but it also reflects on the lack or resources available to the majority smallholders. In a useful review of post-harvest handling of cereals and legumes, Mosha (2003) emphasised the impact of climate – moisture and temperature – on keeping quality, and recommended GAPs that should be followed. FAO (1995) provided a useful guide to help identify insects typically found in poorly stored cereals and legumes.

Whether isolated or in contact with the consumer, the smallholder is unlikely (or unable) to do more to better present his/her crop for sale. Much will depend on the extent of his/her capabilities, knowledge and facilities/materials on-hand. The reality, of course, is one where the smallholder is approached by the travelling trader and simply takes the price offered – placing his/her dependency and interests into the hands of the next link in the value chain. With focus upon cotton production in Zambia, GDS (2007) criticised growers for not making more effort to link into farmer interest groups (in this case, the Zambia National Farmers Union) - to seek information, inputs, technical advice and more that would ultimately lead to better quality goods and higher income.

**(b.) Producer/trader links**

As supplies of basic foodstuffs decline traders will lower their standards of quality and, as appropriate, introduce intermediary processing steps with which to clean, sort and grade to better present these foods in the market. Supplies of basic foodstuffs have been slowly declining in SSA – Central Southern Africa included – over the past 20 years as a reflection on low-priority status; by both producers and host governments. The issues involved were highlighted by Karuga & Alfred (2010) when analysing value chains for 11 staple foods in Kenya. Findings suggest lack of crop priority on the farm (i.e. insufficient fertilizer, crop care, irrigation, etc.), limited extension advice, weak R&D technical assistance (i.e. choice of higher yielding varieties available), insufficient land/low outputs, high post-harvest losses and absence of formal markets.

Horizontal and vertical linkages were either non-existent or extremely weak and ineffective, with the reality of the grower having no one to whom to turn to re-position him/herself within the value chain. Apart from the main cereal staples, the value chains for the other food crops including food legumes *narrow* with limited opportunity for *adding* value (i.e. commodity values were low throughout the value chain – there were few opportunities for boosting margins). The reality was one in which the producer could either decide to take a low price for his/her crop or to refuse to sell it – and to use if for food in the home (with the additional waste likely from poor storage).

**(c.) Markets/industrial links**

The majority food legumes in the region are grown by smallholders and, as already suggested, quality and quantity available per individual grower rarely results in his/her making contact with distant markets and/or industrial processors. However, agro-industrial processors do deal directly with larger-scale growers and/or well-established groups representing SMEs in a locality and/or purchase direct from traders/markets (and typically on the basis of contract negotiation).

The challenge for national managers is one of organizing the many smallholders into organizations, and then supporting them technically/financially that they are able to supply the required quantity and within the range of qualities required, and to set time schedules. TechnoServe (2011) is currently promoting the establishment of a smallholder-based soybean industry in Malawi. A summary is provided by Howwemadeitinafrica (2011). This includes focus upon Kasungu in Central Region, the construction of an oil extraction/meal handling plant and extension of the 17,000 ha already available annually. Given pressure on commercial tobacco production in the same region, access to alternative crops/income represents a measure of socio-economic insurance for both government and growers.

**4.5 Socio-economic impact**

With estimated 50% of Southern African people dependent upon agro-production, the higher the productivity, the greater the employment opportunities and the more money that will circulate in rural communities - the more beneficial the socio-economic impact will be. And, the corollary, the more stability and well-being created the more options available within the community, for example, with choice of remaining or migration. Issues of this kind are appreciated by national managers, but boosting the economic opportunities/welfare of rural communities remains challenging. For example, in their proposal to the Government of Malawi for boosting soybean industrial production TechnoServe (2011) quoted 204,000 partnership growers, cash profits of the order US$235/ha and a boost in annual income of >US$50/grower. With annual per capita GDP US$900 and >50% of the population living in poverty, national returns of this kind are useful.[[9]](#footnote-9)

In their proposal to boost the productivity of food legumes internationally, ICRISAT (2011)a also promoted the socio-economic benefits that follow from this kind of investment. Theirs is a pro-poor value chain smallholder programme with focus upon food and nutritional security that will enable women-in-the-community (in particular) to gain the socio-economic benefits of more sustainable intensification of food legumes production. On macro-scale this is food security, more cash and better living standards for 300 million people - an additional 7.1 Mt food available, savings of the order US$3B in nitrogenous fertilizers and >400,000 tonnes atmospheric nitrogen stabilized. On micro-scale this means 150 million women beneficiaries that, together with family members, make up 10% of world population. It’s a reasonable investment for a programme likely to cost of the order US$500M.

**4.6 National support for domestic production**

All regional countries provide R&D and extension advice to food legume growers in recognition of the traditional roles of public services but, increasingly, technical support of this kind is being shifted to the private sector (or shared within PPPs). The adoption of good agricultural practices (GAPs) will help growers to boost productivity (in reality to double yields to 1.5 t/ha) by using better quality seed, selecting improved varieties, maintaining soil fertility and taking care to reduce post-harvest losses according to ICRISAT (2011)a. Of the six strategic objectives developed by ICRISAT, partnerships are proposed with which to boost the capacity, capabilities and reach of national institutions – and to extend this into the private sector, NGOs, CBOs, farmer groups and others. National support thus becomes crucial to the success of agro-production (and not just the ICRISAT programme, but for *all* initiatives).

It is not sufficient, however, to continue to identify the issues and to persuade growers to make the husbandry and crop-care changes required – and, in any case, much of this is already well known by local people. Some form of innovation may be required to shift emphasis and these are described by Gildemacher, *et al*. (2009) as *‘innovation systems’*; and considered as *‘marketing systems’* and *‘knowledge and information systems’*. Growers in Kenya and Ethiopia were described as *‘wary of markets’* and reluctant to invest more in their crops given the risks involved – their systems are typically always low-investment – low inputs and low outputs. Growers may increase productivity without breaking out of this cycle, for example, by buying higher quality seed, using more fertilizers and so on. Growers may need to be encouraged to consider parallel technical and market interventions.

Managing the in-flow and use of knowledge/information within the value chain creates challenges for growers, but de Roquefeuil (2011) has shown that the mobile phone is already making a difference – putting growers in contact with each other. Basic husbandry information – technical or otherwise – is already considered by growers as self-developed; from personal or community experience. Other sources of information included farm input suppliers, NGOs and the public sector (R&D and extension workers) but, again, this was frequently for novel or new information not already available, for example, crop chemicals/use, new varieties of seed and so on. Publications and media tended to play a marginal role. Traders played no role at all.

Gildemacher, *et al.* (2009) identified four sources of support/information typically available within the country for growers – national R&D organizations, extension services (whether public-, private- or NGO-based), food crops growers (separately or within groups) and the private sector.[[10]](#footnote-10) Specialized international agencies and/or bi-lateral donor groups provided out-of-country information, but usually in partnership with in-country groups. Thus it is that the International Institute of Tropical Agriculture (IITA), the International Centre for Agricultural Research in Dry Areas (ICARDA) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) provide technical assistance to food (legume) crops industries throughout Africa but, with scarce resources, this can be strictly limited. The IITA is based in Nigeria and has a combined cereals and legumes programme currently underway with potential beneficiaries listed for the 10 countries that make up the Southern Africa Region (IITA, 2008), but with priority clients listed for Malawi, Zambia & Zimbabwe.[[11]](#footnote-11)

The opportunities and constraints of the different actors/sources of information provide a complex network of issues – which can be summarized as declining state services, nascent private sector services, growers that do not trust grower’s groups, marginalization and stagnation.

State-sponsored development is increasingly directed into discrete interventions in partnership with NGOs, farmer groups and the private sector – seeking to provide a key input (e.g. rural seed store, processing factory, feeder road, etc.) with which to stimulate one or more of the key groups that comprise the value chain. Increased income encourages take-up of novel ideas; otherwise production remains *‘business-as-usual’*. Traders and market operators tend to be outside much of the pro-feed legumes productivity programmes taking place in Southern Africa, for example, with focus upon the grower and/or public services.

**Section 5**

**Challenges Ahead**

There are considerable challenges for food legume value chains in the region – whether considered from within when seen from the insider-position of a main industrial player (i.e. grower, trader, marketer or processor) or from the outsider-position of the national investor – whether public and private sector. Populations in the region are expanding and, whilst consumption of food legumes remains relatively static, demand is growing slowly to match increased numbers of people and, importantly, changing dietary demand that meets the expectations of larger numbers of urbanized people and people seeking to switch to healthier foods. Relative stagnation with crop(s) productivity and the paucity of investment in infrastructure, industries and/or services create long-term challenges that require national/industrial leadership. It is not clear whether this leadership is emerging; and, if it is, then it remains largely country-based. There is little or no regional view. Meanwhile imports of food legumes into the region continue to rise to meet demand.

**5.1 Improved performance of the food legume value chain**

Recognition of constraints within the value chain will help make the changes that will boost productivity, enhance value and provide for more compatibility between the different nodes/players involved. Constraints can be considered within and outside the farm-gate. They can also be considered within the summary of ‘*threats’* and ‘*weaknesses’* in the SWOT analysis of the value chain as shown in Annex A4 and summarized earlier in section #4.3. Constraints represent challenges to industrial progress – in production and markets, with provision of services and infrastructure and, importantly for encouraging the private sector. They warrant further scrutiny.

**5.2 Choice of food legume crop or none at all?**

Markets for the most popular edible food crops vary on the basis of client preference – what people like to eat in which particular country. BenBelhassen (2005) described crops grown worldwide in order of production as dry beans, dry peas, chickpeas, dry broad beans, cow peas, lentils, pigeon peas and *‘others’*. The issues then become focus upon those crops for which the different countries of the Southern African region have industrial experience. This comes from a comparison of Tables 5.1 & 5.2.

**Table 5.1. Global position of Southern African food legume producers**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Food legume** | **Country** | **Global rank****(1-20)** | **Production (US$x106)** | **Production (tx103)** | **Production as proportion of #1 producer (%)** |
| Groundnuts | Malawi | 19 | 116.6 | 282.1 | 2 |
| Pulses (nes) | Mozambique | 3 | 87.9 | 166.9 | 16.6 |
|  | Botswana | 14 | 21.9 | 40.1 | 4 |
| Soybeans | South Africa | 14 | 135.7 | 516.0 | 0.6 |
| Chick peas | Malawi | 12 | 17.9 | 52.4 | 0.7 |
| Cow peas | Malawi | 10 | 18.1 | 72.1 | 3 |
|  | South Africa | 18 | 1.9 | 5.7 | 0.24 |
| Dry beans | Angola | 15 | 135.8 | 247.3 | 7 |
| Lentils | Malawi | 20 | 1.1 | 2.7 | 0.2 |

*Source: FAO/STAT (2011)*

1. *Production data rounded.*
2. *The category ‘nes’ is particular to FAOSTAT and categorizes all food legumes not included in other categories – ‘not elsewhere specified’*

Key points to note from Table 5.1 are: the useful range of countries and crops, notwithstanding the small proportion of production on world-scale. Production is dominated by the industrial countries – Canada & USA - and those with the largest populations – India, Brazil & Nigeria. And, as a reflection of the poverty of the majority people in these countries, food legumes remain typically a food for poor people. The one exception is food legumes that are used for industrial processing, for example, soybean. Further, consider the position of Malawi within global industries – as a small but versatile producer; and if Malawi, then why not Mozambique, Zambia and Zimbabwe? Value per tonne is a useful indicator of potential returns from Table 5.1 with higher earnings possible from groundnuts, dry beans and pulses (nes).

**Table 5.2 Position of food legumes within commodities by country\***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Country** | **Food legume** | **National rank****(1-20)** | **Production (US$x106)** | **Production (tx103)** | **Production as proportion of #1 crop (%)** |
| Angola | Dry beans | 3 | 135.8 | 247.3 | 2 |
| Malawi | Groundnuts | 4 | 116.6 | 282 | 7.5 |
|  | Pigeon peas | 8 | 80.3 | 206 | 5.5 |
|  | Dry beans | 9 | 75.7 | 171.4 | 4.6 |
|  | Cow peas, dry | 20 | 18.1 | 72.1 | 2 |
| South Africa | Soybeans | 18 | 135.8 | 516 | 4.3\*\* |
| Zambia | Groundnuts | 10 | 45.8 | 120.6 | 6.4 |
|  | Pulses (nes) | 18 | 12.5 | 26.4 | 0.1 |
| Zimbabwe | Groundnuts | 10 | 38.1 | 92.9 | 13.5\*\*\* |
|  | Soybeans | 13 | 29 | 110 | 15.7\*\*\* |
|  | Dry beans | 20 | 17.3 | 32.9 | 4.7\*\*\* |

*Source: FAOSTAT (2011)*

1. *\*Production data rounded*
2. *\*\*Compared to #1 food crop - maize representing the #3 highest earning agro-production sector (with #1 & #2 livestock products).*
3. *\*\*\* Compared to #1 food crop - maize representing the #8 highest earning agro-production sector (with industrial crops and livestock products dominating sectors #1-#7).*

Table 5.2 shows the differences in agro-production between South Africa and Zimbabwe and the other three countries, and the dominance of large-scale/mixed commercial production in the former. After maize and cassava, food legumes are widely grown as a basis staple in Angola, Malawi & Zambia. Higher value industrial crops – tobacco, sugar, fruits, oil seeds, etc. and livestock products dominate agro-earnings in South Africa & Zimbabwe. Angola & Zambia have the land and investment potential to grow *all* annual and plantation crops – with more reliable weather and fertile soils than Zimbabwe. The latter has demonstrated the fragility of large-scale investment during times of socio-political change; and the country has declined in productivity/wealth as the commercial sector has wound-down. Models of this kind are not lost on the international investors when other more realistic and investment friendly national land managers are available.

Region-wide the potential for boosting food legume production is obvious – but with focus upon the north-central countries of the Southern Africa region where these crops (and maize and cassava) currently feed the majority people. Dry beans show the best returns.

**5.3 Constraints to production**

The resilience of food legume crops and their ability toproduce under less than ideal conditions results in less care provided than required - growers take advantage of this resilience and accept lower yields and lower quality. Summarizing constraints:

* Yields remain low in all regional countries on the basis largely of low input costs and low-risk production systems. Growers typically favour other *‘industrial/market’* crops with fertilizers, crop-care chemicals, etc. at the expense of food crops. Thus productivity continues to remain low.
* Growers rarely produce for quality, and have poor understanding of standards of presentation and the value of sorting on the basis of size, variety, damage, etc. and the importance of care when handling legume crops from field to store to market. Lack of post-harvest care can result in considerable damage/loss to previously undamaged seeds/pods/haulm (on the basis of fragmentation and/or insect/rodent attack).
* Harvesting/storage will vary on the basis of the crop – haulm/pods, separate pods, threshed pods/seeds. Whatever the form, under-cover protection from rain, out-of-reach of vermin, and air-tight/insect proof containers for seeds will be needed. This results typically in sometimes disorganized storage around the house/compound. Deterioration/losses are dependent upon periods in store.
* In a free-market economy, storage provides for sales during times when supplies are low (with resultant higher prices available); thus the importance of storage that simply has to maintain the crop in the best possible condition for as long as possible. The practicalities of making choices are sometimes beyond the capabilities of impoverished producers with limited information.
* Crop-care practices remain weak with food legumes grown on margin lands, under dry-land conditions without supplementary water and in places that make the crop more susceptible to insect/vermin/wildlife attack and/or theft. There is limited knowledge of choice of varieties and of use of crop care/loss prevention measures. Similarly, failure to adopt GAPs results in continuous cropping in the same location, with sometimes carry-over infection/infestation from one crop to the next.

**5.4 Constraints to marketing**

Region-wide, marketing constraints remain much the same with mainly small-scale producers as price takers and unable to take advantage of increasing demand for food legume seeds – almost irrespective of quality. Issues focus upon those of trading, and can be summarized:

* Growers have little or no understanding of market opportunities, prices, etc.
* Growers remain isolated within rural communities and have generally failed to group into *‘producer organizations’* that are able to work with traders/markets from a position of strength.
* Production is quantity-orientated, and few growers produce more than small surpluses and then have little consideration for standards of uniform quality.
* Production can be year-round, but is typically cyclical and rain-dependent. This limits opportunities for matching production with market demand.
* Farm services are strictly limited, and growers (lacking access to producer groups) are unable to negotiate purchase arrangements, gain access to credit, leverage contracts, etc. (i.e. assuming sufficient quantity could be produced to meet contracting requirements, etc.).
* Traders collude within rural districts to drive down farm-gate prices and, simultaneously, organize themselves into market cartels – that help maintain high retail prices.
* Industrial outlets are strictly limited – industrial sectors are typically dominated by *informal* food processors, and product standards are mixed.

**5.5 Defining markets**

Markets are not well-understood by growers, and this places them at a disadvantage to traders. Growers need access to specialized market services that will act in their interests including provision of market information. Summarizing market issues:

* Whatever the markets and whatever the sector, country and/or region it is essential to collect and analyse information that will show trends and opportunities – and the constraints and investment that may need to be addressed.
* Market studies need to be undertaken that encompass: seed supplies, quality required of fresh markets, and demand for food legumes for industrial processing.
* Industrial markets need to be defined in terms of competition from neighbouring and distant suppliers of similar products.
* Markets are ultimately dependent upon standard/grades that can be understood, implemented and monitored within value chains. Much will depend upon the extent to which markets are prepared to pay for higher quality.
* Marketing services and specialists can be encouraged that will provide inputs, assist the main sectors, seek novel proposals, etc. that will lead to a boost in productivity.

**5.6 Boosting productivity in the value chain**

Focus upon the key players/nodes within the value chain, that each is able to capitalize on strengths available and minimize the extent of the constraints that prevail. As follows:

* Within the farm-gate. Provide support to growers and rural communities with formation of producer organizations; linking growers to markets in formal and informal manner – providing market information, discounted purchases of crop inputs and access to credit, infrastructure and technical assistance.
* Role of the public sector. With, for example, specialized food legume field-days, demonstrations, access to R&D findings, recommended GAPs and more.
* Agribusiness expertise. Encourage growers, traders and service people to adopt a commercial approach to food legume production – maintaining a trading book, understanding a balance account, monitoring the flow of capital, etc.
* Market services. Encourage services based upon the exchange of market information that a measure of financial transparency becomes normal practice. Services of this kind can be commercialized.
* Industrial development. Encourage the role of the industrial entrepreneur with investment in post-farm-gate enterprises, for example for grading and/or packing seeds for improved market sales, retail sales or for delivery to specialized processors, etc.
* Technical novelty, Focus investment into novel ideas and/or markets that become available. Provide support for innovative groups within the local value chain – whether growers, traders or processors. Seek outside investment from donors, government, NGOs and others that will help boost productivity.

**5.7 Provision of services and infrastructure**

The extent of the services and infrastructure available within food legume growing countries of the region is directly related to national wealth, to the investments made mainly by the public sector during 50 years of independence for the majority countries and, ultimately, upon good governance. Generalizations are always of mixed benefit, but it is worth considering the region and the extent of the agro-production services and infrastructure available on the basis the two groups of countries that feature in the region – those with dual large-scale commercial and smallholder sectors (i.e. mainly South Africa & Zimbabwe) and the remainder - in which agro-production is dominated by smallholder production.[[12]](#footnote-12) This is not so much a comparison of strong and weak economies in the region, but those that demonstrate models that can be emulated by others. Take, for example, South Africa and Malawi.

South Africa has the best infrastructure in Africa – communications, transport, fiscal, structural, energy, manufacturing, services and more. This reflects in agro-production which positions domestic industry on par with the best in the world – high investment, technologically sophisticated, well educated, high quality/standards that meet the world’s most discriminating markets, and versatility and wealth. Every community has access to services, infrastructure, power and transport; the issue are those that go back more than 100 years with the original socio-economic development of the country. It has provided the modern country with excellent services and infrastructure – and the country has capitalized on these to focus upon structural change and more equitable sharing of wealth. Much of this will reflect upon post-farm-gate investment as existing agro-industrial sectors become even more sophisticated, technically advanced and export-orientated (as a source of wealth and employment).

South African services and infrastructure provide the example for others in the region to emulate/copy. More pragmatically, they may be in a position to contract into services ex-South Africa or to tranship goods via South African infrastructure – road, rail, ports, markets and/or factories. With the Republic shifting strategically into commercial exploitation within markets to the north, there are opportunities for shared ventures on the basis of South African-led FDI-investment and the resources and people of the host country.

Food legumes development apart from soybeans (wherein South Africa is a minor world producer) are likely to continue to take a minor role within national agro-production, but contracting into regional countries with use of South African services, expertise and/or investment funds is already well underway. And, if the country is simply a front for *overseas* investment then the new ports, roads, handling facilities and more (including more R&D, education, social facilities, etc.) will benefit both the country and the region. China, for example, is slowly taking a priority position with both imports and exports to the country - providing FDI and expertise.

For long-periods (1970s-1990s) a recipient of South African investment in infrastructure and services, Malawi has gained benefited from the resourcefulness of its people coming to terms with the least developed real estate in the region. For the beginning of the 21st century this has resulted in a resilient economy and a largely industrious people. With everyone living within relatively easy reach of the few urban centres in the country, investment in roads and telecommunications and dual focus upon a few key industrial crops – tobacco, sugar, tea, etc. for export and the mix of food crops required with which to feed the country, a reasonable portfolio of crops, storage and handling facilities have been established country-wide. The quazi-state marketing organizations that dominated agro-production in Central Africa until recently have provided Malawi with crops handling/storage facilities and expertise – providing farm inputs, techno-advisory services and, at time of harvest, reliable buyers and trustworthy price information.[[13]](#footnote-13)

**5.8 Opportunities for the private sector**

Region-wide, the role of the private sector in promoting, organizing and managing all aspects of national (and regional) food (legume) production and processing industries has long been recognized. The private sector already dominates agro-production of food legumes – if by default. Many hundreds of thousands of people make a reasonable living producing, trading and marketing all kinds of food crops including food legumes, providing services and processing food/legume products. On the basis of 110 million (M) people living in the 10 countries of the Southern African region, of which an estimated 50% are rural people then >50M make a living from agro-production and/or servicing growers. Food legumes production has been part of traditional food security patterns since the earliest times and dependent largely upon women in the community for production and, when surpluses exist, for small-scale trading. This is not a *‘private sector’* as such, but rural people living normal lives – more a ‘*non-government’* sector, but one that depends upon the traditional services provided by the state – extension, R&D, quazi-state commodity boards and similar. Commercial services have been established throughout the region to service growers – with focus upon mixed/larger-scale growers and less so on subsistence/garden categories but shops, trading stores and travelling sales-people are available and cover most small communities with agro-production inputs – tools, equipment, seeds, fertilizers and more.

Thus the agro-industrial role of the private sector has remained largely one of agro-production, trading and marketing, with smaller investments in processing as a reflection on the fragmented nature of the respective national value chains (and a region value chain that is barely recognizable). All regional governments continue to promote the role of the private sector and are, gradually, shifting position that will open new avenues in which entrepreneurs will be able to invest and risk capital. Much the same opportunities are promoted by the international partners.

Maluleke (2010) was promoting PPP investment in partnership with African governments, and quoted >US$100M available in support of smallholder production from the Standard Bank with focus upon Mozambique in Southern Africa (and other African countries). SAGCOT (2011) was also promoting PPP developments, this time based upon ‘*corridor’* development from Mbeya to Dar-es-Salaam in Tanzania (i.e. a practical option for agro-producers in Northern Malawi & Northern Zambia.); US$50M is available. SATH (2011)b is aggressively private sector focused, encouraging production and movement of agro-goods in a region covering the DRC to South Africa. TechnoServe (2011) recommended boosting soybean production in Malawi, based upon smallholder production, ‘*qualified’* traders and investment in processing plant by local companies CP Feeds and CORI for oil extraction/cake export. And, not least, ICRISAT (2011)a is promoting international investment in R&D for food legumes with US$136M available for the first three years of an eight year programme and, importantly for value chain focus, acknowledges the partnership role of *‘….legume traders associations, major legume product manufacturers, supermarket chains, NGOs and CBOs’.* SSA will provide a major platform for R&D exploration with the aim of *‘….leveraging legumes to benefit the poor’.*

Summary messages of this kind suggest that food legumes industries will, ultimately, depend upon the private sector for development. And, the corollary, failure to encourage private sector partnerships, and agro-industrial development will not follow. *(Note comments, for example, describing lack of agro-productivity in Angola and Zimbabwe, respectively, in Annex A1, sections A1.1 & A1.5 and directly attributable to lack of confidence on the part of the private sector.)*

The challenges of attracting private capital and providing the frameworks in which entrepreneurs will invest are daunting. Lack of services and infrastructure – power, roads, water supplies, etc., no on-farm or off-farm structures for handling food legumes, inadequate institutional support, border controls that continue to penalize those attempting to trade regionally (e.g. to exploit markets in the main urban centres), markets that remain the domain of cartels that provide biased trading conditions for growers and, importantly, the inability of producers to group and represent themselves better - is indicative of the fragmented nature of national food legume industries everywhere in Africa.

**Section 6**

**Action Planning**

**6.1 Develop an action plan**

It is not sufficient to monitor status, to determine the constraints to progress and to note opportunities for making a difference. Given the disorganized nature of legume seeds industries in the region, the lack of investment available and the skewed nature of domestic production – many thousands of growers producing for household consumption and selling small surpluses into markets dominated by traders – planning is required; and the logical starting point is an *‘action plan’*. This may follow the conceptual framework provided in Table A2.1 (in Annex A2) on the basis of two key objectives. Focus upon people and their socio-economic welfare can be defined in objective #1 as follows:

***Objective #1. Socio-economic investment. To improve the productivity of food legume industries and the quality of seeds grown and sold and, by so-doing, to improve the socio-economic welfare and confidence of the rural food legume-growing communities involved.***

Similarly, a second objective may relate to the integration required of regional food legume industries – to enable them to plan *national* investments within *regional* opportunities; that everyone benefits. This may comprise:

***Objective #2. Regional agro-industrial investment. To integrate food legume industries planning into the longer-term requirements of regional industrial opportunities that will boost efficiency of farm supplies, production, transport and processing, and enable the region to compete successfully in home markets for fresh and processed products, and to meet the challenge of imports.***

Defining the constraints, challenges and what needs to be done to achieve objectives of this kind requires understanding of the respective national industries and the value chains that apply to each country, and how this relates to regional structures – people, production areas, main centres, trading routes and similar. Summarizing, this then becomes recognition of the *status quo* of the day – the poorly-organized nature of national industries within the region that results in low agro-productivity. From this, identification of the key interventions may be practical within the budgets and time-lines available.

Table A2.1 provides some indication of the planning that has to be undertaken and, equally important, of the extent of the investment required. Further, it designates priority opportunities that may impact upon both the public and private sectors. Government is typically responsible for the welfare of its nationals, the provision of services and infrastructure and, concerning support for national industries (of all kinds and not simply food legumes), its place within macro-planning on national-scale.

Given the impoverished nature of the majority people in the 10 countries of the Southern African region, a boost in investment for national food legume industries complies neatly with strategic pro-poor, pro-rural and pro-agricultural development planning that typically feature in all national five-year roll-over plans.

The private sector, by contrast, typically has responsibilities that focus upon its shareholders. Socio-economic responsibilities in support of community-beneficiaries, etc. need to be seen as relatively risk-free before investments follow. The responsibilities then shift to the public sector to minimize risk and to encourage the entrepreneur; this is more so with fixed assets that cannot easily be shifted should investments not develop as planned. Thus markets, factories and/or other service centres need to be located in food legume growing areas and/or adjacent to urban centres where consumption is likely. Whether in isolation or within some kind of PPP, the entrepreneur and his/her enterprise/investment becomes part of the wider strategic plan required of national development.

**6.2 Priority choices for investment**

Choice of priority investment clearly rests with those involved with national (and/or regional) management in the five focus countries that make up the main food legume growing countries in the region, those representing the different parts of the value chain and those providing external services. The requirements for the current study are described in Annex A3, and link the client with FAO Member Countries in Southern Africa with food legume producers, traders and processors and, it follows, with the estimated 110 million people living in the region. Estimated 60% of regional people live in rural communities and remain dependent upon agro-production. Estimated 50% of regional people are food insecure. Categorization of this kind helps determine priorities.

Much the same categorization will assist with making choices for priority interventions that may be practical within the technical responsibilities of the client – agro-industries and rural infrastructure. Priority investment choices are shown in Table 6.1. There is a measure of sequential logic in the way that priorities are listed, but *all* priorities have equal value – *all* are important.

**Table 6.1 Priority investment choices for boosting the efficiency of food legume value chains in Southern Africa**

|  |  |  |
| --- | --- | --- |
| **Priority choice** | **Sector** | **Sub-sector** |
| 1. | Value chain recognition | * Re-confirm, re-establish and re-organize national value chains in the five key food legume growing countries – Angola, Malawi, South Africa, Zambia & Zimbabwe.
* Position national value chains within the context of the Southern Africa Region – the five main producer countries and the others – Botswana, Lesotho, Mozambique, Namibia & Swaziland.
 |
| 2. | Strategic industrial planning | * Review strategic national plans for the development of domestic food legume industries (if available).
* Undertake strategic sector planning - if this has not already been done.
* Prepare a strategic plan for the development of the regional food legumes industry in Southern Africa.
 |
| 3. | Agro-production | Undertake investigations and/or prepare documentation for:* Smallholder growers and their need to group into producer organizations.
* Agro-producer services – requirements from the public sector and the private sector.
* Post-production handling, storage and transport – recommended technologies, practices, structures & equipment.
 |
| 4. | Certified seed production & supplies | * Investigate the extent of information available and/or existing investment into the establishment of viable farm input service industries – national basis and regional opportunities – with which to serve food legume producers. Determine performance and/or investment required.
* Link domestic potential to opportunities for boosting seed quality including seed certification.
* Link domestic potential to opportunities for establishing shared private sector investment in local industrial facilities.
 |
| 5. | Trading & markets | * Determine the extent of trading networks within the five main producer countries, and link these to regional markets.
* Identify major constraints for the production of high quality products, and/or market demand for niche quality products.
* Determine the extent of export markets that may evolve for the purchase of high quality products.
* Determine the extent to which a boost in regional production is able to replace imported products.
 |
| 6. | Processing legume foods | * Determine the extent of existing industries for processing seeds – consider informal and formal sectors.
* Project investments required into the next period for processing that will match market demand in the region for the different type of products.
 |
| 7. | Publications, technical & financial | * Review the extent of agro-production and agro-industrial material available with which to promote investment in food legume industries.
* Determine gaps in published information that will further encourage more production, the adoption GAPs and GMPs, greater investment in agro-industries and agro-production services.
* Determine agribusiness models for production, farm services, trading/marketing and for discrete agro-industrial production sub-sectors based upon processed products.
* Prepare documentation that will help bridge information gaps within agro-production/processing of seeds.
* Publish all new documentation on the Internet.
 |
| 8. | Investment opportunities | * In cooperation with national governments and investors from the international community and the private sector, prepare 3-4 project proposals in outline that will focus upon discrete agro-industrial sub-sectors that will boost the viability of regional food legume industries.
 |
| 9. | Promotion of opportunities | * Organize and participate in five workshops in support of national food legume industries in Angola, Malawi, South Africa, Zambia & Zimbabwe.
* Organize and participate in a regional workshop in support of regional food legume industries in Southern Africa.
 |
| 10. | Partnerships | * Make contact with the ICRASAT-led *‘Grain Legumes’* programme due 2012-2020 to combat poverty, hunger & environmental degradation; shared with CGIAR partners CIAT, ICARDA & IITA and eight leading national R&D groups from Ethiopia, Brazil, Turkey, India, USA & elsewhere; take a leading role with Objective #5 *‘Value Chains’.*
* CGIAR R&D centres ICARDA in Syria & ICRISAT in India provide focal points for the development of food legume industries worldwide. The client should re-establish and/or explore relationships focused upon post-harvest, handling, storage, processing, etc.
* Nothing is achieved without the partnership of national institutions in the host Southern African countries. The client should seek to establish new/link into existing food legume networks in the region.
 |

**6.3 End note**

Investment in food legume industries development in the region of 10 countries covered by this study represents a *‘win-win’* situation for everyone concerned – those in the national value chains, consumers in regional countries and those providing services. Food legumes are the most benign of agro-foods - they hold a valuable and traditional role within food industries Africa-wide and people are familiar with the foods that are produced. Food legumes are prepared in kitchens across the continent each day and mixed with cereals to make a balanced meal that provides the sustenance required for work, school and play. Whether as beans, cowpeas, groundnuts or lentils, food legumes - quite literally - feed Africa protein.

Production has risen slightly during the past 20 years, but not sufficient to keep pace with population growth and large quantities of food legumes are imported annually to meet demand. New lands have been brought into production, but yields have remained much the same at around 0.75 tonnes/hectare (t/ha). *(This compares with yields in the industrial countries that have doubled – to reach 2 t/ha – during the same period.)* Much the same potential exists for Southern Africa. As populations continue to increase and resources of land and water come under increasing pressure to sustain more people, the productivity of all crops including food legumes will be scrutinized further for growth.

Of the order 40% of people in Southern Africa are already food insecure, and the dichotomy of shared wealth between rural and urban people widens further as urbanization continues unabated – the people of Southern African are already one of the most urbanized people in Africa, and the region will industrialize further on the basis of the socio-economic wealth of the people and their assets.

What can the client do to make a difference? Probably not a lot from a brief exploratory study of this kind - but the value of the catalyst (and the skills of the entrepreneur) is one of recognising opportunities and exploiting them. Living with yields of food legumes that have not changed significantly in 25 years is no longer an option, and higher crop productivity is required in Southern Africa. These crops have low priority - national value chains are little recognized and inefficient. Table 6.1 identifies a number of discrete categories suggesting options for making choices. The client has technical responsibilities within all priority choices listed.

As a starting point, however, the client may like to consider:

* #10. Partnerships. Exploring partnerships in priority #10 to see what the client can achieve in partnership with others, for example, taking an active part in the forthcoming *‘Grain Legumes’* programme during the period 2012-2020; and, if this is not practical, then seeking the advice/interest/shared opportunities of the leading CGIAR R&D centres that focus upon food legumes – ICARDI/Syria & ICRISAT/India.

Similarly, explore the SADC MAPP – productivity focused agriculture – for Southern/Central Africa: US$28M is available for *‘technology generation’* and US$9.6M for *‘market access’* (SADC, 2008).

* #2. Industrial planning. Then approach priority #2 to clarify the strategic planning required by sector/country/region; and, if none of this appears to stimulate interest, focus upon a couple of fail-safe options available to the client in priority #3.
* #3. Agro-planning. (i.) *‘Post-production handling’* – review the cycle of what has gone and what is offered (to reduce the estimated 40% of crop losses post-harvest) and/or (ii.) ‘*Processing’* – of food legumes to encourage further private sector investment in Angola, Malawi, Zambia & Zimbabwe – and elsewhere in the Southern Africa Region, as appropriate.
* #5. Trading & markets. In parallel with #3 or as an alternative initiative, focus upon the development of the food legume/soybean industrial market. There is already interest in this sector in the region. Prepare a Working Document similar to that of Diaz Rios (2007) for asparagus/Peru.

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**Annex A1**

**Food Legume Crop Producers in Southern African**

Providing a brief introduction to the five countries of the Southern Africa region in which significant food legume production industries have been established and/or for which further potential for agro-industrial investment has been recognized. Food legume industries are explored in the context of some of the main constraints and opportunities that have been identified during the study. Agricultural statistics for the five countries are summarized in Table A1.1. The key point to note is the relative efficiency with which agro-production in the smallest country – Malawi compares with the other countries.

**Table A1.1 Basic agro-production statistics for five focus countries**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Factors/Country** | **Angola** | **Malawi** | **South Africa** | **Zambia** | **Zimbabwe** |
| Agric growth | 127 | 115 | 100 | 107 | 112 |
| Arable land (Mha) | 3.3 | 2.45 | 14.75 | 5.3 | 3.2 |
| Arable land (%) /total land | 2.65 | 26 | 12.15 | 7.1 | 8.32 |
| Organic cropland (ha) | n/a | 300 | 45,000 | 5,690 | 40 |
| Cereal area (Mha) | n/a | n/a | 3.3 | n/a | 1.3 |
| Cereal production (t) | 127,000 | 115,000 | 100,000 | 107,000 | 112,000 |
| Tractors | 10,300 | 1430 | 72,300 | 6,00 | 24,000 |
| Fertilizer use (kg/ha) | 0.4 | 15 | 48 | 6 | 49 |
| Food production index | 113 | 96 | 106 | 108 | 86 |

*Source: NationMaster (2011)a-e.*

**A1.1 Angola**

A fertile country of great natural resources and with cropping land just 2.65% of total land area – the potential is enormous; all permanent and annual crops – large-scale, smallholder and all combinations of the two. Almost 30 years of civil war, however, that ended in 2002 left the previously buoyant agro-production systems of pre-independence destroyed, dilapidated and/or abandoned. The country has shifted to dependency upon the oil industry – quick and relatively easy to develop based in imported services and, crucially, export markets that readily embrace oils supplies that are not dependent upon the Middle East.

And after oil/gas the re-establishment of mineral ores – iron, gold, copper and others – has quickly been following - to the detriment of agro-production. In a country of <6M people, lacking infrastructure, confidence, domestic funds, FDI and expertise, agro-production will continue to stagnate – all crops and all sectors (apart from the destructive/extraction industries of natural timber/forests). The economy is dependent primarily upon the public sector, and this is blighted by political patronage and corruption. This is not about to change any-time-soon, which raises issues for the development of the agro-production sector and, for current reporting, for food legume cropping.

The flourishing agro-production industries of the 1970s and earlier became lost as the civil war over-ran farmland, rural towns and infrastructure alike and the farming communities abandoned their land and assets. Insecurity, the presence of land-mines and lack of investment funds have resulted in large areas of the country becoming depopulated and, paradoxically, this resulted in over population, land degradation and food insecurity in those areas in which people resettled and established subsistence blocks – see Fig. A6.5. Efforts to resurrect the large-scale farming of earlier times with the establishment of state farms, cooperatives and associations of tenant farmers have thus far largely failed.

The country has shifted to importation of foodstuffs to augment the estimated 55% deficiency from local production, and financed this largely from oil revenues. Rehabilitation of defunct coffee production remains a priority for export earnings, and food self-sufficiency as an alternative to imports. Food legume production features in none of the proposals, notwithstanding the considerable inflow of technical assistance and equipment as grant funding from a raft of international and bi-lateral agencies/donors. Apart from limited social responsibilities towards agro-production provided by the international oil industries, the private sector currently remains noticeable for its absence in agro-production in Angola.

*Based upon reporting from: AEO, (2011)a, NationMaster (2011)a, MBendi (2011), EarthTrends (2003), USAID (2011), Wikipedia (2011), USTrade (2008).*

**A1.2 Malawi**

Malawi has all the characteristics of a small SSA country: dependency upon agro-production (i.e. 39% GDP, 80% export earnings & 80% employment), high population growth (2.7% p.a.) and almost half the population under the age of 15. Poverty is widespread – with 53% below the poverty line. The country has reasonably good infrastructure and services, but remains isolated from southern African and international trading links.

Malawi is the only significant agro-producer country in the Southern Africa region constrained by the twin challenges of expanding populations and small finite geographic area.[[14]](#footnote-14) Of the order 25% of the national land area – 2.45 Mha - is suitable for crop production, with the majority people and crops in Central and Southern Regions as shown in Fig. A6.4.

Food production has been buoyant during the period since the introduction of the Farm Inputs Subsidy Programme (FISP) in 2004, with surpluses of major staples available. During the 2010/11 agricultural season FISP assistance included distribution/sales of 160,000 tonnes fertilizer for maize; and 8,000 tonnes and 1,600 tonnes, respectively, for improved maize seed and improved food legume seeds. The original critique levelled at the FISP has been largely forgotten with the achievements made – boosting food security and raising smallholder income. The country recorded >900,000 tonnes surplus maize above annual requirements in 2010/2011.

Agro-production is 25% large-scale commercial with the remainder smallholder based. Plantation crops – tea, coffee, sugar and tobacco – dominate large-scale (and export) sectors, with the majority food crops grown by smallholders. Maize and root crops are the main food crops, respectively, at 20% and 18% land allocation. Agro-production was valued at US$1,648M in 2009/10. The FISP has boosted food legume crops production, most of which is consumed in-country apart from groundnuts and increasingly soybean, which enjoy regular export markets. Of the food legumes grown in Malawi the most popular are phaseolus beans, soybean, pigeon peas and groundnuts. Malawi is second only to Kenya with production of pigeon peas in Africa harvesting of the order 150,000 tonnes annually.

Considered more oil-based crop than food legume, domestic production/demand of soybean is shared with imports from neighbouring countries with South Africa dominating both imports and export sectors. Whilst the potential for soybean has been recognized and exploited, production practices are weak and growers remain the weaker partners in the production chain. Whilst populations continue to expand, food crops and food security will remain a priority sector; soybean offers potential for boosted production, and particularly should the crop be taken up by the larger-scale commercial sector and/or the skills/capacity of smallholder growers improve. These opportunities have been recognized by government.

*Based upon reporting by: Kabuli, et al. (2009), AEO (2011)b, NationMaster (2011)b & TechnoServe (2011).*

**A1.3 South Africa**

The most powerful economy in Central and Southern Africa has long recognized its potential to develop within the continent and, since the advent of majority rule in the early 1990s, has set out to expand commercially throughout SSA. Government have promoted the sub-region as a future centre for food production worldwide – on par with the industrial agro-producer heartlands of North and South America, Central Asia and Oceania. Two key statistics continue to be highlighted: 1. Africa (and the MENA & Caribbean countries) imported food to the value US$254B in 2007 (33% higher than the year before); and 2. The African domestic food staples agro-economic sector was valued at US$50B in 2008 – and is destined to double by 2015. South Africa is determined to lead and/or direct *African* agro-production opportunities that will redress these issues.

South Africa continues to offer itself to the world as the logical springboard into Africa. It has all the assets required including the largest population in the sub-continent at 45M people – and the best educated, >15 Mha of arable and permanent croplands, a natural biodiversity that dominates the continent and, crucially, the most modern infrastructure, the most dynamic commercial sector, technical and educational institutions that are amongst the best in the world, a balanced and resilient economy and a track record of achievement. It offers the English language.

The large-scale commercial agro-production sector is on par with the best elsewhere in the world – productivity, yields, efficiency, modern, market-orientated, etc. The nascent mixed/smallholder sector is largely organized, supported institutionally, and competitive. National GDP has remained mixed – manufactures, services, tourism, agriculture & minerals. Annual growth has remained below potential since the world economic downturn of 2008, at <3%.

South Africa is constrained long-term in choice of crops and use of natural resources on the basis of sufficient water available for crop production and, with climate change projected to bring further disruption of rainfall into the next period, on the basis of water use efficiency. Fig. A6.1 provides some indication of the main agro-producer areas – in the south and SW along the coastal-lands of the Indian Ocean, and in a wide sward of country to the north of Lesotho. These are the cereal heartlands of the country. The further west and north, respectively, into Namibia and Botswana the less the rainfall and the more suited the land for livestock production. Livestock products dominate agro-production. Food legumes are a minor food crop and, apart from soybean for agro-industrial processing, do not feature in published information.

*Based upon reporting by: AEO (2011)c, NationMaster (2011)c, Maluleke (2008) & SATH (2011)a-d.*

**A1.4 Zambia**

Zambia is a stable democratic country at the heart of Africa; and one endowed with considerable resources – minerals, land, water, energy and, not least, a reasonably well-educated population. Isolation in Central Africa and dependent upon sometimes fragile road/rail links to the Atlantic Ocean via Angola, to the Indian Ocean via Zimbabwe and/or Malawi, and to the south (primarily South Africa) via Zimbabwe. In recent times, this latter route has been replaced with more reliable road links via Botswana. Rail routes that previously linked the Copper Belt with Cape Town have become defunct in recent times – but this may change into the next period.

Notwithstanding long-term dependence upon mineral extraction – which tends to be hostage to markets and technical innovation – agro-production potential has been largely side-lined in recent times. A previously buoyant commercial middle- to large-scale sector Lusaka-Livingstone remains, but has not grown significantly given >15 years deterioration in agro-production/economic performance in Zimbabwe to the south, and to which the sector previously shared techno-commercial links. Zambia continues to urbanize to the detriment of the smallholder agro-producer sector, with lack of investment funds, lack of technical ability and limited knowledge of markets, and it continues to remain largely stagnant. Productivity of all food crops outside the commercial sector shows declining yields.

Of the order 7% of the country is cropping land – 5.3 Mha, with the remainder open woodlands, flooded marshlands and grasslands. The country is, par excellence, the ultimate mix-farming country – all crops, trees and livestock; with extensive water resources available many crops could eventually be irrigated (Fig. A6.3).

Agro-production is rain fed and thus rain dependent, and annual productivity can change of the order +/- 30% on the vagaries of rainfall in any particular year. As a result, smallholders have shifted to more drought tolerant crops – cassava, millet, groundnuts in recent years. Maize, however, remains the preferred staple food for the majority people – most of which is home-grown and consumed in the community. Food legumes feature in traditional diets, with people in the cities shifting to easier-to-prepare foods, many of which are based upon non-traditional crops such as wheat and potatoes.

Estimated 45% of the population of 9.5M are poor, live in rural communities and remain dependent upon agriculture. Of the order half the active workforce in the country remains out-of-formal-employment and, with mixed investment/markets projected for minerals, manufacturing and similar sectors, government have been making efforts to boost the role/investment of the private sector. This has resulted in new partnerships with the emerging economies – to augment traditional ties with Europe, etc. Results have been mixed with predatory agreements and the country awash with imported goods/materials that are sometimes cheaper and better quality than similar goods made in-country – resulting in closures of domestic manufacturers.

*Based upon reporting by: AEO (2011)d, NationMaster (2011)d, Wikipedia (2011)b & The IDL Group (2002).*

**A1.5 Zimbabwe**

Once the country that fed the region on the basis of a robust commercial agricultural sector, Zimbabwe slipped into decline from the late 1980s-on as the result of political expediency over-riding the pragmatism of redistributing the natural wealth of the country over a more realistic period of time. Thus illegal land occupation and property acquisition accompanied by intimidation (resulting in >30 people killed) became accepted practice, and eventually passed into law as the ‘Land Reform Act’. Fragmentation of land blocks has led to decline in industrial and food crops, as the new owners with limited skills, experience and, crucially, resources (i.e. finance, workers, farm equipment and more) have, in many cases, reverted to smallholder/subsistence production. Land blocks taken as working units by the political elite have proven more resilient, but here too productivity has declined.

The socio-economic reality for the majority people has been profound, for as real GDP has fallen on average 5-10% annually through the 12 year period from the mid-1990s-on the poverty rate has increased from 40% to >70%. Estimated 80% of people remain unemployed. Re-investment in the mining sector from 2008, however, as a measure of confidence returned (on the basis of the new Government of National Unity) provided the first real growth in GDP – which has hovered around 5-7% annually thereafter. This has reflected in the agro-production sub-sector and primarily in demand for tobacco.

Zimbabwe is an arid country with limited agricultural lands available; it is highly suited to large-scale low-intensity production systems. Of the order 8.2% of the country is cropping lands - 3.35 Mha. The most productive lands lie in a broad belt east-west across the northern half of the country and along the main axis road that links Lusaka, Zambia to Beira Mozambique via the capital Harare; these are shaded green in Fig. A6.2. The challenge facing national managers into the next period is one of resurrecting confidence in the large-scale commercial sector (irrespective of ownership/management) that a viable small farm/smallholder sector can be built on the basis of the techno-financial services provided for the larger growers. Challenges of this kind are not insuperable.

Whilst industrial crops such as tobacco have remained resilient throughout the recent agro-industrial transition, the country has lost access to the extensive resources, networks, overseas markets and financial and intellectual services required with which to continue to boost agro-production. This is reflected in the arrival of new trading/investment partners from the industrializing countries – and particularly from China. South Africa remains a dominant partner within national mining industries.

Surpluses of food crops of all kinds are no longer available, and the country has imported basic staples including maize; and taken steps to control prices in local markets to prevent speculation, etc. The impact has been to reduce the role of the private sector and, the corollary, to shift responsibilities further to an inefficient public sector.

Subsistence agro-production has provided sustenance for the majority rural people, with ‘farmer markets’ springing up on the periphery of all towns and cities. The agro-processing sector has stagnated as utilities – electricity, water, telecommunications, etc. have become unreliable, as inflation has soared, foreign exchange has become restricted and as the value of the Zimbabwe dollar has fallen. A shift into parallel currency use in country – with the introduction of the US dollar from 2009-on, has provided a measure of stability with which to begin to rebuild the economy.

Apart from maize the major agro-production sectors are linked to industrial crops – tobacco, sugar, cotton and more. None of the smallholder crops typical of Central Africa are grown in significant quantities as a reflection of the arid nature of much of the country and the lack of resources with which to irrigate on small-scale. Soybeans, dry beans and groundnuts feature within the major 20 commodities grown, and are indicative of potential rather than trends in reality.

*Based upon reporting by: AEO (2011)e, NationMaster (2011)e and FASonLine (2000).*

**Annex A2**

**Action Plan - Development of Regional Food Legume Industries in Southern Africa**

The relative small-scale and fragmented nature of national food legume industries in the five Southern African countries explored in the study, and lack of cross-border investment in services, supplies and expertise brings risk with generalizations of the kind contained in an *‘action plan’*. That said, a start has to be made.

The action plan contained in Table A2.1 provides the basis for targeting the separate national industries in isolation with crops/varieties that best suit local people, agro-ecological environment and, crucially, markets available. Success with national focus can be shifted into sub-regional- and ultimately regional-focus wherein the efficiencies of cross-border expertise, transport, markets and industrial development/investment will promote a shift into *‘improved production & marketing’.* This will enable regional producers, traders and processors to compete on world markets with foreign industries and, in particular, those located in the industrial countries.

**Table A2.1**

**Framework for an action plan in support of food legumes industries development**

|  |  |  |
| --- | --- | --- |
| **Item** | **Sub-programme** | **Activity** |
| 1. | Strengthen food legumes value chain* Growers linked to markets.
* Innovation captured and linked to growers.
* Information shared.
 | 1. Improve value chain performance* Identify the main players in the value chain.
* Encourage main players to form groups.
* Put groups in contact one-with-the-other.
* Establish permanent linkages between groups.
* Promote the identity/reality of the value chain.

2. Develop market prices information systems* Explore the viability of existing market information systems.
* Modify, augment and/or make improvements.
* Collect, process and disseminate market prices by crop type, crop variety, quantity and quality on daily basis.
* Cover all main national & regional markets.
* Publish information in newspapers, radio, cell/SMS and/or internet systems.
 |
| 2. | Improved crops/varieties/seeds available* Wider choice of improved crop variety seed available.
* Larger quantities of seeds available.
* Quality seed supplies commercialized.
 | 1. Selection of crop/varieties available* More germplasm materials imported, screened and used for multiplication productive varieties.
* Greater selection of varieties by sub-region and/or disease/pest resistance; and for specialized markets for fresh and/or industrial use.

2. Quality seed available* Greater quantities of foundation & basic seed available to growers.
* State-supervised production network of seed growers established with regional/crop focus.

3. Certified seed available* Selection of sufficient groups of growers that will produce certified seed under state-supervision.
* Sufficient certified seed available to meet national and/or regional demand.

4. Seed laws introduced* Legislation introduced to promote value and use of high quality seed.
 |
| 3.  | Growers trained and supported* Majority growers organized into groups.
* Groups become service providers.
* GAPs widely accepted/adopted.
* More familiarity with use of credit.
 | 1. More growers trained* Focus upon growers in community groups and grower-trainers.
* Improved understanding of soil management, crop management, use on-farm seed and IPM.

2. Grower organizations provide more services* Grower organizations become familiar with agri-business management, technical & organizational practices.
* Groups advise growers within membership arrangements.

3. Credit provided to growers* Micro-credit facilities established for growers.
* Linkages established banks-micro-credit-grower organizations.
* Funding provided at commercial rates to growers supported by grower organizations.

4. Adoption of good agricultural practices* Publication/training in GAPs for all food legume growers.
* Larger quantities of fertilizer used.
* Boost in agro-chemical use for crop-care.
* Better understanding of post-harvesting handling of food legumes for storage and transport.
 |
| 4.  | Handling and transport improved* Better handling of food legumes during harvest, post-harvest and into markets.
* Improved infrastructure available for handling and transport food legumes.
* More astute marketing.
 | 1. Improved post-harvest handling of food legumes* More appreciation by growers of higher yields and higher quality from care with handling food legumes during harvest and post-harvest.
* Improved handling, more storage structures & resource & wider acceptance of GAPs.
* More choices available post-harvest; to store and/or to sell to markets.

2. Farm-to-road transport improved* Greater compatibility between growers and small-scale traders/transporters.
* Improved understanding of good transport practices for food legumes.
* More understanding by public sector for investment in feeder roads/farm tracks.
* Resulting in more investment in farm-tracks/feeder roads.

3. Road-to-market transport improved* Compatibility between small-scale and larger-scale traders/transporters; resulting in more efficiencies and lower-costs.
* More investment by public sector in rural roads in food legume growing areas.
* More opportunities for adding value post-farm-gate and pre-wholesale markets
 |
| 5.  | Markets re-organized and/or established* National and regional market services and facilities improved.
* Novel market opportunities identified and exploited.
 | 1. Wholesale markets re-organized* Improved understanding of function and operation of wholesale markets in main centres.
* Capture participation of wholesale markets in re-organization.
* Investment provided for improved infrastructure.
* Wholesale markets open to newcomers.

2. Retail markets re-organized* Shift from low-quality bulk supplies to markets based upon crops/varieties/quality.
* Improved transparency of market prices prevailing.
* Improved infrastructure provided at main retail markets – basis of higher earnings/licenses paid.

3. Specialized outlet markets identified* Establishment of markets for crops, varieties, quality, processing, export and more.
* Encourage role of ‘*drivers’* within value chain - identifying & exploiting new markets.
 |
| 6.  | Agro-industrial processing available* Increased investment in agro-industries nationally and regionally.
* Establishment of more technical services in support of agro-industries.
* Confidence building.
* Increased wealth and employment creation.
 | 1. Recognition of markets available* Investigations for extent of markets available for processed food legume products.
* Mobilization of industrial interest in new market opportunities.
* Extent of formal and informal production facilities identified.

2. Road map for agro-industrial investment* Dissemination of information available for market development in processed foods.
* Mobilization of private sector interest in investment.
* Public incentives provided for investment outside the main urban centres.
* Opportunities for public-private-partnerships.
* Establishment of public sector support services – food inspection, traceability, quality, HACCP, etc.

3. Promotion of processed potato products* Pro-industrial development packages developed with incentives for tax liabilities, credit available, importation of equipment, foreign exchange, etc.
* Links developed to R&D and universities for provision of services, agribusiness/technical training of workers.
* Overseas promotion of investment opportunities.
* Encourage establishment of agro-processor groups, industrial parks, business communities, specialized training schools/departments, etc.
 |
| 7. | Regional food legume industrial focus* Crops/varieties selected for sub-regional growth.
* Promotion of sub/regional industrial sectors.
* Establishment of sub/regional agro-industrial ventures.
 | 1. Strategic planning* Explore and/or promote the planning of food legumes production on sub/regional scale.
* Seek partnerships with the main CGIAR R&D centres for existing food legume programmes.
* Establish focus countries/focus crops and preferred varieties.

2. National focus* Seek partnerships within countries for focus upon agro-production & agro-processing of selected crops/varieties.
* Develop critical mass producers/services/markets.

3. Regional industries* Extend national initiatives into sub/regional opportunities.
* Establish regional centres for agro-production & agro-industries.
* Encourage private sector investment.
 |

The region is fortunate with access to the extensive resources of South African agro-producers/industries/services. Developments within the countries to the north of South Africa can, with strategic planning/investment, ultimately link into the financial and technical networks provided by the Republic. And, if this is not practical in the short term, then to networks in other parts of Africa. For the northern Central African countries in the region, this would mean links to East Africa. Specialist food legume industrial sectors can be considered/developed on the basis of regional suppliers – and the logical first choice would be expanded soybean industrial development.

For access to novel germplasm, crops and/or varieties of food legumes that may suit Southern African growers, contact with the IITA Nigeria would provide a valuable link into the extensive selection of West African food legumes. Continent-wide, West Africa dominates the production of food legumes.

**Annex A3**

**Terms of Reference for the Study Southern Africa Food Legumes Industries**

The consultant was tasked with the following terms of reference:

*Item #3. Undertake an appraisal of prospects and requirements for improved food industry value addition and technical efficiency in specific sub-sectors in Africa. The appraisal will be based on a desk study of existing documents. The sub-sectors are tentatively edible oil, rice, red meat and Irish potatoes and will be confirmed with the supervising officer after contract signing. (15 days: Unit Result G03G103).*

Briefing undertaken 14 October 2011 with the client’s supervising officer confirmed requirements for two studies:

1. Irish potato industries/East Africa.
2. Food legumes industries/Southern Africa.

The consultant was required to follow the model already used by Diaz Rios, L. (2007) when assessing, analysing and describing the Peruvian asparagus industry. Given constraints of time – 7.5 days/study – it was suggested that one or both of the two studies would be reconsidered for further investigation based on the findings of the initial studies - should this comply with programme requirements of the client into the next period.

**Annex A4**

**Southern Africa Food Legumes Industries: SWOT Analysis**

The analysis of the strengths, weaknesses, opportunities and threats (SWOT) associated with a particular venture, project, business and/or industry helps to identify those internal and external factors that impact favourably and unfavourably that should be taken into account when planning developments. This is the case with the performance of value chains associated with food legume industries in Southern Africa. A SWOT analysis helps to determine the positive and negative influences and developments that will determine performance. Opportunities and threats come from outside the value chain, and strengths and weaknesses are associated with internal aspects of the value chain. Table A4.1 provides a summary of findings for food legume industries in Southern Africa.

**Table A4.1**

**SWOT analysis for food legume industries value chains in Southern Africa**

|  |  |
| --- | --- |
| **Strengths** | **Opportunities** |
| * Food legumes long recognised as a traditional food of high nutritional value – proteins and energy; and eaten daily by large numbers of people in the region.
* Long history of cultivation – people are familiar with production and culinary tastes of different food legumes.
* Geographical conditions match range of different crops available - extensive areas of cropping lands suited to legumes production.
* Good agricultural production conditions: fertile soils, high rainfall and high solar radiation provide potential for consistently high yields.
* Excellent *traditional* crop and complies with production constraints of expanding rural populations cultivating smaller units of land; food legumes can be inter-cropped, grown as a catch crop and/or used as a green manure or for livestock feed.
* Resilient and reliable crop with known performance/yields and, notwithstanding low-medium earnings, preferred choice of food.
 | * Out-of-season production opportunities for exports to Asian countries.
* Expanding production food crops to match population growth and urbanization in the SSA region (and in the Middle East).
* Growing regional demand for processed snack foods – of all kinds.
* Establishment of small- & medium-scale processing units in most urban centres.
* Technological developments and/or manufacture of packaging and/or processing equipment under license.
* Establishment of district and/or regional crop handling and storing centres linked into wholesale and retail markets, to processors and to exporters.
* Dissemination of industrial production and processing experience from the stronger regional producers (e.g. South Africa & Malawi) to others (e.g. Angola).
 |
| **Weaknesses** | **Threats** |
| * Value chains not recognized and/or supported within countries; limited recognition of food legumes *‘industrial sector’*.
* Commercial (larger-scale) producers dominate value chains to the detriment of smallholder producers for majority food crops.
* Small-scale production focused upon home food supplies, with small surpluses sold commercially – weakens the position of individual growers.
* National quazi-government purchasing agencies tend to focus on quantity to the detriment of quality.
* Failure of national industries to encourage value addition (e.g. product transformation, promote payment for quality and/or encourage establishment of private sector services).
* Reluctance of smallholder growers to follow GAPs – crop considered second- or third-level priority, and treated accordingly.
* Failure to provide sufficient water during critical growth periods.
* Loss of crop potential – static yields and high post-harvest losses.
* Recommended R&D findings are slow to shift into practical application.
* New varieties of legumes are slow to be disseminated and taken-up by growers.
* Disorganized value chains of producers-traders-processors; seed typically not sold on basis of uniform quality.
* Lack of harmonization of disease and pest control between neighbouring countries in the region.
* Crop losses pre- and post-harvest high from labour intensive harvesting & handling practices that fail to monitor maturity.
* Limited investment in post-production infrastructure for handling, storing and/or processing.
* Seeds held in store for long-periods may develop toxins that are hazardous to consumption. Similarly, storage can adversely affect cooking quality and increase demand for fuel.
* Many people lack knowledge of nutritional value of legumes and/or different ways of preparing them as food.
* Failure to recognize dominant role of women producers; and to provide services (for markets/sales and home use).
 | * High quality seed continues to be imported, and takes market share from lower-quality domestic production; growers fail to meet challenges of importers.
* Consistent failure on the part of smallholder producers to match the quality of production of commercial growers.
* Poor quality of seeds/pods in store post-harvest (i.e. insufficient control of temperature, humidity, pests, etc.) adversely impacts, respectively, upon markets and production.
* Lack of people with sufficient experience and/or knowledge of production, trading and processing requirements.
* Production stagnating as growers shift to other more productive crops.
* Lack of investment in training qualified people, with provision of infrastructure and with establishment of reliable industrial producer institutions; industry slow to establish support services.
* Lack of industrial leadership in regional countries; and for regional production.
 |

**Annex A5**

**Contacts in National Food Legumes Industries in Southern Africa**

Representing contacts – agencies, organizations, NGOs, companies and institutions that service national and regional food legumes industries in Southern Africa. The list is not exhaustive, but simply records those currently involved as noted in the brief exploratory investigation undertaken in preparation of the report.

**Table A5.1 Contacts within national food legumes industries in the Southern Africa Region**

|  |  |  |
| --- | --- | --- |
| **No.** | **Contact** | **Information** |
| **1.** | **Angola** |
|  | Ministry of Agriculture & Rural DevelopmentCaixi Postale 1257LuandaeMail:Angolanode@fanrpan.org<http://www.angola-portal.ao/MINADER/Default.aspx> (Portuguese)<http://www.fanrpan.org/countries/angola> (English) | Promoting appropriate agricultural policies to reduce poverty; increasing food security; and promoting sustainable agricultural development. |
|  |  |
| **2.** | **Malawi** |
|  | Ministry of Agriculture, Irrigation & Water DevelopmentPO Box 30134Lilongwe 3Email: agriculture@agriculture.gov.mw<http://www.malawi.gov.mw> | Responsible for national development of agro-production, food security, etc. with parallel tasks of environmental care, promotion exports, boosting rural incomes, maintaining standards, providing R&D & tech-information, etc. |
|  |  |
| **3.** | **South Africa** |
|  | Ministry of Agriculture, Forestry & FisheriesP/Bag X250Pretoria 0001eMail: n/a.Website <http://www.nda.agric.za/> | Promoting a united and prosperous agricultural sector on the basis of economic growth, job creation, rural development, food security and environmental sustainability. |
|  | Agricultural Business Chamber (ABC)PO Box 76297Lynnwood Ridge 0040eMail: admin@agbiz.co.zahttp://www.agbiz.co.za/Home/tabid/362/Default.aspx | Providing technical & financial information, advice, etc. with which to enable South African agribusinesses to operate competitively and sustainability.Covers all sectors of agro-industries development – value chains, trade, govt regulations, etc. with focus agriculture. |
|  |  |
| **4.** | **Zambia** |
|  | Southern Agricultural Growth Corridor of Tanzania (SAGCOT)Address: n/aeMail: info@africacorridors.com<http://www.africacorridors.com/sagcot/index.php> | PPP in support of investment & development along the proposed Dar-es-Salaam-Zambia/Malawi main highway.Covers 30% mainland Tanzania.Launched mid-2010 with >US$50M available for promotional activities. |
|  | Ministry of Agriculture & CooperativesPO Box 50181LusakaeMail: pcd@maff.gov.zmhttp://www.agriculture.gov.zm | Contains Dept Agriculture & Dept Agribusiness & Marketing. Provides high quality, appropriate & cost-effective to farmers. *s.* |
|  |  |
| **5**. | **Zimbabwe** |
|  | Ministry of Agriculture, Mechanization & Irrigation DevelopmenteMail: n/ahttp://www.moa.gov.zw | Responsible for promotion of sustainable & viable agricultural sector; develop and manage land resources; provide technical, administrative & advisory services, etc. contribute to social and economic development. |
|  |  |
| 6. | **International & Intra-regional** |
|  | Food and Agriculture OrganisationRomeItaly.eMail:FAO-HQ@fao.org<http://www.fao.org> | Leading international partner for rural/agricultural development. Representative in >80 countries worldwide. Offices in all legumes & pulses producing countries in Southern Africa.Manages the leading agricultural database worldwide – FAOSTAT.Provision of technical & financial advice for legumes & pulses industries production.Contacts include:Agro-industries technologies: divine.njie@fao.orgAgro-economics/finance:carlos.dasilva@fao.orgAgribusiness & SMEs:doyle.baker@fao.orgCrop production:alison.hodder@fao.org |
|  | International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India<http://www.icrisat.org>International Centre for Agricultural Research in Dry Areas (ICARDI), Syria<http://www.icardi.org>.International Centre for Tropical Agriculture (CIAT), Colombia<http://www.ciat.org> | CGIAR-member institutions.Providing technical assistance to food legume producers and industries worldwide.Actively involved in Southern Africa.ICRISAT have offices in Bulawayo, Lilongwe & Nairobi. |
|  | International Institute of Tropical AgriculturePMB 5320, IbadanOyo StateNigeria.eMail: iita@cgiar.org<http://www.iita.org> | CGIAR-member institution working with agro-production & rural development in tropical regions worldwide – addressing poverty, malnutrition and hunger. R&D-led activities to boost agro-production.Focus on Africa.IITA have R&D stations in Malawi & Mozambique. |
|  | ASAREC SecretariatPO Box 765Entebbe, Uganda.eMail: secretariat@asarec.orghttp://www.asarec.org | R&D network supporting agro-science & extension in 10 ASARECA East & Central African countries.Provides t/backstopping for germplasm, information, training & administrative support.Funded by USAID. |
|  | Southern Africa Trade Hub (SATH)PO Box 602090Gaborone, BotswanaeMail: info@sotradehub.orghttp://satradehub.org/ | Works in partnership with national governments & SADC; to boost trade competitiveness of region. Focus upon transport (roads, railways & air), value chains, private sector, intra-regional trade, etc.eNewsletter available.Funded by USAID. |
|  | Southern African Development CommunityP/Bag 0095Gaborone, BotswanaeMail: registry@sdac.inthttp://www.sdac.org/ | Socio-political organization.Works to promote a common future for 15 regional countries, with economic well-being and improved standards of living and quality of life.Based upon sustainable and equitable economic growth and socio-economic development through efficient productive systems, integration & good governance.Food, Agriculture & Natural Resources Directorate (DANR) - one of four. |
|  | Alliance for Commodity Trade in Eastern & Southern Africa (ACTESA)Lusaka, ZambiaeMail: info@actesacomesa.orghttp://www.actesacomesa.org/ | Programme established by COMESA.Established 2009 in support of small-scale growers to better integrate them into national, regional and international markets.Promotes agro-production, trade, private sector, investment, commodities, etc.Grains & pulses one of seven key focus sectors of programme.Donor funded: USAID, DfID, AUSAid & others. |
|  | Soil Facility Consortium for Southern Africa (SOFESCA)PO Box MP 163Mt Pleasant, Harare, ZimbabweeMail: pmapfumo@cgiar.orghttp://www.sofesca.org | Hosted by CIMMYT in regional HQ. Develops & promotes technical and institutional innovation that boosts soil fertility management and R&D for sustainable food security and livelihood options in Southern Africa.Focuses upon Malawi, Mozambique, Zambia & Zimbabwe. |
|  | TechnoServe South Africa25 Owl ParkMilpark, South AfricaeMail. esampson@technoservice.org.zahttp://www.technoserve.org/work-impact/locations/southafrica.html | HQ in Washington DC, USA.Works in Mozambique, South Africa, Swaziland & Zambia in Southern Africa.Private sector focus – poverty, SMEs, entrepreneurs, transforming lives. Experience agro-industries & value chains. |
|  | Regional Agricultural Trade Intelligent Network (RATIN)PO Box 218-00606Nairobi, KenyaeMail:<http://www.ratin.net> & <http://www.eagc.org> | Hosted by the East Africa Grain Council. Provides market information of regional foods/materials; to make markets more transparent in support of food insecure people. Particular focus upon traditional foods including legumes.eNewsletter available. |

**Annex A6**

**Main Agricultural Production Areas in Southern Africa**

Maps are shown for the five focus countries in Southern Africa included in the value chain study – Angola, Malawi, South Africa, Zambia & Zimbabwe. The reality of food legumes and of traditional crops and cuisine in the region is one wherein people in *all* countries grow food legumes and, in many cases eat them on a daily basis. Choices have been made for those countries with immediate potential for boosting crop productivity – those already growing significant areas of food legume crops, those trading them inter-regionally or internationally or those – like Angola and/or Zimbabwe that have, in the recent past, demonstrated the suitability and viability of well-organized countrywide production systems.

Not shown are those countries with small land areas – Lesotho and Swaziland, and those with an arid climate that restricts large-scale crop production – Botswana and Namibia. Mozambique has land and water resources in plenty for the production of a range of food and industrial crops and, in the middle-future, it has the potential to become the granary of Africa. For the immediate present, however, it faces challenges with establishing sufficient infrastructure, services and commercial production systems.

Food legumes production maps by country were not immediately available and agricultural production area maps have been substituted, with the proviso that smallholder food legumes are grown wherever people live, and that commercial large-scale production is synonymous with areas shown for cereal or mixed crop production.

**Figure A6.1 Agricultural production areas in South Africa**



*Source: National Department Agriculture, Pretoria (2011)*

**Figure A6.2 Agricultural production areas in Zimbabwe**



*Source: FASonLine (2000)*

**Figure A6.3 Agro-ecological zones of Zambia**

**

*Source: Wikipedia (2011)b*

**Figure A6.4 Geography & communications - Malawi**



*Source:* [mappery.com/map-of/Malawi-Map-2](http://mappery.com/map-of/Malawi-Map-2)

**Figure A6.5 Agricultural production areas of Angola**



*Source: WFP (2011)*

1. Legumes & pulses. Throughout the report the terms *‘food legumes’* and/or *‘food legume crops’* have been used synonymously with *‘legumes & pulses’* and/or *‘legume & pulse crops’*. For the basis of the report the terms are inter-changeable. Further, and notwithstanding the importance of legumes in farming systems, these terms should not be confused with *‘feed legume crops’*. The nutritional value of feed legumes and their tolerance to dry-land conditions makes them highly suited for grazing livestock. All legume crops including feed legumes play an important role within recommended crop rotations, but focus upon value chains within the context of the report remains one of legumes and pulses for *human* consumption. Food and feed opportunities continue to overlap, however, with seeds and/or seed pods harvested for people, and the haulm harvested or fed-in-situ as livestock feed. Other farming systems encourage short-term/catch crops wherein fast-growing legumes are cultivated and either feed in situ or ploughed into the land. Legume crops provide the basis of many recommended good agricultural practices (GAPs) in farming systems worldwide. Further information in support of legumes for livestock feed is available from FAO (1987). [↑](#footnote-ref-1)
2. Boosting properties nitrogen fixation. Largely beyond a review of *‘value chains’*, some understanding of the value of legume crops as a source of soil nitrogen is important – for the choices made by smallholder growers when seeking to boost cost-efficient production of household foods. The ability of legumes to fix nitrogen in soils (i.e. encouraging the nitrogen-fixing bacteria to work effectively) is directly related to the vigour of the parent plant; and this is based upon favourable conditions for plant growth – water, light, temperature and soil nutrients. Further, the *Rhizobium spp.* required are also susceptible to ambient conditions – water, soil pH, nutrition and genetic specificity. Fail to encourage the development of root nodules and the nitrogen-fixing properties of the plant/crop are reduced. FAO *(1987)* described nitrogen supplied to soils by forage legumes of the order 100-400 kg/ha/year. Nitrogen-fixing properties also enable legume plants to compete successfully with non-nitrogen-fixing plants in soils where nitrogen content is low – and thus the value of legumes in soils that have been disturbed – cultivated, pioneered, re-constructed, cleared, etc. wherein nitrogen content may have become lost. [↑](#footnote-ref-2)
3. Soybean production. The rise in soybean production worldwide during the past 25 years has been phenomenal, placing this crop on par with the major cereals – wheat, rice, maize, etc. – in terms of area planted. The major difference being the recent nature of crop expansion - it is currently the most valuable crop in the world. During the period 1980-2009 maize lands expanded by 21%; that of soybean 45%. Worldwide the crop is grown on >94 Mha. Annual production 2005/07 was 218 Mt, with 370 Mt forecast for 2030. Soybeans are grown for protein and oil content, respectively, at around 40% and 20%. No other popular crop can match these specifications – and it is content that makes for versatility.

Soybeans have become the classic *‘agro-industrial’* crop of the modern era - and the basis for a host of different processed foods and drinks in *all* countries, but primarily in the industrial countries. Soybean grains can be eaten directly, but >85% soybean produced is processed into soybean meal and oil. Meal is the material that remains after oil extraction. A range of products are manufactured - nuts, milk, pulp, flour and others. Soybean meal is the basis for livestock production in the industrial countries. Soybean products are used as an alternative/filler/extender in >200 different food products including meat substitutes.

*Based upon reporting by: Reenberg & Fenger (2011), Masuda & Goldsmith (2009), USDA (2004) & Wikipedia (2011)c.* [↑](#footnote-ref-3)
4. Southern Africa in context. *A brief historical synopsis is warranted – why 10 separate countries?* Developed on the basis of permanent seaboard trading stations that were established by the mainly European trading nations from the 16th century-on, the modern countries that make up the region – Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia & Zimbabwe – remain independent entities through to the current day on the basis of their earlier colonial status. South Africa enjoys the oldest and most powerful of the regional economies and, since majority rule in the early 1990s, has been able to project commercial strength and investment into the other countries of the region. The majority countries were granted independence from the mid-1960s on, but transition was not without considerable socio-economic upheaval and the end result was abandoned infrastructure, capital flight, loss of confidence and, ultimately, slow economic growth. Notwithstanding recognized regional potential – extensive natural resources, reasonable services, education, law & order, etc. – DFI has been strictly limited, national managers struggle to develop economies that will meet the increasing demands of expanding populations (and do so within national borders that remain hostage to out-of-date colonial mandates), and the majority people – rural people - remain impoverished with estimated >40% food insecure. [↑](#footnote-ref-4)
5. Asparagus industry Peru. The introduction to the Southern African legumes & pulses industry provided in the current report follows the model provided by the more profound desk study undertaken by FAO/AGS in 2007 to explore the Peruvian asparagus industry (Diaz Rios, 2007). It has adopted a similar approach to characterization, historical perspective, competitive advantages and value chain analysis, and identifies the challenges that need to be met by the industry to enable it to continue to meet market expectations. A clear difference between the two studies concerns market exploitation given the astronomical rise of the Peruvian asparagus industry over a period of little more than 20 years, focus upon added value exports (reaching annual sales of US$262M by 2005) and the efficiency of which domestic industries perform and foreign market are exploited. Only small quantities of asparagus are sold into domestic markets (>99% is exported).

Food legume industries in Southern Africa, by contrast are mainly grower-led, focus production/markets on low-quality seed, add minimum value to value chains and enjoy small export markets (and mainly for soybean). Domestic markets do not meet local demand – and food legumes are imported. Further, whilst potential for both sales and food security is recognized, insufficient public and/or private investment is available to make a difference in the short-term. Food legume industries continue to under-perform on the basis of marginal interest by national and regional investors*.* [↑](#footnote-ref-5)
6. Grain Legumes Programme budget. Largely peripheral to focus upon *‘value chains’*, but recognition of the extent of the opportunities available with stimulating food legume industries worldwide, ICRISAT (2011)a has confirmed commitments of the order US$37M for 2011, US$48M for 2012 and US$52M for 2013 – in total US$137M for the three year period. Investment is likely to triple during eight years proposed for investigation. [↑](#footnote-ref-6)
7. Southern Africa Trade Hub (SATH). Working in partnership with national governments, SATH is promoting more efficient intra- and extra-regional trade that will help reduce trading costs and promote better market services – information, transport, finance and more. This will lead to increased quantities of more competitively-priced food traded, boost security of food supplies and make private sector services more profitable – encouraging greater investment and further competition. Given the lack of infrastructure in Central and southern East Africa, in particular, SATH has been working in support of SADC transport corridors including Zambia-Dar-es-Salaam, Trans-Kalahari, Maputo-Zimbabwe/Northern South Africa and the North-South corridor (SATH, 2008). [↑](#footnote-ref-7)
8. Inter-regional trade Malawi & Zambia. Quite apart from key issues of decision-making on the basis of the (in)accuracy of trade recorded, the reporters based their findings on comparison of the export value of three main foodstuffs – maize, rice and dry legumes as shown in Table 3.2.

**Table 3.2 Total export values selected food crops (US$1,000)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Country | Maize | Rice | Dry legumes | Products 2008 | Products 2009 | Differences % |
| Malawi | 1,650 | 2,860 | 1,150 | 5,660 | 1,195 | -79 |
| Zambia | 11,230 | 115 | 1,350 | 12,690 | 8,275 | -35 |

*Source: Gbegbelgbe, et al. (2010)*

A key point to note from this brief comparison is the value of dry legumes within total exports for 2008 – 20% and 12%, respectively, for Malawi and Zambia. Given the paucity of natural resources, high population density, food insecurity and distance from the coast producers in Malawi, in particular, have demonstrated their ability to boost productivity and to meet export standards for food legumes. [↑](#footnote-ref-8)
9. Tobacco production & health risks. And the value of soybean is not simple one of raising incomes for a handful of rural communities, but seeking a glimpse into the future with the international community shifting against commercial tobacco. Recent guidelines from the WHO may threaten the future of Malawi’s highest agro-export earner. According to FAOSTAT (2011) the country produced >208,000 tonnes of leaf tobacco with value >US$331 million in 2009. Soybean production, by comparison, was 73,000 tonnes in 2010 and the crop did *not* feature in the top 20 grown in the country. Just 10,000 tonnes was available for export (with value of the order US$2.7 million). Tobacco has six times the economic value of soybean and the country is highly experienced with tobacco production, but the production of 1.2 Mt soybean would bring in the same foreign earnings. Finding sufficient land would be challenging (at around 1 t/ha typical of smallholder production). Tree cover in Malawi would also benefit given the fuelwood required for curing tobacco leaf – at best 15 t/t and at worse 40 t/t. [↑](#footnote-ref-9)
10. Services for growers. Gildemacher, *et al*. (2009) were exploring services available to potato growers in three East African countries, but the principles highlighted in reporting continue to relate to smallholder growers of *all* food crops – an apparent lack of attention from public sector services when there is relatively little opportunity, for example, for exporting, for added value processing and/or for novel new food outlets (when, for example, compared to fruits and vegetables). Ultimately, it is the growers themselves who remain at fault – by their lack of organization, lack of incentives to produce more and to higher standards, and lack of imagination for novelty and new opportunities. This, however, is hardly surprising given the isolation, limited education and low expectations of most smallholder growers. The establishment of organizations of food (legume) crops producers that match the organizations founded to represent the larger-scale/commercial growers typical of South Africa and/or Zimbabwe is required. [↑](#footnote-ref-10)
11. IITA Cereals & legumes programme. With an estimated US$33M scheduled to be invested during the period 2009-2011, IITA anticipates a boost in the sustainability and productivity of combined cereal/legume agro-systems. Estimated 60% of investment will relate to post-farm-gate value chains – markets, processing and/or utilization. Output #2 ‘*Commercialization/value addition promoted’*; Output #3 ‘*Information/processors & others’*; and Output #4 ‘*Value added products/*markets should be followed. A number of publications will eventually be made available. [↑](#footnote-ref-11)
12. Large-scale commercial agro-production. The comparison is a risky one, for all countries in the region have experience of dual-agro-production sectors – as a legacy of the original status of national management – whether this was from Cape Town, London, Lisbon or Salisbury (during the period through to the late-20th century) or through to the present with national management shifted to the respective capital cities of the newly independent states. The issue has been one of redistribution of land/wealth, and the disruption that has occurred in the main agro-producer countries – excepting Botswana & South Africa (but much depends on the extent of the definitions involved). The smaller and less dominant the large-scale commercial sector, for example, in Malawi & Zambia and the easier the transition with national management, the more successful the large-scale commercial sector. What is clear, however, is that industrial-scale production will be required long-term if the potential wealth of the agro-producer countries in the region is to be realised and shared with the majority people (who will, in most cases, eventually be urban-based).

Zambia is a classic example of the contradictions of current socio-economic development with >600,000 small-scale subsistence/emergent, 25,000 medium-scale and 750 large-scale farmers. The former provide self-employment and a measure of food security, and the latter contribute to GDP. Agro-production employs >85% all people, and >50% are impoverished and food insecure. And this is a democratic country with low population and a valuable portfolio of natural resources (The IDL Group, 2002). [↑](#footnote-ref-12)
13. State marketing boards. Dating from the era of political union within the Central African Federation pre-independence, Malawi enjoyed the services of the Farmers’ Marketing Board (FMB) which <10 years after independence took on a *‘development’* role as the Agricultural Development & Marketing Corporation (ADMARC). Herein was the basis of the stability of food markets and the source of the mainly urban-based infrastructure – stores, granaries, hard-standings, transport, offices and, crucially, expertise – that exists through to the current day. State management of crop markets began to diminish from the 1990s to encourage a greater role for the private sector; and ADMARC was subsequently wound down and its assets shifted to private sector use(GTZ, 2011). [↑](#footnote-ref-13)
14. Population densities & agro-production. Three of the 10 countries that make up the Southern Africa region have relatively small geographical land areas – Malawi, Lesotho & Swaziland. Population densities from Table 1.2 are, respectively, 111, 62 & 56 people/km2. Thus the most isolated country in the region has the highest regional population density (and twice that of the other small regional states). Lesotho & Swaziland have always remained captive to the economic development of their more powerful neighbour – South Africa - and have, as a result developed extensive socio-economic networks, remittance cultures and work dependency that have, on the one hand, provided a measure of food and economic security, but – by contrast – traded this in exchange for diminished freedom of independent decision-making. This represents the pragmatism of living adjacent to a powerful neighbour. Malawi, by contrast, has enjoyed none of the insurance advantages offered by association with a friendly (and rich) neighbour and has had to make pragmatic choices for self-development. This has resulted in a wealth of agro-food-industrial crops production based largely upon the smallholder sector. This provides examples/models for others in the region (and elsewhere) to consider and, for this reason, Malawi has been included in the current food legumes study. [↑](#footnote-ref-14)