1999-2000 Starter Pack Evaluation

Module 4

THE IMPACT OF STARTER PACK ON SUSTAINABLE AGRICULTURE IN MALAWI

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Executive Summary

Module 4 of the SPS2 Evaluation focuses on the 'optimal' composition of the Starter Packs and the contribution of the Starter Pack scheme to sustainable agriculture in Malawi. Other Modules deal with the agronomic, inter and intra household impact. It uses participatory monitoring and evaluation (PM&E) approaches to elicit evidence from farmers at 30 nationally-representative sites. It aims to capture regional variations and differences between farming practice groups (high, medium and low sustainability) as well as to report on national trends and patterns.

Issues in sustainable agriculture in Malawi

Chapter 2 discusses how the reduction and removal of subsidies over the last decade has reduced the farm-level economic rationale for farm families to use the hybrid maize/chemical fertiliser technology package. In any case, research data cast doubt on the value of varietal improvement and the use of chemical fertiliser given prevailing soil organic matter levels and farmer management practices. By the mid 1990s, the environmental and economic sustainability of Malawi smallholder agriculture was seriously in doubt in the immediate short-term.

According to the evaluation of the 1998-99 Starter Pack, it and accompanying extension advice appeared to have made a contribution to immediate farm family food security, as well as to demonstrating the value of the 'best-bet technology' for ameliorating soil fertility.

But over a longer-term horizon, Malawi will have to address a wider set of sustainability questions. These include on-farm technical questions relating to alternative soil fertility measures, non-chemical pest and disease control, and the impact of HIV/AIDS on farming systems; economic and environmental questions relating to human nutrition and other aspects of livelihoods, and ecosystem functions; and questions relating to institutional structures and processes in agricultural research and extension, in national institutions and policies, in donor institutions and in local groups and institutions.

Impact of Starter Pack on sustainable agriculture

Chapter 4 shows that, out of 15 possible choices, farmers in Module 4 villages across Farming Practice Groups (FPGs) and regions picked out the following (in descending order of importance) as the five most important indicators of sustainable agriculture in Malawi:

- **Crop diversification** (growing a range of staple crops)
- **Seed availability** (enough seed for timely planting at recommended spacing for all crops)
- **Farmland size** (enough land to feed family)
- **Tools and implements** (owning all the necessary farm tools and implements)
- **Mixed cropping** (optimal mix of crops for in-field soil fertility management through inter-cropping and relay planting)

Chapter 6 shows that Starter Pack has had a largely positive impact on all these indicators except tools and implements, which the Starter Pack programme does not cover.

Starter Pack had a positive impact on three other Sustainability Indicators that were not

ranked in the top 5 by farmers: institutions (meaning access to services through institutions); crop rotation; and fertiliser application.

It is also reasonable to assume that Starter Pack has made some contribution towards biodiversity. The evidence for this is farmers' reports of the positive impact of Starter Pack on crop diversification and mixed cropping via improving the availability of seed. Baseline crop and variety diversity in the Malawi smallholder sector over the last 30 years, as presented in the Module 4 trend analyses, appears to have been relatively low. Many farmers in Module 4 villages mentioned that Starter Pack was their first access to seed of some crops and varieties. Chapter 6 explains why, although these reports could be surprising given the limited range of crops and varieties in Starter Pack, they are less so if the historical context of Malawi's seed system development is considered. Small farmers appear to be *short* of crops and varieties and seeking new sources. Starter Pack has offered limited crops and varieties to date, but it does appear to have the *potential* to increase the diversity of the crop and variety base in Malawi if better attention is paid to variety choice and seed quality in the packs in the future.

Box ES1 summarises farmers' preferred changes to Starter Pack to further enhance its impact, as recorded in Chapter 7. Responses were similar across regions.

Box ES1: Preferred changes to Starter Pack, ranked in order of importance to farmers in Module 4 villages

Maize: seed with the characteristics of **MH18** not Panaar.

Legumes: **groundnut** and **bean** seed not soyabean seed.

Logistics: provide the Pack **early**. Minorities want the Pack delivered closer to the village, and more fairness in Registration and distribution

Extension: introduce **demonstration plots**, and give face-to-face **instructions**

Fertilizer: **no change** to basal fertilizer or top dressing for most FPGs. Minorities want change in proportion of basal and top dressing, or reduction in fertilizer to make space for more legume seed.

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Overall, changing seed came out clearly top-most priority for farmers, with logistics in second place. Changes to extension were much less important. Few farmers wanted any changes to fertilizer.

Farmers in Module 4 villages consider Starter Pack is going some way to support the positive trends and slow down or reverse the negative trends in farmers' top 5 Sustainability Indicators. This is charted in Table 8.1 in Chapter 8.

It is particularly good that Starter Pack supports seed availability because, according to the household distributions given in Chapter 4, this is one indicator for which a majority of households – and particularly female-headed households – experience problems.

Policy implications (Chapter 8)

‘Best-bet’ technologies

According to Module 4 results, farmers recognise and prioritise the importance of many of the components of the ‘best-bet’ technologies for ameliorating soil fertility. In particular, they recognise the importance of crop diversification and mixed cropping and believe that Starter Pack is supporting this. The application of chemical fertiliser was not in farmers’ Top 5 Sustainability Indicators. Given the importance attached to increasing fertiliser application in Malawi in the short-term, it might be useful to find out more about why farmers do not prioritise this as highly as some other technologies.

National seed policy

Module 4 results have the following implications for Starter Pack planning:

- tenders for Starter Pack seed must specify varieties as well as crops. Seed quality assessors should be involved in the tender-awarding process
- indicative seed requirements for Starter Pack should be announced early enough for seed companies to be able to offer adequate quantities of certified seed of preferred varieties.
- Starter Pack should consider all sources of quality seed, including local small and medium enterprises as well as regional formal sector seed companies.

It is particularly important that varieties are chosen carefully and attention is paid to the physical quality of the seed put into Starter Packs because of their significant impact on crop diversity. It would be highly undesirable if Starter Pack contributed to farmers attempting to grow inappropriate varieties and/or putting scarce resources into attempting to germinate poor quality seed.

Institutional development

World-wide it is now agreed that ‘sustainability’ relates not only to the economic and environmental impact of technologies and practices but also to institutional structures and processes. Indeed, Starter Pack was originally conceived as a means of transforming Malawi’s agricultural research and extension institutions into real participatory mode.

Module 4 farmers expressed a clear desire for Starter Pack to change to include more extension advice. Some small changes may help, such as ensuring planting instructions are provided in more user-friendly ways than last year. But bigger changes may also be needed, such as increasing the emphasis of extension messages on non-crop production components of agricultural sustainability (residue incorporation, green manuring, agroforestry, etc), and delivering extension advice through NGOs and local groups as well as through GoM channels.

Donor agencies also have a responsibility to work towards ensuring SP objectives are achieved in a way that is institutionally sustainable over the longer-term. SPSI and SPS2 were both planned and implemented as one-off exercises, and each year final decisions to implement were not taken until very close to the start of the agricultural season. This negatively affected many aspects of the Scheme If Starter Pack is still considered to be a relevant way of delivering ‘best-bet’ technologies in Malawi, then it is time to establish the Scheme on a more permanent institutional basis, so that it has the opportunity to deliver the positive contribution to agricultural sustainability of which Module 4 has shown it is clearly capable.

Chapter 1 Introduction

The Starter Pack (SP) scheme operated in 1998-99 (SPS1) and in 1999-2000 (SPS2) and is intended to provide 20 kg of fertiliser and seed of modern varieties – sufficient for 0.1ha - to all rural households with land in Malawi, to:

- increase household food security;
- act as a fore-runner to a wider social safety net programme;
- examine 'best-bet' agricultural technologies for smallholder farmers in Malawi; and
- introduce more sustainable agricultural practices.

In both years, some 2.86 million Starter Packs were distributed by government with NGO assistance. In the first year, at least eight different kinds of pack were distributed, with the intention of being tailored to the needs of different areas. In SPS 2 in 1999-2000, the composition of the packs was determined largely by supply constraints and was not tailored to agro-ecological conditions.

The evaluation of SPS 2 consists of five modules investigating: agronomic impact (Module 1); micro-economic impact and willingness to pay (Module 2); gender and intra-household distribution (Module 3); impact on sustainable agriculture (Module 4 – this study); and comparing household registrations for Starter Pack with 1998 national census data (Module 5).

Module 4 focuses on the composition of the Starter Packs. It aims to elicit evidence from farmers on the 'optimal' composition of the packs and to evaluate the contribution of the Starter Pack scheme to sustainable agriculture in Malawi.

In particular, Module 4 attempts to evaluate:

- whether the proportion of hybrid maize, composite maize, other cereals and legumes in the packs affects their acceptability to farmers in the short term;
- whether farmers' criteria on the composition of the starter packs alters in a medium/long-term perspective;
- whether the composition of the packs has had an impact on agricultural practices, local consumption, seed stock and replanting patterns (e.g. in terms of the varieties of maize and legumes consumed and kept for replanting);
- whether the starter pack programme has affected farmers' overall strategy, for instance the balance between maize and other crops planted; and
- the use and impact of chemical fertiliser on the farm and how SP fertiliser compares with the alternatives available to farmers to increase soil fertility.

This report presents the results of Module 4. After this Introduction, Chapter 2 provides background information on the key issues in sustainable agriculture in Malawi today. Chapter 3 and accompanying Appendices outlines how the 30 sites visited for the Module 4 field work were selected and their characteristics, and also outlines the participatory monitoring and evaluation (PM&E) methods used. Chapter 4 presents farmers' views on sustainable agriculture, and in particular discusses the indicators they say they use to assess the sustainability of the agriculture they see practised around them. Chapter 5 describes farmers' own assessments of trends in sustainable agriculture

in Malawi over the last 30 years and Chapter 6 builds on this by identifying the main impacts farmers say Starter Pack is having on the sustainability of agriculture. Chapter 7 goes on to outline the changes to Starter Pack that farmers would like to see in order to increase its contribution to the sustainability of agriculture, focussing on changes to pack composition, agricultural extension services, and Starter Pack logistics. And finally Chapter 8 draws out the technical, logistical and institutional policy implications of these results.

For the sake of brevity, the main body of the report includes only summary tables. Full tables are included in the attached CD-ROM, which also contains all the raw information obtained from the 30 field work sites.

Chapter 2 Issues in sustainable agriculture in Malawi

Malawi has one of the highest population densities in the world for a country dependent on a single cropping season per year. Some 85% of the population remain in the rural areas, but 70% of rural families have less than 1 ha of land – the minimum necessary to achieve family food security – and soils are poor over much of the country. At the same time, the Malawi population is increasing at over 3% a year so, with little unallocated land in the smallholder sector, farm families' access to land is declining markedly.

Up until the mid-1980s, national food security was achieved most years through an extensive system of agricultural input and marketing subsidies which made the promoted agricultural intensification package of hybrid maize seed and chemical fertiliser economic for most farmers. Even then, a significant proportion of farm families were not food secure: surveys in the 1980s reported some 25% of rural children were stunted, indicating long-term malnutrition (Quinn et al., 1988). And there was a continuing downward trend in unfertilised maize yields observable from the early 1970s onwards, due to declining soil fertility (Rockefeller Foundation 98:10).

From the late 1980s, Malawi went through a period of substantial economic and political reform. Fertiliser subsidies were dramatically reduced; the government agricultural credit system ended; ADMARC (the agricultural marketing parastatal) underwent substantial retrenchment; and consumer maize prices were liberalised. Successive devaluations as part of the wider macro-economic reform programme caused a dramatic increase in fertiliser prices.

All this has served to increase the pressures on smallholder agricultural land, at the same time as reducing the economic rationale for farm families to use the hybrid maize/chemical fertiliser technology package that had been the lynchpin of Malawi's agricultural development strategy for the last twenty or more years. The use of hybrid maize seed and chemical fertiliser fell dramatically in the smallholder sector and in any case, research data cast doubt on the value of varietal improvement and the use of chemical fertiliser given prevailing soil organic matter levels and farmer management practices (Rockefeller Foundation, 1998: 15-17). Accordingly, a structural food deficit of several hundred thousand tonnes per year emerged in Malawi. By mid 1990s, the environmental and economic sustainability of Malawi smallholder agriculture was seriously in doubt in the immediate short-term.

Agricultural researchers have responded by identifying a 'best-bet technology' package as a short-term solution to ameliorating soil fertility in the smallholder sector[1]. This has two components: increasing access to improved maize seed and chemical fertiliser inputs and the extension advice to go with it; and diversifying the cropping system using grain legume rotations. It is to supply this package that the Starter Pack Scheme has operated in 1998–99 and 1999–2000, with the intention of supplying 0.1h-worth of improved maize seed, grain legume seed, and chemical fertiliser, to all rural families with land in Malawi. According to the first evaluation of Starter Pack (Longley et al, 1999), the 1998-99 Starter Packs and accompanying extension advice appeared to have made a measurable contribution to immediate farm family food security, as well as to demonstrating the value of the 'best-bet technology' for ameliorating soil fertility. A recent modelling exercise (Masters et al, 2000, draft) found that Starter Pack has the potential to increase maize output, and therefore household income and maize carryover, although it is insufficient to

[1] For more on this, see Rockefeller Foundation, 1998.

generate food security on the smallest farms.

But sustainability means different things over different time-frames and, viewed over a longer-term horizon, Malawi will have to address a wider set of questions beyond how to reduce the length of the hungry period faced by farm families and ameliorate soil fertility problems.

Some of the **on-farm technical questions** that will need addressing include:

- the real feasibility and potential scale of application of other options for improving soil fertility, particularly grain legumes;
- the options for biological, cultural and mechanical pest and disease control, particularly in locally-important susceptible crops such as beans;
- the options for adapting local farming systems to cope with the predicted impact of HIV/AIDS, in farm families that are already predominantly short of labour.

Agricultural researchers and the Maize Productivity Task Force are already making considerable inroads into assessing options for improving soil fertility. The proposed Malawi Better Land Husbandry Programme should contribute more. The introduction of biological pest control for cassava mealy bug was a major success story in the 1980s in Malawi. Less work has been done to date on HIV/AIDS impacts.

But there will also be important questions to answer relating to the **wider economic and environmental impact of current agricultural practices**. Maize now dominates the cropping pattern in the smallholder sector, with tobacco and cotton promoted as the main alternative cash crops. Very little smallholder land is planted to alternative food crops or left fallow. New programmes such as Sasakawa-Global 2000 continue to promote high external input – high potential output maize production. The questions to consider here include whether there are better feasible alternatives for:

- **human nutrition** – providing a greater quantity and quality of preferred foods, including micro-nutrients and access to wild foods;
- other aspects of **farm families' livelihoods** in terms of cash income, building/fencing materials, animal fodder, medicinal and amenity needs;
- **ecosystem functions**, including water cycle and quality, micro- and macro-climate and sustainable use of biodiversity.

Sustainable use of agricultural biodiversity can make a critical contribution to agricultural sustainability in a number of ways. Some of the key linkages are described in Box 1.1. Because the sustainable use of agricultural biodiversity is so central to agricultural sustainability, in this Report it is treated as an integral part of agricultural sustainability issues rather than being referred to separately.

Box 1.1: The role of agricultural biodiversity in sustainable agriculture[2]

Agricultural biodiversity encompasses the variety and variability of plants, animals and micro-organisms at genetic, species and ecosystem level which are necessary to sustain key functions, structures and processes in the agro-ecosystem in support of food production and food security[3].

Different species and genetic components of agricultural biodiversity are directly useful for the provision of food, fodder, medicines, building materials and cash income through sales. Genetic components are also useful in providing desirable attributes in crops and livestock such as pest/disease resistance, increased and more stable yields, and other characteristics such as storability. At the ecosystem level, having a diversity of species and variation within these species can make important contributions to soil quality and stabilisation, water cycle and quality, micro- and macro-climate and habitat protection, as well as to overall ecosystem productivity. Conserving agricultural biodiversity is also important for ensuring future options, and for present-day amenity and cultural values. Therefore, agricultural biodiversity should be a valued resource within any sustainable agricultural system, and it is particularly valuable for farmers in more traditional agricultural systems such as those that prevail in much of the smallholder sector in Malawi, for whom it may not be realistic or appropriate to rely on external inputs to substitute for agricultural biodiversity functions.

There is no such thing as an *a priori* 'optimum' level and mixture of agricultural biodiversity in an agro-ecosystem; rather, the desirable configuration is determined by prevailing local natural and – equally importantly – socio-economic circumstances. But it is important to realise that the voice and market power of farmers in more traditional agricultural systems can sometimes be overshadowed by other stakeholders, institutional structures and processes, such as seed industry breeders and suppliers. The challenge in Malawi, as elsewhere, is to create an enabling environment that more accurately reflects the true value of agricultural biodiversity for sustainable agriculture. This will involve changes in institutions and policies at local and national level, to achieve a more appropriate balance in economic incentives and research agendas.

[2] For more on this, see Cromwell et al, 1999.
[3] Adapted from FAO, 1999.

In the longer-term, sustainability relates not only to the economic and environmental impact of technologies and practices, but also to **institutional structures and processes**: 'Sustainable agriculture …. must become a process for learning' (Pretty,1995:1249). As originally conceived, Starter Packs were proposed as a continuing method of putting the best of new agricultural technology into farmers' hands for widespread evaluation and verification, and as a means of moving Malawi agricultural research and extension into a real participatory mode. Any assessment must therefore consider the extent that Starter Pack can be built upon to achieve this transformation of structures and processes:

- the **agricultural research and extension system** – how can it better learn from farmers and other stakeholders?
- **national institutions and policies** – how can they (particularly input and output marketing) better support sustainable agriculture?
- **local groups and institutions** – how can they better be encouraged to manage natural resources effectively?

In this respect, the **donor agencies** contributing to the design and implementation of Starter Pack have a responsibility to ensure that its institutional format can contribute to this.

Box 1.2 summarises the key issues relating to agricultural sustainability in Malawi that have been discussed in the preceding paragraphs. Any assessment of the contribution Starter Packs can make to sustainable agriculture in Malawi must try to consider Starter Packs' actual and potential impact in relation to each of these issues. Furthermore, these issues must be considered over both the short-term and longer-term horizons, and in relation to the varying needs and capabilities of different socio-economic categories both between and within farm families[4].

[4] These latter are focii of Modules 2 and 3 respectively.

Box 1.2: Key issues relating to agricultural sustainability in Malawi

- **On-farm agricultural technology and practices:**
- soil fertility
- pest and disease control
- access to labour

- **Sustainable livelihoods:**
- food security
- cash income
- non-food and amenity needs

- **Sustainable use of natural resources:**
- agricultural biodiversity
- water resources

- **Institutional structures and processes:**
- agricultural research and extension
- national institutions and policies
- local groups and institutions
- donor agencies

Malawi has a long history of exemplary field trials which have provided important information regarding a number of the key on-farm technical questions, including soil fertility trials, fertiliser trials, and hybrid maize adoption studies by Chitedze, Rockefeller, and CIMMYT amongst others. Malawi is also one of the few countries in sub-Saharan Africa which has operated large-scale Annual Surveys of Agriculture and these provided time-series data at the EPA level on agricultural practices and technology adoption through the 1980s. But up to now, there has been less use of participatory methods: most such work has been conducted at a very localised level by individual non-governmental organisations as a basis for developing specific projects and programmes.

However, amongst development practitioners world-wide, there is now a growing realisation that an understanding of local needs and capabilities is central to any assessment of the options and potential for longer-term sustainability. Therefore an assessment of agricultural sustainability in Malawi, and the potential contribution of Starter Packs to this, based on participatory approaches is a useful contribution to the on-going national debate that has not been made to date. In particular, participatory approaches can help to reveal the diversity of local needs and capabilities amongst different socio-economic categories of families and also *within* families according to gender, age, etc.

It is important to realise that participatory approaches do not necessarily generate all the information needed to identify options and potentials; rather they focus on eliciting the views and understanding of relevant stakeholders. Also, decisions have to be made about the range of stakeholders to be involved and the extent of their participation, ranging from their control over identification of evaluation criteria and data analysis, to a less extensive involvement focussing on participatory indicator identification and participation in information gathering. The challenge in Malawi is to feed the information obtained from such participatory approaches into the national debate on sustainable agriculture.

Chapter 3 Method[5]

Given the limited time and resources available to the study, it was decided to focus on the views of one particular group of stakeholders: farmers. This group was chosen because their views on sustainable agriculture have not been solicited on a national scale in Malawi before. This focus means that the study does not report on the equally relevant and possibly different views of other stakeholders, such as development agencies, national agricultural research scientists, and academics.

The criteria for the Module 4 evaluation (see Chapter 1) were pre-set, so farmers had no input into deciding these. However, it was decided to ask farmers to identify appropriate indicators for assessing the pre-set evaluation criteria, and they chose 15 Sustainability Indicators for this purpose (for more on this, see below and Appendix 2). These relate closely to farmers' goals of meeting immediate livelihood needs, with no reference being made to longer-term horizons nor to wider ecosystem functions. A number (not all) are also closely related to prevailing notions of best farming practices. By definition, none relate to the overall institutional sustainability of the Starter Pack programme, and unavoidable but important omission. However, the frequency with which local level institutional issues were mentioned in relation to the impact of Starter Pack is notable.

3.1 Site selection

Module 4 used the Sphere-of-Influence clusters generated by the 1996 FEWS Vulnerability Assessment Mapping (Moriniere et al, 1996) for site selection, in order to ensure conformity between Modules.

The VAM Sphere-of-Influence clusters were considered to be the best information available at the time for the Main Study of Module 4 because:

- they are derived from an assessment of the significant factors which have primary influences on food security livelihoods and decisions at the EPA level, which are relevant stratification factors for field work on sustainable agriculture;
- they are based on reasonably detailed data and cover the whole country, unlike some other potential stratification data.

Map 3.1 shows the location of the 30 village sites selected for the study, hereinafter referred to as 'Module 4 villages'. Under the VAM Sphere-of-Influence classification, EPAs are classified into spheres of influence and these EPAs were treated as a strata for site selection for this study. The final selection of villages was based on the proportional representation at the national level. Within each EPA, villages were selected randomly within each Sphere-of-Influence from the Starter Pack Logistical Unit database, excluding those villages with too few households registered to receive Starter Pack (see Appendix 6).

[5] A more detailed discussion and critique of the PM&E approaches used in this study and their relevance for this type of research will be published in due course. For more information, contact the authors.

Map 3.1: Module 4 Research Sites

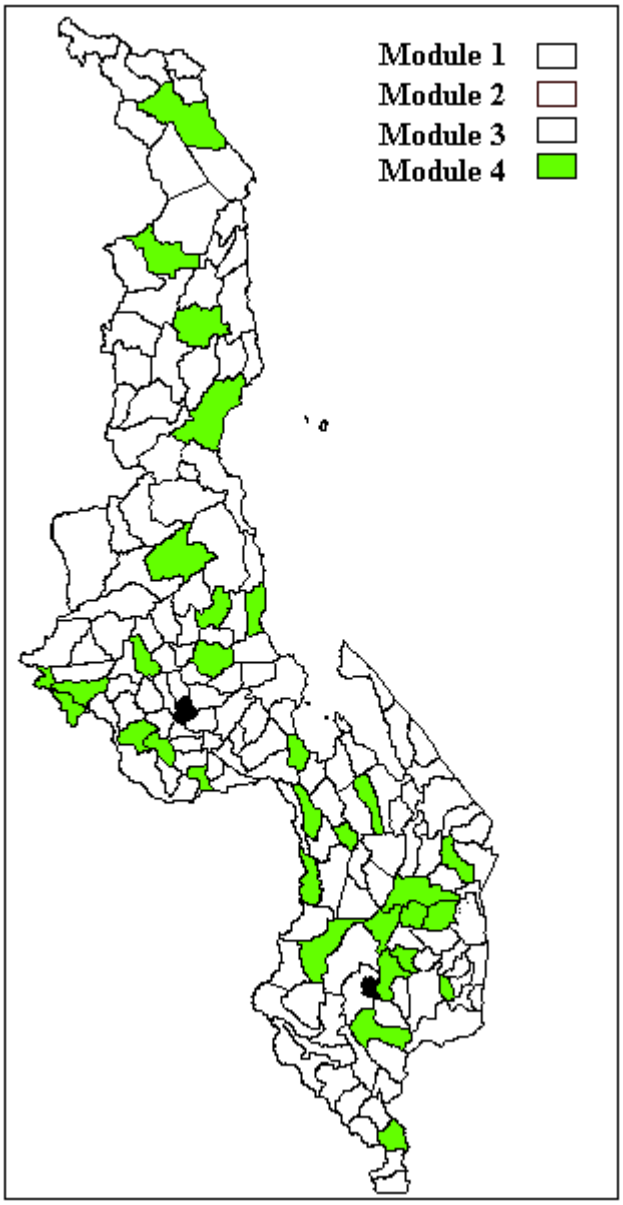

Table 3.1 shows the distribution of Module 4 villages by Sphere of Influence and by Region[6].

Table 3.1: Distribution of Module 4 villages by FEWS Sphere of Influence and by Region

FEWS Sphere of Influence	Northern Region	Central Region	Southern Region	Total Number of Village per sphere of influence
Mixed agriculture	3	2	2	7
Maize	1	6	1	8
Income-generating activities	0	5	6	11
Estates	0	1	1	2
Urban	0	0	2	2
Total	4	14	12	30

A majority of the villages were from income-generating activities sphere of influence with five villages in the central region's 14 villages belonging to this category, and 6 villages (one-half of the south's twelve villages) were in this category. A majority of the maize villages were from the centre with six villages while the other two were from the other regions. Other villages were sampled from mixed agriculture (9 in all regions), from the estate sphere of influence (2 villages) and two villages were from urban-influenced areas. The hypothesis in the study is that agricultural sustainability would be affected by the productivity potential of an area, which is further affected by the sphere of influence.

It should be noted that only 4 of the 30 randomly selected villages were in Northern Region. This means that results from Northern Region are possibly less reliable than those from Central and Southern Regions, with 14 and 12 villages respectively.

The data in the table below show the number of households by sex, captured in this study from the various spheres of influence. Further, the number of households the PM&E exercise got was compared with the number of households that registered for Starter Pack according to SPLU data, to ensure only farmers with experience of Starter Pack were interviewed for Module 4.

[6] Note: all Tables in this report show characteristics of the 30 villages in Module 4 about which information was gathered using participatory techniques involving key informants.

Table 3.2: **Characteristics of households in Module 4 villages, by Sphere of Influence**

FEWS Sphere of /Influence	Total Number of households				
	Male-headed	Female-headed	Total number from PRA	Total Registered for SP	% Registered for SP
Mixed agriculture	690	212	902	690	77
Maize	345	109	454	802	177
Income-generating activities	1,023	300	1,323	1,272	96
Estate	54	20	74	196	265
Urban	128	43	171	261	153

[a] total households registered for SP according to SPLU data as percentage of total households in village according to PM&E data according to village map from the PM&E data.

A majority of the households covered in this study belonged to the income-generating-activities group, comprising just under one-half of the total number of households in the study areas (45%). About one-third of the respondents belonged to the mixed agriculture group. A comparison between the number of households from the PM&E and the 1999/2000 Starter Pack registration showed that for the villages from maize, estate and urban spheres of influence, the number of households that registered for Starter Pack was higher than the number of households the PM&E established. Overall in the country, the number of households that registered for Starter Pack was 10% higher than the ones the PM&E found. This suggests that the registration of Starter Pack was fraught with problems as has been reported elsewhere.

One of the factors often believed to affect farming characteristics is the sex of the household head. In the agricultural sector, sex of the household head can determine access to resources and services for farming. The data in table below show the distribution of the sex of the household head from the villages the study covered by region.

Table 3.3: **Characteristics of households in Module 4 villages, by Region**

Region	Total Number of Households				
	Male-headed	Female-headed	Total	Number Registered for Starter Pack	% Registered for Starter Pack
Northern	257	108	365	407	112
Central	998	271	1,269	1,358	107
Southern	985	305	1,290	1,604	124

[a] total households registered for SP according to SPLU data as percentage of total households in village according to PM&E data.

Overall, over three-quarters of the households were from male-headed households (77%). There was a regional variation with the north having the highest incidents of female-headed households (30%) compared to the centre (21%) and the south (23%). The main reason for the high incidents of female-headed households in the north was because the

husbands had migrated from the villages leaving their wives behind. Therefore the wives were de facto household heads making important decision regarding farming.

The number of households was compared with number of households that had registered for Starter Pack in the 1999/2000 season. The results show that incidents of over-registration were higher in the south (20% higher than the number of households), followed by the north (12%) and they were lowest in the centre (7%). Since the study used more systematic methodologies in establishing the number of households in the village (using social maps) whereby also the households had no incentive to cheat, the difference this table shows implies that there was over-registration overall.

3.2 Information-gathering techniques

The field work for the study consisted of an in-depth Preliminary Field Study and a subsequent Main Study.

Because participatory approaches had not been used to explore sustainable agriculture issues in Malawi before, and yet time was relatively short, it was realised that preliminary participatory fieldwork would be needed to:

- assess which participatory techniques would be most appropriate for the study;
- identify which variables farmers themselves use to assess agricultural sustainability, ie a set of 'Sustainability Indicators' which could be used as a starting point for village-level discussions.

Accordingly, an in-depth Preliminary Field Study was carried out at 3 sites. The sites were chosen to represent the variability in one of the main factors explaining variation in farming practices in Malawi, namely altitude:

- high altitude: Mataka village, Mombezi EPA, Chiradzulu, Southern Region;
- medium altitude: Kabaza village, Mbawa EPA, Mzimba, Northern Region;
- low altitude: Nkhwani 1 village, Bwanje Valley EPA, Ntcheu, Central Region.

Within each site, the individual village was chosen to be of medium wealth and accessibility, to avoid extremes in these two variables unduly influencing results.

The study team spent 6-7 days in each village, starting with an open meeting to discuss farming activities (problem-objective tree) and moving on to identifying different farming practices within the village with key informants (transect walk) and discussing their `sustainability' (*ulimi okhazikika*). From the transect walk and discussion, the team was able to generate for each village a list of farming practices considered to be essential components of sustainable agriculture, with descriptions of how to distinguish 'high', 'medium' and 'low' sustainability for each practice. The team then spent time experimenting with different participatory exercises (institutional mappings, history timelines, pair-wise rankings, trend analyses, dream-nightmare visions, etc) in different formats (open meetings, key informants, focus group discussions, etc), to assess which would be most appropriate for the Main Study, for generating the information needed within the limited time available. The fieldwork in each village concluded with a feedback meeting for the whole village, at which the team presented the results and incorporated comments from village members.

Using the results of the Preliminary Field Study, the team got a clear vision of how the

information needed for the study could best be obtained in the Main Study using participatory approaches, and this was written up as a Field Facilitators Manual (see Appendix 1). The team was also able to identify 15 Sustainability Indicators (SI s) which were mentioned consistently across villages, and these were used as a set of standard indicators for which information was sought in each village during the Main Study. These are described in Appendix 2. A workshop was held to discuss these findings with the other researchers and the managers of the study. As a result of the workshop, the study instrument was fine-tuned.

The Main Study was carried out in 30 villages, with teams of 4 Field Facilitators spending 3 days in each village. The fieldwork followed the pattern set out in the Field Facilitators Manual. In summary, this consisted of:

- introductions;
- background information: resource, social and institutional mapping, transect walk;
- ranking of relative importance of Sustainability Indicators;
- categorisation of households into 'high', 'medium' and 'low' sustainability farming practice groups, using the list of Sustainability Indicators;
- focus group discussions with each farming practice group about: the relative importance of different Sustainability Indicators; trend analysis of factors influencing the sustainability of their farming over time; impact of Starter Pack on their farming; and ideal contents of a 'Dream Pack' as well as changes to SP agricultural extension and logistics.

Throughout, the emphasis was on collecting information that could be used to make comparisons between sites as well as generalisations across sites. Thus, for example, absolute rankings were used in preference to relative rankings wherever feasible.

For each village, results were recorded in a Debriefing Document (Appendix 3). One copy of the Debriefing Document was left in the village and the study team kept one copy.

The information in this report has been obtained by summarising the results from the Debriefing Documents in various simple Excel tables and charts. The emphasis has been to capture regional variations (experience in North, Centre and South) and differences in the experience of farming practice groups (high, medium, low sustainability), as well as national trends and patterns.

Chapter 4 Farmers' views on sustainable agriculture

The study set out to seek farmers' views on sustainability. Unlike in the past whereby groups of farmers were asked questions from which the 'experts' categorised farmers as practising sustainable farming or not, this is the first time that farmers' own views were sought at a national scale.

4.1 Indicators of sustainable agriculture

In order to determine the relative importance of the various indicators in the villages, the respondents were asked to conduct a pair-wise ranking among fifteen potential sustainability indicators (see Appendix 2 for more detail on sustainability indicators). The indicator highly ranked was assigned a one and the lowest ranking was given a 15. An indicator was ranked high if its rank was below a mean minus its standard deviation and it was considered low if its ranking was above a mean plus its standard deviation. Otherwise, it was considered to be of average importance. The data in the table show the summaries of the ranks.

Table 4.1: **Importance of Sustainability Indicators Ranked by Module 4 villages**

	Means of Pair-wise Ranking across villages			
Sustainability indicator	North	Centre	South	Total
Crop diversific'n	5.5	3.6^{h}	3.6^{h}	4.2^{h}
Seed availability	5.5	4.2^{h}	4.5^{h}	4.7^{h}
Farmland size	7.9	4.1^{h}	4.1^{h}	5.4^{h}
Tools and implements	5.1^{h}	5.5	5.8	5.5^{h}
Mixed cropping	7.1	7.9	3.1^{h}	6.0
Fertiliser application	9.0	5.8	6.3	7.0
Institutions	1.3^{h}	10.0	10.7	7.3
Crop rotation	8.8	3.2^{h}	12.2^{l}	8.1
Land husbandry	9.1	9.5	9.0	9.2
Livestock	10.1	8.8	9.6	9.5
Tilling or weeding	11.1	10.4	8.0	9.8
Manure application	10.6	10.0	13.1	11.2
Chemical application	9.6	12.1^{l}	12.2^{l}	11.3^{l}
Agroforestry	11.6^{l}	13.1^{l}	10.9	11.9^{l}
Fallow	8.9	14.3^{l}	13.5^{l}	12.2^{l}

Sustainability indicators were classified as follows: high (^{h} = mean – standard deviation); medium (no superscript); and low (^{l} = mean + standard deviation). Low figure indicates that an indicator was highly ranked and vices versa.

At national level, the following indicators were highly ranked as indicators of sustainable farming:

- **Crop diversification** (growing a range of staple crops)
- **Seed availability** (enough seed for timely planting at recommended spacing for all crops)
- **Farmland size** (enough land to feed family)
- **Tools and implements** (owning all the necessary farm tools and implements)

Overall, the sustainability indicators chosen were fairly consistent across Farming Practice Groups (see Section 4.3 below). This consistency gives us more confidence to use a few selected sustainability indicators in interpreting our results in the subsequent Chapters.

The two indicators of practising crop diversification and having enough seed suggest that the seed that Starter Pack provides has the potential to help farmers to practice sustainable farming, an important indicator nationally.

Data at the regional level show a variation indicating some minor differences among the regions. For example, the respondents in the north highly ranked institutions, i.e. affiliation with an institution indicated that a household was practising sustainable farming, whereas this was on the border between average and low ranking in the centre and the south. Similarly, the centre and the south ranked farmland size highly while the north did not. This is the case because the former two regions are more densely populated than the north hence having enough land in the centre and south is a big deal. In southern Malawi, because of land scarcity, farmers have had to adopt mixed cropping. Therefore it is not surprising that mixed cropping was highly ranked in the region than was the case in the other regions. In a marked contrast, groups in central Malawi ranked crop rotation highly while those in the south ranked it lowly. Also, this is the case because the centre has relatively more land that enable farmers practice crop rotation while the farmers in the south have too little land to do any rotation.

Despite our initial assumptions that sustainable farming among smallholders might be indicated by chemical application, the practice of agroforestry, and the practising of fallow, these were lowly ranked across the country. Land shortage was one of the main reasons respondents gave for not practising fallow or agro-forestry, and lack of knowledge or availability of inputs were also cited as reasons for the lack of use of crop chemicals and agro-forestry.
These findings suggest that recommendations for sustainable agriculture that experts make that include these practices may be contrary to the farmers' available physical and information resources.

4.2 Agricultural sustainability – perceptions by men and women

Having identified what indicators are more important nationally, the respondents were divided into male and female groups. First, they were requested to put all households in their villages into various farming practice groups with respect to the sustainability indicators. These data are analysed by sex of the household head (see Tables 4.2 and 4.3 below). First, the categorisation of the households by male respondents is presented, to be followed by the categorisation by female respondents. The presentation follows the importance of the indicators as established by an earlier analysis above.

Table 4.2: **Distribution of Module 4 households between Farming Practice Groups % – perceptions of male Key Informants**

Sustainable Indicators	Male-headed Households			Female-headed Households		
	FPG1	FPG2	FPG3	FPG1	FPG2	FPG3
Crop diversification	40	24	36	30	24	46
Seed availability	23	31	47	13	27	61
Farmland size	34	32	34	26	32	42
Tools and implements	13	57	40	1	37	62
Mixed cropping	24	28	48	18	34	48
Fertiliser application	23	28	49	11	18	70
Institutions	19	27	54	8	24	68
Crop rotation	16	29	56	4	17	79
Land husbandry	13	23	64	12	21	67
Livestock	11	29	60	9	24	68
Tilling or weeding	30	27	43	26	19	54
Manure application	5	28	68	2	15	82
Chemical application	16	22	61	9	9	81
Agroforestry	19	43	38	20	34	46
Fallow	11	38	52	9	45	46
All indicators	17	34	46	8	36	56

Cell contents = % of households in specified FPG in all villages divided by total (male and female) households in all villages.

All indicators = mode as perceived by Key Informant group, not arithmetical mean.

Table 4.3: Distribution of Module 4 households between Farming Practice Groups (%) – perceptions of female Key Informants

Sustainable indicators	Male-headed Households			Female-headed Households		
	FPG1	FPG2	FPG3	FPG1	FPG2	FPG3
Crop diversification	45	33	22	33	35	32
Seed availability	31	26	44	19	28	52
Farmland size	40	37	24	46	31	23
Tools and implements	3	62	34	1	48	51
Mixed cropping	17	31	52	15	33	53
Fertiliser application	23	26	51	17	28	56
Institutions	20	38	42	11	38	50
Crop rotation	14	38	48	12	31	57
Land husbandry	22	24	54	19	32	49
Livestock	16	28	56	13	26	61
Tilling or weeding	36	42	22	38	35	27
Manure application	11	15	74	12	11	77
Chemical application	24	10	66	26	9	65
Agroforestry	7	29	64	9	26	65
Fallow	9	34	57	13	41	46
All indicators	20	42	38	14	34	52

FPG1 = highly sustainable, FPG2 = medium sustainable, FPG3 = lowly sustainable

Cell contents = % of households in specified FPG in all villages divided by total (male and female) households in all villages.

All indicators = mode as perceived by Key Informant group, not arithmetical mean.

Crop diversification was the most highly ranked sustainability indicator. Male-headed households tend to be more diversified than female headed households.

On **seed availability**, both male (47%) and female headed households (61%) rarely save seed according to the male respondents. Similarly, the female respondents indicated that 44% of males and 52% of female-headed households rely on seed from off-farm sources. The study did not obtain information about how these households obtained seed: better-off households may purchase for cash, but it is legitimate to assume that poorer households may have to rely on other means such as *ganyu* or Starter Pack.

While both groups indicated **tools and implements** to be low, the extent varied much. While both groups indicated that only 1% of the female headed households had tools and implements like a plough, ridger, an ox-cart, enough suitable tools like hoes, sickles and axes (farming practice group 1), the male respondents indicated that 13% of the male headed households were in group 1 while female respondents said only 3% of the male headed households were in this category. Overall, the female headed households were categorised to have few tools and implements.

On **mixed cropping**, the ranges between the male and the female respondents were similar between the male and the female headed households. Almost over one-half of each category had what respondents defined as an 'improper' mixture of crops such as mixing cassava, pigeon peas, maize and beans in the same garden.

Both male and female respondents indicated that over one-half of the male headed and female headed households could not afford to buy any **fertiliser**. While the female respondents showed that there were 5% fewer male respondents than females in farming practice group 3, the male respondents indicated that there were 21% less households than female headed households in this category. This suggests that male-headed households tend to have a chance of affording fertiliser more than the female headed households.

Despite the presence of **institutions** in the research areas, the male respondents said that over one-half of both male and female headed households do not have access to extension service and advice. Given the number of institutions that the respondents indicated to have in their areas, this finding suggests that the institutions are yet to affect a majority of the households. Under one-fifth of the male headed households were said to be members of farmers' clubs for both cash and food crops thereby having access to a range of credit facilities. Furthermore, these are also households that receive extension advice.

The male respondents indicated that more households planted the same types of crops on the same piece of land every year (56% for MHH and 79% for FHH). The female respondents had 48% for male headed households and 57% for female headed households. These findings also show that male-headed households tend to practice **crop rotation** more than the female headed households. Male respondents said only 4% of the female-headed households practice proper rotation as compared to 16% of the male-headed households. The responses from the female respondents showed that the gap from the female-headed households was less, 14% for males and 12% for female headed households.

Given that land is a vital resource for farming, how a farmer uses land can be used to indicate whether one is using the resource sustainably or not. From the responses of the male respondents, a majority of the households do not use their land sustainably. About 64% of the male households and 67% of the female-headed households do not have contour bunds, they ridge across the slope and there is improper ridge spacing. The female respondents put 54% of the male-headed households to be in this category ahead of female-headed households (49%).

A majority of the households only keep few chickens as shown by the number of households under farming practice group 3 under **livestock**. This implies that farmers do not rely on animals for manure production and animal power.

On **tilling and weeding** the female respondents put fewer households, both male (22%)

and female headed households (27%) under a category that usually burns the garden before preparing their gardens or they wait until the first rains before preparing their fields. The male respondents put 43% of the male-headed households and 54% of the female-headed households in this category.

The female respondents put a higher proportion of the households (11% for males and 12% for females) in a category where they apply **manure** in the whole fields than the male respondents (5% for MHH and 2% for FHH). Nevertheless, a majority of the households do not apply manure with a favour towards the male-headed households.

The last three sustainability indicators show that a majority of the households were under the farming practice group 3. These indicators are **chemical application**, **agroforestry** and use of **fallow**. Apart from agroforestry where male respondents put the male-headed households at 38%, the rest of the households were over 50%. While the use of chemicals is dependent upon the type of crop one is growing, often it also depends on a farmer's access to credit. With the traditional credit facility offered by the Ministry of Agriculture and Irrigation, it is not surprising that the number of households using chemicals was low. Agroforestry was the last but one sustainability indicator mentioned. Usually the smallholder farmers practice agroforestry by default. For example in Nkhata Bay, farmers use Tephrosia for killing fish and treating their livestock. Fallowing is becoming less and less common as a result of reduced farmland sizes. By region, it is least practised in the south and practised more in the centre and north.

In conclusion, the data show that there is a somewhat different perception between male and female key informants of the relative distribution of households between farming practice groups for the most important sustainability indicators. Male key informants were most pessimistic and placed a majority of households in medium – low sustainability farming practice groups for the four highest ranked sustainability indicators; whereas female key informants were more optimistic and placed a majority of households in the medium – high sustainability farming practice groups. However, both male and female key informants were agreed that a greater proportion of female-headed households fell in the low sustainability farming practice group. They also agreed that more households than average were in the low sustainability category for two indicators in particular: seed availability; and tools and implements.

4.3 Sustainability Indicators by Farming Practice Group

The data on sustainability was also analysed by farming practice group in order to determine whether the households from different farming practice groups rank sustainability indicators in a similar manner.

Table 4.4: Relative importance of different Sustainability Indicators in Module 4 villages by Farming Practice Groups

Sustainability Indicator	Farming Practice (Average Rank by Pair-wise Comparison)		
	Group I	Group II	Group III
Crop diversification	3.9	4.4	4.7
Seed availability	4.5	3.8	4.2
Farmland size	4.6	4.5	4.0
Tools and implements	5.6	4.4	4.7
Mixed cropping	5.9	6.0	5.7
Fertiliser application	6.4	6.3	8.0

Institutions	9.1	9.7	12.4
Crop rotation	7.5	7.5	6.8
Land husbandry	9.3	9.3	8.9
Livestock	9.3	9.3	9.8
Tilling or weeding	9.6	8.1	8.2
Manure application	11.3	10.8	10.4
Chemical application	11.8	11.6	11.8
Agroforestry	12.0	12.5	12.1
Fallow	13.3	12.1	13.1

Low figure indicates that an indicator was highly ranked and vice versa.

The analysis indicates that there was no difference in the list of top-most indicators among the various farming practice groups, although the three farming practice groups ranked the sustainable indicators differently. The top four indicators were same. These were crop diversification, seed availability, farmland size and tools and implements.

However, their ranking was different among the farming practice groups. For instance, the farming practice group 1 ranked crop diversification as number one while the farming practice group 2 ranked seed availability as the first indicator. The farming practice group 3, in which the majority of households fall, had farmland size as the number one indicator. These findings suggest that for the first two farming groups, seed is the main critical issue indicating sustainability. The farmers from the farming practice group 1 did not rank tools and implements highly, suggesting that these farmers are likely to be more endowed with tools and implements such that they do not consider it as a limiting factor. On the other hand, the farming group 3 view farmland size as the most critical indicator to sustainability. This further indicates that land is the most limiting resource for the poorest farmers.

4.4 Service delivery by institutions

This study rests on the assumption – also highlighted by farmers in their definition of sustainability indicators (see Appendix 2) that the presence or absence of agricultural institutions has had a significant impact on whether smallholder farmers practise sustainable farming. Therefore, a list of institutions available in the villages was asked.

Table 4.5: **Institutions present in Module 4 villages**

Type of institution	Name of institution	Frequency			
		North	Centre	South	Total
Gov'ment	Extension	4	10	7	21
	Primary Health Care	0	1	0	1
	Veterinary	1	0	0	1
Commercial	Farmers World	1	6	2	9
	ADMARC	0	7	3	10
	MRFC	3	6	3	12
	APIP	0	3	3	6
	FINCA	0	0	1	1
	Auction Holdings	0	0	2	2
	NASFAM	1	0	0	1
	EU loan	1	0	0	1
NGO	Concern Universal	3	3	5	11
	CPAR	1	0	0	1
	Green Line	0	0	1	1
	Evangelical Lutheran	0	0	1	1
	ActionAid	0	1	0	1
	AFRICARE	0	1	0	1
	VEZA	0	1	1	2
	World Vision	0	1	0	1
Total number of Villages		**4**	**14**	**12**	**30**

In all regions, the Ministry of Agriculture and Irrigation's extension service was the most dominant institution. This was followed by the commercial organisations such as the Malawi Rural Finance Company and ADMARC. Other NGOs occurred in isolated areas with no national representation. In all, a majority of these institutions focus on agriculture, specifically the smallholder farming sector. Also, this reflects the fact Malawi's rural areas are mainly engaged in agriculture. Historically, the agricultural extension system administered by the Ministry of Agriculture and Irrigation has been the main agricultural extension system in the country. Also, the Ministry was responsible for managing the now-defunct Smallholder Agricultural Credit Administration. Currently, some agricultural credit programs such as the Agricultural Productivity Investment Project (APIP) and the Malawi Rural Finance Company's credit scheme are also channelled though the Ministry of Agriculture's structures. Most important for Starter Pack, the Ministry's extension system was responsible for registration of the Starter Pack beneficiaries.

In the past two decades, the NGOs have increasingly played an important role in affecting the smallholder farmers agriculture through their various agricultural programs that include

credit and extension. The role of the NGOs is likely to increase as the donor support on government budget continues to dwindle and the donor support of the NGOs continues to increase. However, unlike the government institutions that tend to cover the whole country, the NGOs often tend to be localised with no national coverage.

Although only four villages were interviewed in the north, it had a relatively high number of different types of institutions (8) compared to the other regions (centre 12; and south 12).

Chapter 5 Trends in sustainable agriculture in Malawi 1970 - 2000

After establishing the most important indicators, the respondents were asked to conduct a trend analysis on the sustainability indicators to show whether over a thirty-year period the indicators are constant, increasing or decreasing. These were analysed by region and are presented in Table 5.1 below.

Table 5.1: Trends in Sustainability Indicators in Module 4 villages 1970-2000

North

	FPG1			FPG2			FPG3		
	(Percent)								
	Constant	Increase	Decrease	Constant	Increase	Decrease	Constant	Increase	Decrease
Farmland size	75	0	0	25	0	25	25	0	50
Seed availability	0	25	0	50	0	0	0	25	50
Mixed cropping	25	25	0	0	25	0	25	50	0
Crop rotation	0	50	0	0	75	0	0	50	0
Crop divers.	0	75	0	0	25	0	0	50	0
Fertiliser use	0	25	25	0	75	0	0	25	25
Implements	0	25	0	0	25	25	0	25	0
Fallow	25	25	0	0	25	25	50	0	25
Use of chemicals	0	25	0	0	25	0	0	0	0
Land husbandry	0	25	0	0	25	0	0	0	0
Tilling	0	25	0	0	0	0	0	0	0
Livestock	0	0	0	0	0	0	0	0	0

Figures do not add up to 100% because respondents were asked to only do a trend analysis on top five indicators only.

Centre

	FPG1			FPG2			FPG3		
	(Percent)								
	Constant	Increase	Decrease	Constant	Increase	Decrease	Constant	Increase	Decrease
Farmland size	0	7	57	0	79	0	0	0	100
Seed availability	7	14	36	0	14	50	14	7	50
Mixed cropping	7	29	21	0	21	7	14	36	7
Crop rotation	0	7	0	0	29	0	7	7	0
Crop Diver	7	64	36	14	43	14	14	57	21
Fertiliser use	7	64	36	0	29	21	7	29	29
Implements	14	14	0	14	21	21	7	14	7
Fallow	0	36	0	7	7	43	7	14	29
Use of chemicals	0	0	0	0	0	0	0	0	0
Land husbandry	0	7	0	0	14	0	0	0	0
Tilling	0	7	0	0	7	7	0	14	0
Livestock	0	7	0	7	14	0	0	14	0
Institutions	0	0	0	0	0	7	0	0	0

Figures do not add up to 100% because respondents were asked to only do a trend analysis on top five indicators only

South

	FPG1			FPG2			FPG3		
	(Percent)								
	Constant	Increase	Decrease	Constant	Increase	Decrease	Constant	Increase	Decrease
Farmland size	17	67	0	0	0	67	0	92	8
Seed availability	0	17	33	0	17	67	8	8	50
Mixed cropping	17	75	0	0	58	8	8	83	0
Crop rotation	8	25	0	0	0	0	0	8	0
Crop Diver	0	17	8	8	17	8	8	25	0
Fertiliser use	0	75	8	0	42	8	0	50	17
Implements	17	33	0	0	8	25	0	0	17
Fallow	0	42	0	25	25	25	25	33	0
Use of chemicals	0	0	0	25	0	0	0	0	0
Land husbandry	0	8	0	0	8	0	0	8	0
Tilling	0	17	0	0	25	0	0	8	8
Livestock	0	0	0	0	8	0	0	17	17
Institutions	0	0	0	0	8	0	0	0	0

Figures do not add up to 100% because respondents were asked to only do a trend analysis on top five indicators only

The general pattern was that the trends in the sustainability indicators tend to decrease from farming practice group 1 to farming practice group 3. For instance, in the north the farming practice group mentioned that ten indicators increased. This contrasts with eight mentioned in the second group and six mentioned in the third group. Similarly only one indicator was mentioned to decrease in the first group compared to three in the second group and four in the third group.

In the centre, while the number of indicators increasing was no different among the groups, the number of indicators decreasing increased from 5 in the first group to 8 in the second group and 7 indicators in the third group. Overall, farmland size was indicated to have decreased in all groups. While all groups in the third group indicated a decrease as compared to 57% in the first group. Another indicator mentioned by the respondents was seed availability. About 50 percent of the groups in the second and third groups indicated that seed availability was decreasing and 36% of the first category. Similar to this, is the importance of crop diversification that is increasing overall. Over one-half of the groups in the farming practice group 1 (64%) and farming practice group 3 (57%) indicated that there was an increase in crop diversification. About 43% of the groups in the farming category 2 said crop diversification is increasing. This may be due to the increasing impact of land pressure over time: many focus groups mentioned that growing a diverse range of crops was not necessary 30 years ago because there was sufficient fertile land to support monoculture of maize.

In the south, the number of indicators said to be increasing was constant across the farming practice groups. However, the number of indicators mentioned to be decreasing increased from 3 in the first group to 7 and 6 in the second and third categories. Contrary to expectations, farmland size was not mentioned to be decreasing by a majority. For example, while 67% in the first category and 92% in the third said farmland size was increasing, only 67% in the second category said farmland size was decreasing. Farmland size could not have been mentioned to be decreasing because small farm sizes is a historical problem in the region. Moreover, farmers in this area have adopted mechanisms to mitigate the problem of land. Data in the table suggest that increasingly farmers in the

area are using mixed cropping. A majority of the groups said there was an increase in mixed cropping by 75% in the first category, 58% in the second and 83% in the third category. Also, a majority of the groups indicated that seed availability was decreasing. This was mentioned by 33% in the farming practice group 1, 67% in the farming practice group 2 and 50% in the third farming practice group 3.

Chapter 6 Impact of Starter Pack on sustainable agriculture

After identifying the trend of the sustainability indicators, the respondents were then asked to indicate the impact of Starter Pack on the five indicators that were highly ranked. These data were analysed by region.

Table 6.1: Impact of Starter Pack on Sustainability Indicators in Module 4 villages

North

	FPG1			FPG2			FPG3		
					Impact				
	None	positive	Negative	None	positive	Negative	None	positive	Negative
Seed availability	0	25	0	50	25	0	50	25	0
Crop diversification	0	50	0	50	0	0	25	25	0
Farmland size	0	0	0	50	25	0	0	50	25
Tools and implements	0	0	0	0	0	25	50	0	25
Mixed cropping	0	50	0	50	0	0	0	50	0
Fertiliser application	0	25	0	25	0	0	0	25	25
Crop rotation	0	50	0	25	0	0	0	50	0
Institutions	0	75	0	50	25	0	0	50	0

Figures do not add up to 100% because respondents were asked to only do a trend analysis on top five indicators only

Centre

	FPG1			FPG2			FPG3		
					Impact				
	None	positive	Negative	None	positive	Negative	None	positive	Negative
Seed availability	0	50	0	7	64	0	0	64	7
Crop diversification	7	50	0	0	57	0	7	64	0
Farmland size	0	57	7	7	64	0	0	93	7
Tools and implements	28	21	14	36	14	7	21	14	14
Mixed cropping	0	14	7	0	28	0	0	50	0
Fertiliser application	0	57	0	0	57	0	0	28	0
Crop rotation	13	93	0	0	71	0	7	86	7
Institutions	0	21	0	7	21	0	0	0	0

Figures do not add up to 100% because respondents were asked to only do a trend analysis on top five indicators only

South

	FPG1			FPG2			FPG3		
					Impact				
	None	positive	Negative	None	positive	Negative	None	positive	Negative
Seed availability	8	50	0	0	83	0	0	66	0
Crop diversification	8	66	0	0	50	8	0	75	0
Farmland size	25	58	0	0	66	0	0	75	16
Tools and implements	25	8	16	33	16	24	33	0	33
Mixed cropping	0	92	0	25	41	0	0	92	8
Fertiliser application	0	50	0	0	33	0	0	16	0
Crop rotation	16	8	0	16	8	0	0	24	0
Institutions	24	8	0	0	0	0	0	0	0

Figures do not add up to 100% because respondents were asked to only do a trend analysis on top five indicators only

In Table 6.1 above, the focus groups were requested to indicate the impact of the Starter Pack program on different sustainability indicators. A focus group was given a 1 when they

indicated that Starter Pack had a positive impact, and a zero was assigned when they indicated that Starter Pack had no impact on the sustainability indicators. Finally, a focus group was assigned a -1 where Starter Pack was said to affect a given sustainability indicator negatively. Hence a positive number suggests that more focus groups indicated that Starter Pack had a positive impact on the indicator. Among the focus groups, there was a consensus that Starter Pack had a positive impact on some indicators. In all regions, Starter Pack was mentioned to have impact mainly on the following indicators: seed availability, farmland size, fertiliser, crop diversification, mixed cropping, and crop rotation. While impact on most of these indicators is obvious, the impact on farmland size needs elaboration. The respondents said that because they had more seed, they were able to cultivate a larger piece of land. This suggests that some farmers are constrained on the amount of land they cultivate because of lack of seed.

In the north, farming practice group 2 mainly indicated that Starter Pack had no impact on them while farming practice groups 1 and 3 mainly indicated some indicators for which Starter Pack had a positive impact. The most impact Starter Park had was on institutions whereby 50% of the groups across the farming practice group said Starter Pack had a positive impact. This is the case because Starter Pack was distributed with the involvement of various organisations such as the Ministry of Agriculture and Irrigation (registration), and other NGOs for the actual distribution. The other reasons for which Starter Pack a positive impact had to do with the provision of new crops or varieties. Such indicators as seed availability, crop diversification, mixed cropping and crop rotation suggest that farmers were able to practise more sustainable farming as a result of Starter Pack.

In the centre, the picture is similar although institutions were not said to have as much positive impact as was the case in the north. The farmers in the farming practice 2 registered an improvement in some indicators. The most positive impact Starter Pack had was on crop rotation where 93% in the farming practice 1, 71% in farming practice 2 and 86% in the third group said Starter Pack had a positive impact. This was the case because farmers had more seeds of other crops other than maize. These are soybeans and groundnuts. Similarly, over 50% of the groups in all farming practice groups said Starter Pack had a positive impact on crop diversification. This suggests that farmers had access to new types of crops especially the legumes, which enable them to grow new crops apart from their traditional crops. Unlike in the north, over one half of the groups in the farming practice 1 and 2 (57% and 57%) said Starter Pack helped them get fertiliser. Only 28% of those in the farming practice 1 mentioned this fact; this may be because farmers in this group have easier access to other sources of fertiliser such as APIP, and use more fertiliser overall so that the contribution of the Starter Pack is relatively less important to them.

In the south, over 50% of the groups in all farming practice groups said Starter Pack had a positive impact on seed availability, farmland size, and crop diversification. Apart from the farming practice group 2 where 41% said Starter Pack had a positive impact of mixed cropping, an overwhelming majority of 92% in the farming practice and 3 said Starter Pack had a positive impact on mixed cropping. This finding supports an assertion made earlier that mixed cropping is more prominent in the south than in the other regions. Thus Starter Pack enable farmers have access to more seed. Unlike in the centre, crop rotation was not mentioned by a majority of the groups.

The findings from all the regions indicate that Starter Pack affected the various farming communities differently. While it enabled the farmers in the north and centre to diversify

the profile of their crops, in the south farmers were able to intensify their crop mixtures.

Table 6.2 : Reasons for impact of Starter Pack on sustainable agriculture in Module 4 villages

Reasons for Positive Impact

Sustainability Indicator	**Reason for Positive Impact**	**Villages**	
		Number	**%**
Farming Practice Group 1			
Land husbandry	Instruction for soil and water conservation given	2	7
Tools and implements	Bought implements after selling crops	2	7
Seed availability	Had more seeds to plant on larger land	13	43
Farmland size	Increased their farmsize	13	43
Fertiliser application	Increased yield	15	50
Crop diversification	Had seeds for other crops	15	50
Mixed cropping	Improved mixing resulted in high yields	1	3
Chemical application	Enabled farmers buy chemicals after selling crops	1	3
Crop rotation	Enabled farmer rotate their crops	15	50
Farming Practice Group 2			
Tilling and weeding	Improved soil fertility by tilling in crop residues	2	7
Land husbandry	Used instructions in the package	1	3
Tools and implements	Bought farm implement after selling crop	3	10
Seed availability	Planted with first rains	20	67
Farmsize	Increased farmsize because of seed availability	18	60
Fertiliser application	Increased yield	11	37
Crop diversification	Had access to seeds of different types	13	43
Mixed cropping	Assisted in mixing the crops	10	33
Crop rotation	Enabled the rotation of maize with legumes	12	40
Institutions	Received extension messages	4	13

Farming Practice Group 3			
Tilling and weeding	Incorporated legumes in the soil	3	10
Land husbandry	Incorporated legumes in the soil	1	3
Tools and equipment	Bought tools from crop sales	1	3
Seed availability	Planted in time	15	50
Farmland size	Had more seeds to plant on more land	21	70
Fertiliser application	Increased yield	6	20
Mixed cropping	Mixed crops by having different crop seeds	20	67
Crop diversification	Had different tyoes of crops to plant	20	67
Crop rotation	Enabled maize rotation with legumes	14	47
Institutions	Reduced reliance on farm input	3	10

Reasons for Negative Impact

Farming Practice Group 1			
Tools and implements	There were no tools in the pack	3	10
Farmland size	Starter Pack did not increase farmland size	1	3
Mixed cropping	Planted the crops separately	1	3
Crop rotation	Did not crop rotate	1	3
Farming Practice Group 2			
Livestock	No message on livestock prodution	1	3
Land husbandry	There were no messages for this	1	3
Tools and implements	Tools were not included in the pack	6	20
Seed availability	Rduced local seed varieties	1	3
Crop diversification	Got only two types of seeds	1	3
Mixed cropping	Planted the crops separately	1	3
Chemical application	No chemicals were supplied	1	3
Farming Practice Group 3			
Tilling and weeding	Inputs came in late	2	7
Land husbandry	No extension messages on this	3	10
Tools and	Not included in the pack	9	30

equipment			
Seed availability	Were given rotten seed	1	3
Farmland size	The seed they were given were rotten therefore not planted	2	7
Fertiliser application	Received he fertiliser late	1	3
Mixed cropping	Were given rotten/broken seeds	1	3
Crop rotation	Groundnuts were rotten	1	3
Chemical application	Not provided	1	3

Reasons for No Impact

Farming Practice Group 1			
Land husbandry	No messages on this practice	2	7
Tools and implements	There were no tools in the pack	9	30
Seed availability	Seeds were not kept for replanting	1	3
Farmland size	The landsize is too small	4	13
Crop diversification	Crops died due to drought	1	3
Mixed cropping	Planted the crops separately	2	7
Crop rotation	Did not crop rotate	1	3
Institutions	Belong to farmers club	4	13
Farming Practice Group 2			
Livestock	No relationship with livestock prodution	1	3
Tools and implements	Not provided in the pack	8	27
Land husbandry	There were no messages for this	2	7
Tilling and weeding	No advice	2	7
Farmsize	Land did not change	1	3
Crop diversification	Did not change types of crops	1	3
Mixed cropping	Planted the crops separately	2	7
Institutions	Access to loans did not improve	2	7
Crop rotation	No not roate crops	2	7
Farming Practice Group 3			
Tilling and weeding	No advice available	1	3
Land husbandry	No extension messages on this	6	20
Fallow	Was not affected	1	3

A majority of the groups indicated that Starter Pack had a positive impact on some indicators. Among the indicators that were mentioned to have been positively affected

were fertiliser application, crop diversity, seed availability, mixed cropping, and farm size. These were mentioned because of the seed and fertiliser that Starter Pack provided. While the reasons on the other indicators were more straight forward, that was not the case with farm land size. Basically, the respondents said the availability of the seed enabled farmers plant a relatively larger land area than normal. This suggests that the availability of seed remains a major constraint among the smallholder farmers.

In some cases, some indicators that are not directly related to Starter Pack scheme were mentioned. For instance, while the scheme did not provide any tools and implements, some groups indicated that it had a positive impact on the availability of these to farmers. They argued that after last year's harvest, they sold some produce whose proceeds were used to buy tools and implements.

The provision of legumes is highlighted by the fact that the groups who indicated that the scheme had a positive impact on crop rotation, mixed cropping, tilling and crop diversification said by practising these, they were improving the fertility of the soil. The process of registration and distribution of the Starter Pack enable farmers to have access to services of institutions and that is why institutions were said to have been affected by the scheme positively.

The reasons the groups gave for Starter Pack having a negative impact and having no impact were similar. For example, for indicators such as tools and implements and chemical application, while not directly being negatively affected by the scheme, respondents said they were not provided therefore did not assist them. The other indicators were mentioned because the packs were distributed late, or the seed was rotten, or the seed was broken. In such cases, the farmers never used the pack and therefore never benefited through mixed cropping, crop rotation, or crop diversification.

Chapter 7 Desired changes to Starter Pack

The respondents were asked to propose a “dream pack” for the future. Respondents were then asked to indicate desired changes to Starter Pack regarding the extension message and logistics. Thereafter, they were asked to rank the changes in extension and logistics through pair-wise ranking. The following sections present these things.

It proved impossible to get farmers to consider desired changes over the longer-term time frame, so the information presented here relates only to farmers’ immediate needs of the current few seasons.

7.1 Changes to pack composition

The respondents were asked to indicate the nature of their dream pack. They were supposed to indicate the changes based on the current characteristics of the pack, i.e., given the total weight of the Starter Pack, what items would they want to increase or decrease while keeping the weight of the Pack the same. They were allowed to introduce new items or varieties as long as this did not increase the weight. The data in the table below summarise this information.

Table 7.1: **Dream Pack contents**

Pack content			FPG1	FPG2	FPG3
				(Percent)	
Fertiliser	Basal	• Constant	73	80	73
		• Increase	13	7	7
		• Decrease	3	3	20
		• Change type	-	-	-
	Top	• Constant	80	80	80
		• Increase	3	10	3
		• Decrease	13	3	13
		• Change type	7	3	3
Maize	MH 18[7]		60	83	70
	Pannar seed		10	3	10
	NSCM 41		13	10	10
	NSCM 51		-	-	3
	SC 501		-	-	3
	Masika		-	-	3
Legumes	Beans		40	40	30
	Groundnuts		73	70	73
	Others[a]		3	3	3

[a]Under legumes, others included cowpeas and Bambara nuts

The responses on the dream pack were on average similar across the sites. On basal dressing fertiliser, a majority of the groups said they wanted the type and amount of fertiliser to remain the same. This was true for the farming practice group 1 (73%) group 2 (80%) and group 3 (73%). However, a minority in FPG 1 said there was a need for increasing basal fertiliser. This would be done at the expense of the top dressing and some legume seed. On the other hand, a minority in FPG 3 said they wanted a decrease in the top dressing fertiliser. Instead, these said they wanted an increase in legumes. For top dressing fertiliser, 80% of groups in all farming practice groups said they were satisfied with the quantity and type of fertiliser they received. Nonetheless, some groups wanted an increase in the amount while other wanted a reduction. For the farming practice group 1 (13%), the groups wanted an increase in basal fertiliser while for the farming practice group 3 (13%), the groups wanted the fertiliser to be replaced by legumes such as groundnuts and beans. The replacement of fertiliser by legume seed was mentioned by farmers from the south who argued that their areas are already fertile therefore do not need any fertiliser. Therefore they need legumes more than they need fertiliser. Some respondents called for a replace of Urea by CAN fertiliser. This based on the fact that unlike Urea, CAN does not volatilise quickly into the air, therefore remains in the soil for relatively a longer time. Also, CAN can be used in other crops such as tobacco unlike Urea.

[7] Note that farmers often use a variety name as a synonym for its characteristics, eg they may specify MH18 because this is the only flinty maize variety they know, but what they are really referring to is any variety with these characteristics.

Most of the research sites visited had received Panaar seed the previous year(s). When asked to indicate what variety they wanted in their dream pack, a majority was for MH18 (60% for group 1, 83% for group 2, and 70% for group 3). The reasons given for preferring MH18 were that unlike Panaar varieties, MH18 is similar to the local varieties in taste and poundability. Besides that, MH18 is also high yielding. MH 18 is the only flinty hybrid maize variety in the country and therefore similar to the locals which are flinty types. These characteristics were lacking in Panaar varieties. In absence of other flint hybrids, it is unclear whether farmers would still opt for MH 18. Another variety that was mentioned to be part of the dream pack is NSCM41, a variety liked for its early maturing characteristics. Other varieties mentioned in the dream packs include NSCM 51 (Chitute) and SC 501 (a variety from Seed Coop, a new entrant in the seed industry). Other groups mentioned Masika, a composite variety not yet widely known. These results confirm that the Malawi consumer prefers flint maize types, hence for them to maximise the benefits from the Starter Pack, they would have preferred the MH 18 hybrid maize or another variety with the same characteristics. However, during the 1999/2000 growing season, the National Seed Company of Malawi did not win a tender to supply maize seed, yet they are the major producers of MH 18. This development calls for the planners of Starter Pack to take into account farmers' preferences because in some instances, the research revealed that farmers do not use the seed they are given at all, if they do not like it. One drawback about MH 18 is that it is susceptible to a new disease in the country called GLS (Grey Leaf Spot). While other varieties like NSCM 51 (Chitute) is resistant to this disease, farmers are yet to appreciate the economic importance of this disease.

On legumes, a majority of the groups received soybean the previous year. In their dream packs, over 70% of the groups indicated that they wanted to get groundnuts (73% for group 1, 70% for group 2, and 73% for group 3). A significant number of groups indicated that they wanted beans in their dream pack (40% in group 1, 40% in group 2, and 30% in group 3). Generally, the groups were not interested in getting soybeans. Two reasons were generally given against soybeans. First, soybeans were said to be not suitable in the areas and second, soybeans having no market. On the other hand other crops like groundnuts were preferred because they had a market, and beans had a market as well as being an important food crop. It appears therefore that one major drawback against soybeans is that its utilisation by the smallholder farmers remains limited as adapted varieties and also markets are not widespread.

7.2 Changes to extension

The views of the respondents were sought regarding how they would want the extension service to change in order to make it more effective to their farming. These data were analysed by farming practice groups and are presented in the table below.

Table 7.2: Desired changes to agricultural extension in Module 4 villages

Change	North (N=4)	Centre (N=14) (percentage)	South (N=12)
FPG1			
Demonstration plots	50	50	25
Give instructions	50	0	58
Provide spoons	0	0	17
No Change	0	43	0
FPG2			
Demonstration plots	25	50	67
Give instructions	75	64	42

Provide spoons	25	0	0
No Change	25	21	8
FPG3			
Demonstration plots	50	71	33
Give instructions	75	60	42
Provide spoons	0	0	0
No Change	25	0	58

Note: regional totals per FPG sum to more than 100% because respondents could cite more than one desired change.

In all, the respondents proposed three changes. First, they said they wanted an introduction of some demonstration plots as was the case in the past whereby each block within the Ministry of Agriculture and Irrigation's extension system had a demonstration block. Such a block would demonstrate the use of the Starter Pack. Second, the respondents said they wanted to be given instruction by the field assistants on the use of the Starter Pack, not just to receive written leaflets of instructions in the Pack. This suggests that currently the extension workers do not advise the farmers on how to use Starter Pack, yet they help in the registration process. Third, some farmers said they wanted the extension system to provide them with spoons for applying fertiliser. The implication of this suggestion is that farmers may be using wrong tools that lead to under-supplying or oversupplying of fertiliser. There might be a need to advise farmers on what locally found tools they can use to supply the correct amount of fertiliser, such as coke bottle tops.

A majority of the respondents from all three farming practice groups across all regions indicated that they wanted an introduction of demonstration plots and also to be given instruction on how to use Starter Pack. Some farmers mentioned how confusing the written leaflets received in 1999-2000 had been, as they contained new recommendations (from the Sasakawa-Global 2000 programme) on planting station density and holes per station that none of the farmers had heard of before.

The only significant change noted across farming practice groups was that respondents from the farming practice group 2 and group 3 from the north (75%) and the centre (over 60%) said they wanted to be given instructions
and also be given demonstration blocks. In both cases, only 42% of the respondents from the south fell into this category. Generally, the respondents from the farming practice group 1 did not have as many demands.

7.3 Changes to logistics

The respondents were asked to suggest the changes in the logistics of the Starter Pack based on their experience in the last two years. The data are presented by region and by farming practice group.

Table 7.3: **Desired changes to SP logistics in Module 4 villages**

Change	North (N=4)	Centre (N=14) (percentages)	South (N=12)
FPG1			
Provide early	75	100	92
No change	0	0	17
Provide near the village	25	7	17
Increase the amount	0	7	17

Seal properly	50	7	0
There should be fairness	0	50	0
FPG2			
Provide early	100	100	92
No change	0	0	0
Provide near the village	25	14	32
Increase the amount	25	0	0
Seal properly	0	14	0
There should be fairness	0	7	50
FPG3			
Provide early	50	93	92
No change	0	0	8
Provide near the village	0	35	17
Increase the amount	0	7	0
Seal properly	0	7	8
There should be fairness	25	7	0

Various changes were suggested regarding the logistics of Starter Pack. First, many respondents felt that Starter Pack can be improved if it were provided early so that farmers can take advantage of the first rains. There was an agreement among the respondents across the regions and across the three farming practice groups on this one. In fact, the lateness in the distribution of Starter Pack has been one of its major criticism since its inception in 1998/99 season. The respondents from the north did not generally express the lateness of Starter Pack to the same degree. This is the case because the rains in Malawi start in the south and progress northwards. Hence, by the time Starter Pack is distributed in the north, the rains will just have started unlike in the south where in some cases Starter Pack has been distributed when the maize is just below knee-high.

The second frequently suggested improvement was that Starter Pack should be distributed to the beneficiaries homes, i.e. there was a feeling among some respondents that Starter Pack was being provided too far away from people's homes. This suggestion has budgetary implications as the more centres there will be, the more personnel to be employed, the longer distances to be covered and the more paper work in general. It may therefore not be feasible to implement this change.

Third, respondents suggested that there should be fairness in the registration and selection process feeling that some households were favoured, especially the rich and the powerful households while some deserving poor households are left out. This was critical in the centre.

The fourth suggestion was that there a need to improve the sealing of the packs (smaller bags as well as the 'mother bag'). Some packs were received punctured with seeds and fertilisers mixed up. This makes utilisation of the fertilisers especially difficult since one can not easily separate the two kinds of fertilisers.

7.4 Ranking of desired changes to Starter Pack

After suggesting the changes in the extension system and the logistics of the Starter Pack, the respondents were requested to rank the desired changes from the two sections to indicate the most important changes they would want. Table 7.4 below displays the results by region and by farming practice group.

Table 7.4: Ranking of desired changes to Starter Pack in Module 4 villages

Change	North (N=4)	Centre (N=14) (percentages)	South (N=12)
FPG1			
Time of Delivery	0	21	42
Introduce demonstration plots	0	14	8
Change variety of crops	75	64	58
FPG2			
Time of Delivery	100	29	50
Introduce demonstration plots	0	0	0
Change variety of crops	0	50	42
FPG3			
Time of Delivery	25	14	42
Introduce demonstration plots	25	0	0
Change variety of crops	75	79	50

The variety of crops included in the Starter Pack proved to be the highest ranked desired change and particularly important to Farming Practice Groups 1 and 3 and in Northern and Central regions. Timing of delivery was also ranked high, although marginally less so in Northern region, where the agricultural season starts later, and for Farming Practice Group 1. Perhaps this Group can more easily compensate for late delivery by hiring more labour or applying other inputs.

In summary, the desired changes to Starter Pack all indicate a desire to see the **quality** of the Starter Pack programme improved, both in terms of content and delivery systems.

Chapter 8 Conclusions

8.1 Impact of Starter Pack on sustainable agriculture - summary

As we saw in Chapter 4, out of 15 possible choices, farmers in Module 4 villages across Farming Practice Groups and regions picked out the following (in descending order of importance) as the five most important indicators of sustainable agriculture in Malawi:

- **Crop diversification** (grow a range of staple crops)
- **Seed availability** (enough seed for timely planting at recommended spacing for all crops)
- **Farmland size** (enough land to feed family)
- **Tools and implements** (own all the necessary farm tools and implements)
- **Mixed cropping** (optimal mix of crops for in-field soil fertility management through inter-cropping and relay planting)

As we saw in Chapter 6, Starter Pack has had a largely positive impact on all these indicators except tools and implements, which the Starter Pack programme does not cover. (The positive impact on farmland size is presumably through the ability to plant a larger land area resulting from Starter Pack).

Tools and implements was the only Sustainability Indicator out of the 15 on which farmers said Starter Pack had a zero or negative impact. Starter Pack had a positive impact on three other Sustainability Indicators that were not ranked in the top 5 by farmers: institutions (meaning access to services through institutions, in this case through the Ministry of Agriculture); crop rotation; and fertiliser application.

It is also reasonable to assume that Starter Pack has made some contribution towards biodiversity through broadening the range of crops and varieties grown in Malawi, although it was not possible to measure this objectively under this study. The evidence for this is farmers' reports of the positive impact of Starter Pack on crop diversification and mixed cropping via improving the availability of seed. These reports could be surprising given the limited range of crops and varieties in Starter Pack, but they are less so if the historical context of Malawi's seed system development is considered[8]. Two factors, in particular, are relevant. First, the historical promotion of the hybrid maize and chemical fertiliser technology package and the corresponding lesser emphasis on the supply and distribution of seed and extension advice for other crops. For example, NSCM barely produced seed of non-maize crops for the smallholder sector during the 1980s. Second, the lack of a widespread tradition of seed sharing in Malawi, compared to some other rural African societies. This may have been partly the result of the political system operating in the 1970s and 1980s, which discouraged independent grass-roots level initiative and collaboration. These two factors meant that baseline crop and variety diversity in the Malawi smallholder sector over the last 30 years, as presented in the Module 4 trend analyses, appears to have been relatively low. Many farmers in Module 4 villages mentioned that Starter Pack was their first access to seed of some crops and varieties. Malawi's experience does not therefore appear to fall within the commonly-assumed paradigm of highly biodiverse small farm agriculture at risk from the interventions of the formal seed sector. In fact, it appears closer to the experience documented in, for example, Wood and Lenne (1993), of small farmers being *short* of crops and varieties and keenly seeking new sources. Starter Pack has offered limited crops and varieties to date,

[8] For more on this, see Cromwell and Zambezi, 1993.

but it does appear to have the *potential* to increase the diversity of the crop and variety base in Malawi if better attention is paid to variety choice and seed quality in the packs in the future. This is an important contribution to the long-run sustainability of agriculture for reasons outlined in Box 1.1.

It is good news that the farmers in Module 4 villages consider Starter Pack is going some way to support the positive trends and slow down or reverse the negative trends in farmers' top 5 Sustainability Indicators. Table 8.1 summarises the trend analysis that was discussed in Chapter 5.

Table 8.1: 1970-1990 trends in farmers' top 5 Sustainability Indicators, and perceived impact of Starter Pack

Sustainability Indicator	1970-1990 trend	Impact of Starter Pack
Seed availability	-	+
Crop diversification	+	+
Farmland size	0	+
Tools and implements	+	0
Mixed cropping	+	+

Note: 0 = zero; - = negative; + = positive

It is particularly good that Starter Pack supports seed availability because, according to the household distributions given in Chapter 4, this is one indicator for which a majority of households – and particularly female-headed households – experience problems.

Box 8.1 summarises farmers' preferred changes to Starter Pack to further enhance its impact, as recorded in Chapter 7. Responses were similar across regions.

Box 8.1: Preferred changes to Starter Pack, ranked in order of importance to farmers in Module 4 villages

Maize: seed with the characteristics of **MH18** not Panaar.

Legumes: **groundnut** and **bean** seed not soyabean seed.

Logistics: provide the Pack **early**. Minorities want the Pack delivered closer to the village, and more fairness in Registration and distribution since there was a feeling that the process was marked with favouritism.
Extension: introduce **demonstration plots**, and give face-to-face **instructions**

Fertilizer: **no change** to basal fertilizer or top dressing for most FPGs. Minorities want change in proportion of basal and top dressing, or reduction in fertilizer to make space for more legume seed.

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Overall, changing seed came out clearly top-most priority for farmers, with logistics in second place. Changes to extension were much less important. Few farmers wanted any changes to fertilizer.

8.2 Policy implications

8.2.1 'Best-bet' technologies

It is good news that, according to Module 4 results, farmers in Malawi recognise and prioritise the importance of many of the components of the 'best-bet' technologies for ameliorating soil fertility that are currently being promoted by agricultural research and extension. In particular, they recognise the importance of crop diversification and mixed cropping and believe that the trend for these two indicators is positive, and that Starter Pack is supporting this. Interestingly, the application of chemical fertiliser was not quite in their Top 5 Sustainability Indicators (it ranked 6/15). Given the importance attached by the agricultural research and extension services to increasing fertiliser application in Malawi in the short-term, it might be useful to find out more about why farmers do not prioritise this as highly as some other technologies. Farmers in Module 4 villages also stated that the trend in crop rotation was positive and that Starter Pack was having a positive impact on it, although it fell outside their Top 5 Sustainability Indicators (ranking 7/15).

8.2.2 National seed policy

Farmers consider Starter Pack has had a positive impact on overall seed availability, and has been a factor supporting crop diversification and mixed cropping. However, changes to the crops included in the Pack and to the maize varieties are the top priority change farmers would like to see to Starter Pack.

In both Starter Pack years to date, but particularly in 1999-2000, the seed included in the Pack was what was available on the regional market at the time of procurement, even though this was not the preferred or most suitable maize variety, nor the preferred legume. In fact, it was poor quality grain (not seed) in the case of a significant proportion of the

legume seed supplied in 1999-2000.

This is clearly not ideal and has the following implications for Starter Pack planning:

- tenders for Starter Pack seed must specify varieties as well as crops. Ideally seed quality assessors should be involved in the tender-awarding process, to ensure the seed procured is of the correct variety and physical quality
- indicative seed requirements for Starter Pack should be announced early enough for seed companies to be able to offer adequate quantities of certified seed of preferred varieties. For most crops and varieties, this will be 9 – 12 months prior to Pack distribution. For maize seed, however, it has to be recognised that Malawi is unique in the Southern Africa region in preferring the storability and taste characteristics of flint maize and so extra time will be needed for this specialist market to respond – 12 – 15 months prior to Pack distribution.

It is particularly important that varieties are chosen carefully and attention is paid to the physical quality of the seed put into Starter Packs because of their significant impact on crop diversity. It would be highly undesirable if Starter Pack contributed to farmers attempting to grow inappropriate varieties and/or putting scarce resources into attempting to germinate poor quality seed.

Furthermore, according to anecdotal evidence collected in the Module 4 villages, there is a real danger that some farmers simply will not plant poor quality or non-preferred Starter Pack seed, thus negating the relevance of this component altogether unless the above changes are made.

In the wider perspective, given the importance farmers attach to seed availability, national seed policy needs to become much more effective so that Starter Pack seed needs can be met on an on-going rather than ad hoc basis, and the availability of quality seed of preferred varieties outside the Starter Pack programme can be increased. To this end, the comprehensive Agricultural Input Supply Policy planned for completion by the end of FY 2000-01 could in particular address:

- arrangements to improve access to Malawi breeder seed of preferred maize and legume varieties by seed production enterprises (national companies or small-scale seed entrepreneurs);

- arrangements to effectively utilise the capacity of small-scale seed producers such as those operating under the Smallholder Seed Multiplication Scheme and under various NGO programmes.

Other relevant seed supply issues are raised in the May 2000 IFDC document *An action plan for developing sustainable agricultural input supply systems in Malawi* (IFDC et al, 2000) and in Tripp, 2000.

8.2.3 Institutional development

World-wide it is now agreed that ‘sustainability’ relates not only to the economic and environmental impact of technologies and practices but also to institutional structures and processes. Indeed, Starter Pack was originally conceived as a means of transforming Malawi’s agricultural research and extension institutions into real participatory mode.

Although farmers in some regions believe Starter Pack has increased their contact with extension institutions, this is primarily for technology delivery (delivery of the Pack) and Module 4 farmers expressed a clear desire for Starter Pack to change to include more extension advice. Some small changes may help, such as ensuring planting instructions are provided in more user-friendly ways than last year's confusing written leaflets. But bigger changes may also be needed, such as increasing the emphasis of extension messages on non-crop production components of agricultural sustainability (residue incorporation, green manuring, agroforestry, etc), and delivering extension advice through NGOs and local groups as well as through GoM channels.

Donor agencies are also involved in the design and implementation of Starter Pack and they too have a responsibility to work towards ensuring its objectives are achieved in a way that is institutionally sustainable over the longer-term. SPSI and SPS2 were both planned and implemented as one-off exercises, and each year final decisions to implement were not taken until very close to the start of the agricultural season. This negatively affected many aspects of the Scheme including the quality and appropriateness of inputs procured, the ability to deliver well-planned extension advice, and not least the ability to deliver Packs in good time for planting. This latter ranked second in farmers' list of desired changes to Starter Pack. If Starter Pack is still considered to be a relevant way of delivering 'best-bet' technologies in Malawi, then it is time to establish the Scheme – or any other means of achieving the same objectives - on a more permanent institutional basis, so that it has the opportunity to deliver the positive contribution to agricultural sustainability of which Module 4 has shown it is clearly capable.

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Please note: although the references cited in this Bibliography have been placed into a single category, many of them also contain information relevant to other categories.

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