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Promising Practices: One

Improving food security through sustainable agricultural practices:
lessons learned from Zambia

Acknowledgements

This Promising Practises report has been written by Donna Finlayson, a SCIAF volunteer and consultant, with the support of Stephen Martin, a SCIAF Programme Officer with many years of experience of working with resource-poor farmers in Africa.

This publication has been distilled from the impressive depth of knowledge and experience of the four Zambian organisations that partnered with SCIAF to implement the Promotion of Rural Food Security Programme (PRFSP). Their collective expertise, dedication and sheer hard work cannot be underestimated. Thus it is with much appreciation that I thank all the staff in the Kasisi Agricultural Training Centre, Jesuit Centre for Theological Reflection, Caritas Livingstone, Caritas Mongu, supported by Catholic Relief Services for making the PRFSP a great success.

Without the encouragement and financial support of the Scottish Government the PRFSP would never have got off the ground. A very warm thanks go to the International Development team in the Scottish Government and especially to Jenny Simons for her support and guidance.

Further appreciation for their encouragement, editorial support and help in turning this Promising Practices report into a publication goes to Val Morgan, Alexis Barnett, Jill Wood and Frances Rayner of SCIAF.

Lastly I would like to acknowledge the fight PRFSP's participating farmers have in order to survive in an environment that few of us in the West would last more than a few days in. Their hard work in trying to provide for their families deserves our highest respect. Their resource-poverty is a reminder of the unfairness of the world we live in and an aide memoire of why SCIAF and its partners are advocating and working for a just world.

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Front cover and inside front cover photographs:
Sean Sprague.

All photographs taken by SCIAF/Stephen Martin
unless otherwise stated.

Useful websites

SCIAF: www.sciaf.org.uk

James Hutton Institute: www.hutton.ac.uk

Edinburgh University Centre for African Studies:
www.cas.ed.ac.uk

Kasisi Agricultural Training Centre, Zambia:
www.loyno.edu/~katc/

Jesuit Centre for Theological Reflection, Zambia:
www.jctr.org.zm/

Caritas Livingstone/ Caritas Mongu, Zambia:
www.caritas.org/worldmap/africa/zambia.html

Catholic Relief Services: www.crs.org

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Acronyms

CL	Caritas Livingstone
CM	Caritas Mongu
CRS	Catholic Relief Service
JCTR	Jesuit Centre for Theological Reflection
KATC	Kasisi Agricultural Training Centre
MACO	Ministry of Agriculture and Co-operatives (now the Ministry of Agriculture and Livestock (MAL))
MOH	Ministry of Health
NGO	Non governmental organisation
PRFSP	Promotion of Rural Food Security Programme
SCIAF	Scottish Catholic International Aid Fund
TOT	Trainer of trainers



Foreword

The Promotion of Rural Food Security Programme (PRFSP) was designed by SCIAF (Scottish Catholic International Aid Fund) with four Zambian partners with a focus on improving food security and household incomes for small-scale farmers (hereafter referred to as farmers) in Zambia's Lusaka, southern and western provinces. These rural, resource-poor farmers have, for decades, seen their mean annual harvests decrease as their soils become increasingly depleted and infertile. The same farmers now face the added uncertainty of the unknown impacts of climate change which have the potential to threaten their very survival.

The PRFSP addressed food insecurities through a range of supportive and sustainable agricultural activities. The programme emphasised sustainable farming practices such as composting, use of animal manure, use of green manures, minimal tillage, crop diversification and rotation, use of open pollinated varieties (OPV) seeds and latterly agro-forestry. The programme advocated sustainable practices over the unsustainable and damaging use of inorganic fertilisers, pesticides and destructive practices such as the indiscriminate burning of crop residues.

This report explores areas of best practice evidenced in the PRFSP. The learning points also form the foundation of the PRFSP's follow-on project, the Kulima Programmeⁱ.

As the potential of sustainable agricultural systems to improve farmers' soils and their yields became evident, the PRFSP brought farmers together to share their challenges, learning and successes. These farmer-to-farmer exchanges were mainly confined to Zambia with one visit to peer farmers in Malawi. However, it became evident that the broader uptake of these low cost, low risk, proven approaches to increasing soil health and production by non-participating neighbouring farmers has not occurred. This has led SCIAF and its partners to seek the help of Edinburgh University to enable us to understand why farmers are not readily adopting practices and approaches to farming that could, over time, greatly improve the health of their soil and therefore its productivity and

also its ability to adapt to the vagaries of climate change.

As one Zambian farmer said, "If we can enable farmers to look after their soils, then their soils will look after their crops."

Time is of the essence if small-scale rural farmers are to sustainably improve the health of their soils. Improved soils are absolutely essential if farmers are to adapt to the uncertainties and extremities of climate change. Without changes to current farming practices they will inevitably become casualties to the changing environment in which they strive to survive.

If we have learnt anything from the previous three years and the PRFSP it is the central importance of focusing on soils, soils and soils. If we, the international development sector, fail to take this on board and do not make restoring soil fertility central to agricultural programmes, we will effectively be wasting precious resources and time. The need for this focus becomes even stronger when the uncertainties of the effects of climate change are factored in. Time is running out if we are to support small-scale farmers to weather the storms and droughts that lie ahead.

Stephen Martin

Stephen Martin
Co-ordinator, Promotion of Rural Food Security Programme

ⁱ The word Kulima is very common in the Bantu languages meaning "to till"

Introduction



Healthy soils are the foundation of sustainable agriculture.

Photo: Sean Sprague

The Promotion of Rural Food Security Programme (PRFSP) was a three year programme funded by the Scottish Government in which a consortium of partners participated in implementing a livelihood programme addressing rural food insecurity. SCIAF's Zambian partners were the Kasisi Agricultural Training Centre (KATC), Jesuit Centre for Theological Reflection (JCTR), Caritas Livingstone (CL), and Caritas Mongu (CM) supported by the Catholic Relief Services (CRS). The programme was conducted across the five districts of Chongwe, Kazungula, Sesheke, Shang'ombo and Mongu in the Lusaka, southern and western provinces of Zambia respectively.

The core objective of the PRFSP was to enable, encourage and mentor farmers in sustainable agricultural farming techniques which, over time, will restore depleted soil fertility and thereby increase productivity. Sustainable agriculture will increase yields without the need of government subsidies that may assist on a year-by-year basis but don't do anything to address the underlying issue of falling soil fertility. Through promoting sustainable practices the programme has begun to witness signs of improved food security, household income and increased resilience to climate change for participating farmers.

The PRFSP partners provided a range of services to the farmers who had chosen to participate in the programme. This included training in sustainable agricultural practices such as minimum tillage (planting basins and using a Magoye ripper), composting, biological pest management, crop rotation, crop diversification, market access, food preservation, and food packaging as well as vegetable cash crop management.

The PRFSP enabled partners to disseminate information in relation to sustainable agricultural practices through local language training manuals, radio programmes for farmers, the implementation of a Training of Trainers (TOT) programme, arranging advocacy meetings with the Ministry of Agriculture and Cooperatives (now the Ministry of Agriculture and Livestock (MAL)) and the House of Chiefs, and providing residential training for community facilitators at

Kasisi Agricultural Training Centre. The advocacy organisation, JCTR, was active in establishing meetings with traditional chiefs, in which successful organic farmers presented visiting VIPs with their own stories about their conversion to sustainable ways of farming and the impact this change has had on their food security.

Through the PRFSP, JCTR conducted monthly 'rural basket' surveys, measuring food consumption, agricultural development and social service delivery. The survey reports served as an assessment of the impact of the intervention on food security in specific areas.

The PRFSP promoted support for rural farmers over the long term through establishing community Food Security Committees. These help to identify food shortages at an early stage. Farmer-to-farmer visits were promoted to encourage the sharing of sustainable agricultural practices at a local level.

This Promising Practices report will outline the PRFSP's strategy, positive outcomes, challenges presented, and finally draw upon lessons learned to offer details on best practice, which will be further developed in future programmes such as the Kulima Programme (Oct. 2011-2016).



Photo: Sean Sprague

Programme overview



Many Zambian families struggle to survive due to food insecurity. Photo: Sean Sprague

Country profile

Zambia was once classified as a middle-income country but over the last three decades it has suffered from economic decline. Currently three out of four Zambians live in poverty and more than half live in extreme poverty¹. For rural households, 83% live in poverty, with 71% living in extreme poverty². Most of the extremely poor population are engaged in farming.

Rural households tend to have very limited or no alternative ways to increase household income. As a result, the majority of the population is food insecure³. Livelihood insecurities are compounded by periods of climatic shock such as floods⁴ and drought which affect staple rain-fed crops, such as maize⁵. Livestock production has also been declining due to drought affecting rangeland, particularly in the west and southern regions.

The production of staple food crops over the last two decades has varied greatly due to weather patterns. In some years Zambia enjoyed grain surpluses of 70% and in other years deficits of 50%⁶. In the case of deficit years this significantly contributed to the severe famines experienced in the early 1990s. In 2012 many still go hungry with 43% of the population malnourished⁷. Life expectancy is estimated to be 49 years⁸. While Zambia customarily has been a net importer of maize, rice and wheat, the excellent 2010-2011 rains and the government's expensive fertiliser subsidy programme has meant that in 2010 and 2011 Zambia was nearly self-sufficient in wheat and a net exporter of maize. The current government has recognised that their subsidy fertiliser programme is unsustainable. More money goes into subsidising fertiliser than into the Ministry of Health. As both the subsidy programme and the costly import of cereals in drought years is an unsustainable long-term option, a sustainable alternative needs to be championed.

The Zambian Government, under its Poverty Reduction Strategy (PRS), has contributed funds from its national budget to stimulate agricultural production. However, preference has been given to a fertiliser subsidy programme to stimulate commercial farming rather than small-scale agriculture. The government has supported the Conservation Farming Unit (CFU) and while they have a remit to work with small-scale farmers, in practice some CFU staff have expressed a preference to work with emerging commercial farmers rather than with resource-poor farmers who they think should be looked after by social services. Sustainable farming is socially just in that it helps the resource-poor as well as the emerging commercial farmers and the already established commercial sector. The PRFSP supported farmers in Zambia to advocate for changes in government policy towards supporting sustainable agriculture, offering many more people the opportunity to work their way out of poverty.

Most of Zambia's extremely poor population are engaged in farming.
Photo: Sean Sprague



Purpose of the programme

The PRFSP was implemented to contribute to the UN Millennium Development Goal (MDG) of eradicating extreme poverty and hunger⁹ through improving food security, household incomes, and the resilience to climate change of vulnerable farmers in Zambia through the widespread adoption of sustainable agricultural system techniques. The programme focused on increasing farmer knowledge of sustainable farming practices such as composting, minimum tillage, and latterly the integration of agroforestry into the farming system to begin the long process of restoring soils through increasing the soil organic matter (OM) content. Increasing OM in soil improves the ability of the soil to hold moisture as well as increasing its microbiological life and fertility. The development strategy was based on the assumption that if the proposed interventions were low cost (to the participating farmers and to the government), low risk (the risk to current production levels) and successfully adopted by

participating farmers, then neighbouring non-PRFSP-participating farmers would voluntarily choose to adopt some or all of the practices they had observed to be successful for their peers. This is a common assumption underpinning many development activities but is rarely stated.

The PRFSP hoped that if the programme was successful in working with self-selecting farmers - however tentative the results may be, given the limited duration – non-participating farmers would begin to adopt sustainable agricultural systems of production and therefore, given time, the benefits of such an approach would have a positive impact on a wider number of farmers. It is important to remember the PRFSP's message had to compete against the promotion of very heavily subsidised fertilisers by the government and other organisations, thus it was less likely that farmers would switch to the sustainable option.



Barren soils = falling yields.



Improving soils = improving yields.

Steps in implementation

The PRFSP was a three year programme established in 2008 with 100% funding from the Scottish Government's Sub Saharan Africa Development Programme. The PRFSP was established in response to Zambia's food insecurity problems as part of a sustainable livelihoods approach taken by SCIAF and its partners. The PRFSP partners had all worked individually with SCIAF from as far back as the 2002 Southern African drought, but this was the first time that all the partners had come together to implement a common programme.

The consortium was made up of two specialist organisations, JCTR and KATC along with two rural development organisations, CL and CM with support from CRS. JCTR has a long history of working with Zambian civic society to effect change through lobbying the Government of Zambia and was a major player in the 2002 fight to prevent genetically modified organism (GMO) cereals being introduced into Zambia. Its role within the PRFSP was to co-ordinate and lead advocacy work targeted at the

government of Zambia and the influential House of Chiefs in support of sustainable agriculture. KATC is a highly respected agricultural research, training and extension NGO that has pioneered sustainable agricultural systems for both small-scale and commercial farmers. Through its effective extension and mentoring activities it has supported thousands of farmers to improve their productivity and hence their household's food security and quality of life. The KATC is a credit to its founder and the highly qualified and motivated staff that keep alive the vision of a sustainable agricultural sector making Zambia food secure. The three Caritas organisations (CL, CM and CRS), along with KATC's extension programme, work directly with rural, resource-poor farmers seeking to simply grow enough food for their household to survive another year. These organisations are staffed by dedicated local people committed to supporting and helping individuals and communities increase their food security and life chances.



A PRFSP extension worker explains the benefits and value of composting.

The approaches to sustainable agriculture promoted by the PRFSP have been pioneered and proven by KATC and its participating farmers over the past fifteen years. After over a decade of working with farmers to improve their food security and household income through the adoption of conventional farming techniques, they were forced to abandon this approach as the participating farmers were annually getting poorer and more indebted. Their conversion to organic agricultural techniques has proved much more successful in three distinct ways. Firstly, crop yields have increased providing greater farmer household food security. Secondly farmers' soils have improved, increasing the sustainability of their farms. Lastly adopting farmers have proved that during drier years their soils can still produce even when neighbouring non-adopting farmers see their crops fail.

The PRFSP uses the term 'sustainable agricultural systems' as opposed to 'conservation farming' or purely 'organic farming' simply to accommodate an initial reluctance of all PRFSP partners to adhere to either the purest organic approach - that outlaws the use of inorganic intervention in every circumstance - and those reluctant to advocate a conservation approach that permits the use of inorganic fertilisers and pesticides if deemed necessary. As the PRFSP proceeded the difference in opinions narrowed and while not everyone within the consortium would bar all inorganic interventions on an ideological basis, all agreed that for rural resource-poor farmers the distinction is largely academic. Resource-poor farmers cannot afford, even if they wanted to, subsidised fertiliser, and/or hybrid seeds that increase their vulnerability



Agro-forestry improves soils.

and further reduce the long-term fertility of their soils. It is also unfeasible for the government to subsidise every farmer.

As any organisation working in agricultural development knows, it is difficult to verify claims of production increases as the annual performance of crops is affected by many variables

such as rainfall, seed quality, seasonal variation in disease and pest perniciousness. Many of these factors lie outside the farmers' control. In measuring success it is also important to be aware of the limited time available to implement the programme. Typical funding cycles are limited to three years, which for agricultural development constitutes three rain-fed growing seasons. Ideally a much longer period (\geq five years) is needed to effect long-term agricultural change.

Given these qualifications the PRFSP can tentatively claim a number of successes. The majority of participating farmers adopted one or more sustainable agricultural farming practices, with many farmers stating that they were no longer burning their fields to increase crop fertility and were reducing soil moisture loss by adopting minimum tillage techniques. Farmers also explained that they shared sustainable farming knowledge with neighbouring farmers. In terms of crops, farmers experienced increased yields for maize, and experimented in crop diversification to reduce the risk of crop failure by planting more drought resistant cereals such as sorghum or millet. Over the three year period there was a general increase in household food security, with staple crops lasting up to 7.3 months of the year compared to 6.5 months indicated in baseline studies. Progress has also been made in advocating for change to national

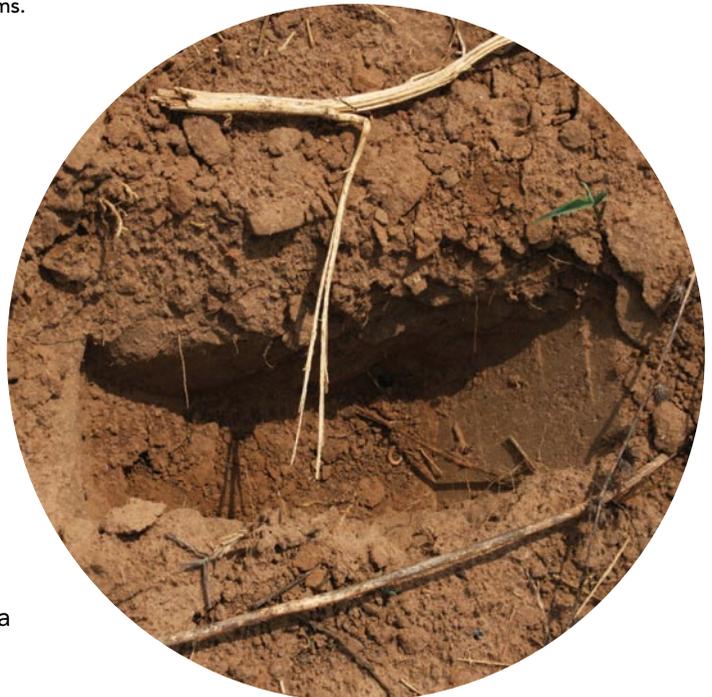


Healthy maize grown using sustainable agricultural systems.

agricultural policies, as the Zambian Government has committed to introduce an organic farm bill to its parliament.

Building on the initial success of the PRFSP, the consortium took the learning from the programme, together with four invited organisations (Agakura Agricultural Training Centre (Burundi), Caritas Mingoche (Malawi), Edinburgh University's Centre of African Studies (Scotland) and the James Hutton Institute (Scotland)), and developed and initiated the Kulima Programme. With follow-on six-month funding from the Scottish Government, the expanded consortium started the Kulima Programme on 1st October 2011. The Kulima Programme builds on the learning and experience of the PRFSP, through complementary interlinked objectives of improving food and nutritional security of

farmers through the promotion of sustainable agricultural systems, while undertaking anthropological research to better understand the factors that determine if farmers will adopt new ideas, and thirdly to scientifically verify the chemical, biological and fertility improvements to soils under the promoted approaches. This latter objective is linked to strengthening the advocacy element of the Kulima Programme for lobbying the governments of Zambia, Malawi and Burundi on the benefits to farmers of adopting a sustainable agricultural systems approach to food security. It is only through the analysis of PRFSP's Promising Practices and their incorporation within the Kulima Programme, that confidence can be gained that the programme's agricultural work is moving in the right direction. This report is being offered to the wider agricultural development sector in the hope that it strengthens current and future working with resource-poor farmers to support their efforts to survive sustainably into the future.



Planting basin, used to concentrate organic fertiliser and reduce moisture loss.

Programme strategy



"If we can enable farmers to look after their soils then their soils will look after their crops." *Moses Mulenga.*

Photo: Sean Sprague

Promotion of sustainable agricultural systems

To increase testing and adoption of sustainable agricultural practices partners identified their expertise and promoted certain aspects of sustainable or organic farming, with some partners adopting a combination of both. KATC largely promotes organic farming which stresses organic fertilisers, minimum tillage, crop rotation and biological pest and disease management. The conservation farming principles that KATC applies include water harvesting, minimum tillage and no burning. CL adopted a mix of organic farming techniques, especially among groups growing vegetables. Partners encouraged farmers to share their learning, mainly through visiting other farmers or demonstrating on their own land or demonstration plots. Partners also increased access to improved planting materials. KATC's approach was to facilitate the link between farmers in Chongwe and some companies selling improved seed varieties,

especially to farmers demonstrating sustainable agricultural practices. CRS gave improved seed to all participating farmers, distributing 12,355kg in total with CL distributing 4,942kg; no costs were incurred by farmers as the PRFSP paid for the distributed seeds. CL gave drought-tolerant seeds of sorghum and millet to participating farmers. CRS also gave out drought-tolerant seeds in the first year (2008-09). KATC held training sessions in which the uses of open pollinated varieties (OPVs) of maize were promoted along with drought tolerant varieties of cassava.

All the above activities promoted sustainable agricultural practices with the objective of increasing their uptake throughout the selected regions. The Kulima Programme has reviewed the PRFSP and collectively moved to the KATC-promoted approach as outlined in the following box.



Sustainable agriculture promises a better future for Zambian farmers.

Sustainable agriculture

Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs.

A basic idea behind sustainable agriculture is that farmers should co-operate with nature and not fight against it. Most of today's agricultural activities involve a constant battle with nature. Trees are cut, soils are over-worked, vegetation burnt and the soil left exhausted and impoverished. Single crops are grown on large areas of land continuously and chemicals are used in ever increasing amounts to control weeds, insects and diseases. Sustainable agriculture encourages a gentler approach to farming and provides a viable productive alternative.

Sustainable agriculture promotes the capacity of the land to remain productive through improving the foundation of agriculture, the soil. Therefore sustainable agriculture can be defined as a way of farming that is governed by three basic principles - it is environmentally friendly, economically viable and socially just.



Top: Dwarf Sorghum;
Above: So much lost - burning in western Zambia.

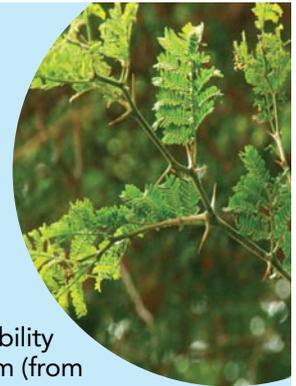
Principles of sustainable agriculture

a) Environmentally friendly: This means that the quality of the natural resources is maintained and the viability of the entire eco-system (from humans, crops and animals to soil organisms) is enhanced. This is best ensured when the soil is managed and the health of crops is maintained by natural methods. Resources are used in a way that minimises the loss of nutrients, biomass and energy, and avoids pollution.

b) Economically viable: This means that farmers can produce enough for their family's consumption and gain sufficient income to pay for labour and other costs of production, and for the needs of their family (e.g. education, healthcare, clothing, housing).

c) Socially just: This means that social responsibilities such as working and living conditions of labourers, the needs of rural communities, consumer health and safety both in the present and the future are fulfilled. Maintaining and improving, for future generations, the health of the environment (e.g. soil microbes, wildlife, etc.) is also an important part of the picture.

Sustainable agriculture stresses the improvement and preservation of the land while increasing productivity and decreasing dependency on external inputs.



Top: Faidherbia Albida or 'Wonder tree';
Above: Agro-forestry study tour in Malawi.

Sustainable agriculture practices

Sustainable agricultural practices are classified into three main categories. These are: soil improvement practices, pest control practices and tillage practices. Practices under each category are elaborated below.

1. Soil improvement practices

Need to nourish and improve the soil – There is a need to add organic matter to the soil as a first step to increasing the productivity of the soil. Soil fertility and organic matter can be improved by:

- **Crop rotation** - growing more and varied crops including more leguminous crops, shrubs or trees in the rotation.
- **Composting** – utilising animal and household organic waste.
- **Mulching** – applying a layer of material (usually crop residue or grass) over the surface of the ground. Mulching reduces the evaporation of moisture from the soil by keeping it protected from the direct rays of the sun. When mulch decays on the surface it increases the humus content of the soil and provides food for soil microbes enabling their population to beneficially increase.
- **Green manure plants** – growing a green manure crop specifically for adding fertility to the soil and for improving the structure of the soil. In addition to recycling nutrients and fixing nitrogen, this green manure crop conserves the soil by providing shade and ground cover to prevent soil erosion and retain moisture. It also acts as living mulch keeping down the weeds.
- **Fertiliser trees** – Growing fertiliser (leguminous) trees improves the fertility of the soil through the biological fixation of atmospheric nitrogen, increasing biomass production and nutrient recycling. Examples of fertiliser tree practices include improved fallows, using *Faidherbia albida*'s unusual seasonal properties to fertilise crops grown beneath its canopy and *Gliricidia sepium* intercropped with field crops.



Training in making fertiliser tea.



Farmers make small bee drinking ponds to aid pollination.

Given time these changes in approach will reap greater rewards as yield increases are realised.

2. Pest control practices

Reducing damage to crops from pests is important in maximising yields. Plants which repel insects are placed amongst the crops whilst plants which attract pests are planted in field borders. This reduces pest damage without the use of inorganic pesticides. Organic pesticides made using suitable plants also play a part in controlling pests.

3. Land preparation practices

- **Minimum Tillage** - minimum tillage is crucial for soil and water conservation.
- **Ripping** - using the Magoye ripper or the sub soiler. These open soils that are affected by hard pans that prevent root and water penetration. The sub soil ripper breaks this pan enabling easy root and water penetration with minimum disturbance to the soil.
- **Pot holing/planting basins** – This opens the soil at and around the planting station for easy root and water penetration with minimum disturbance to the rest of the soil. The hole/basin traps conserve water and moisture, thus enabling the plants to survive severe water stress conditions (drought).
- **Introducing biological life into the soil**
- **Planting deep rooted crops such as pigeon peas**

Generally, adoption of the soil improvement, pest control and land preparation agricultural practices outlined above, governed by the three principles of being environmentally friendly, economically viable and socially just, defines sustainable agriculture as practised and promoted by firstly the PRFSP and subsequently the Kulima Programme.

Resilience and capacity to cope with extreme weather

Across the selected districts different traditional knowledge systems have informed various attempts to adapt to extreme weather events. These events are thought to have always presented challenges to Zambian farmers whereas now their frequency, intensity and ferocity are expected to increase. Only time will tell how accurate forecasts of the unfolding effects of climate change on Zambian agriculture are, but the widely accepted scientific predictions for Sub Saharan Africa is that wet areas will get wetter, increasing flooding, while drier areas will get drier, increasing droughts.

PRFSP identified that in some communities there is collective action being taken to prepare for extreme weather events, for example, by maintaining and clearing drainage ditches and channels that encourage the smooth drainage of excess rainfall, constructing community firebreaks to prevent destruction to crops by wild bush fires, and the construction and management of community grain stores in order to mitigate the seasonal loss of crops.

KATC has been particularly influential within this area, offering information and advice on crop resilience and enhancing the capacity of farmers' soils to withstand rainfall disruptions within their sustainable agricultural training programmes.



Flooding on the Zambesi.



Frost damaged banana tree in Zambia.

CRS conducted research on early warning systems as part of a baseline survey and CL organised two slots on local radio for lead farmers to share their knowledge. In addition information was also offered by the local meteorological station and shared with farmers on an ad hoc basis. CRS and CM supported five communities to draw up disaster management/mitigation action plans and CL supported two.

Nutrition

Extreme weather leading to crop failure or damage can have an impact on nutrition. PRFSP partners worked with the Ministry of Health in the planning and delivery of training for healthcare professionals as part of the Nutrition Support Group (NSG). The NSG taught community members about the need for a balanced diet, through cooking demonstrations using locally produced food, growth monitoring of children, and counselling and referrals for malnourished infants. CRS and CM trained five NGO workers in keyholeⁱⁱ gardening.

Partnership with government and other actors

KATC, CM (with CRS) and CL all developed strong working relationships with their respective district agricultural co-ordinators and agricultural extension officers from the Ministry of Agriculture and Co-operatives (now MAL) operating in Chongwe and Sesheke. The development and maintenance of strong inter-agency relationships led to positive and productive outcomes. KATC, CM (with CRS) and CL agricultural officers were active in developing the understanding and technical capacity of MACO (now MAL) extension officers towards sustainable agriculture. PRFSP partners worked closely with the Ministry of Health (MOH) and supported local NGOs with similar nutritional objectives. CL had to address community witchcraft concerns with participating farmers before they were comfortable to visit other farmers' land. A local belief held by many farmers is that visiting another person's farm may open them up to accusations of witchcraft if the visited farmer's crops are later ruined.

ⁱⁱ Keyhole gardens are gardens which can be located close to homes. They are small in size but can produce high yields, especially when compost or manure is applied, and are less labour intensive.

Policy and advocacy

JCTR had a distinct and specialist role within the PRFSP. It was mainly responsible for advocating for a change in the Zambian Government's agricultural policy which spends 80% of MAL's limited budget on providing subsidised inorganic fertiliser. The provision of this subsidy has become a political policy rather than a considered agricultural development strategy. The National Agricultural Policy (2010-15) now includes the provision to promote conservation farming and while the consortium would like to see the government go further and promote SAS, it is respected as a step in the right direction. However, the budget allocation for conservation agriculture is inadequate to fully and successfully promote conservation farming. JCTR has developed positive relationships with government officials at the district level in areas where JCTR are conducting monthly household surveys, known as 'rural basket' researchⁱⁱⁱ. JCTR and KATC also contributed to meetings held by the Sector Advisory Group (SAG) 2011 for MACO, which offered KATC and JCTR an opportunity to influence government policy in the agricultural sector. KATC and JCTR collaborated to

organise awareness-raising visits illustrating the demonstrable success of sustainable agricultural practices in improving the food security and lives of resource-poor farmers to both senior Zambian parliamentarians and influential members of the House of Chiefs.

ⁱⁱⁱA monthly household survey, compiled over a period of twelve months, to assess the rural household situation, including food availability, consumption patterns and cost of non-food essential items. The programme was piloted in 2009 and launched in 2010 and has now been expanded to encompass 16 communities across the five districts of the PRFSP intervention.

Sustainable agriculture stresses the improvement and preservation of the land while increasing productivity and decreasing dependency on external inputs.



Learning how to take soil samples.

Positive outcomes



Cash crops can help to pay for school fees, clothing and other essentials items such as medicine.



At the end of the three year PRFSP, and accepting the consortium's hesitancy in claiming success when so many variables are involved, a positive direction of travel has been noted within the key objective areas of the programme. There is evidence of improved crop yields allowing some PRFSP participating farmers to improve their current food security status while being able to sell surplus produce to increase their household income. PRFSP has seen an increase in the number of farmers adopting sustainable agriculture techniques. It is an encouragement to the consortium that many participating farmers are beginning to take tentative steps towards improving their long-term sustainable husbandry of their soils. Given time these changes in approach will reap greater rewards as yield increases are realised. For the PRFSP participating farmers their journey to an improved, ultimately sustainable future has started.

Increased knowledge and adoption of sustainable agricultural practices

- Over three consecutive seasons at least 75% of trained households adopted sustainable agriculture farming practices.
- There was a 26% increase in participating households planting at least one drought resistant variety from each of the three types of crops promoted by the programme (cereals, legumes and oil seed).
- 17.5% of participating households who reported improved yields over three consecutive seasons had planted drought resistant crops, legumes, oil seed and had integrated livestock.
- Over PRFSP's three growing seasons participating farmers recorded a 550kg/ha increase in their yields on land where they had adopted sustainable agricultural practices.
- Resource-poor PRFSP farmers participated in farmer-to-farmer visits, explaining and sharing their knowledge and experience of sustainable farming.

Diversified farming

- Throughout the duration of the programme food security increased for communities, with

food supplies lasting up to 7.3 months compared to the baseline study of 6.5 months.

- On average PRFSP households increased their diversity of food types and quantities of food consumed. This increased their dietary diversity score to three compared to the initial baseline score of 1.9.
- 14% of households increased their income from sale of farm produce.
- In each season an average of 28% of households produced diverse crops for market.
- The average area of land under cultivation using sustainable agricultural techniques increased by 0.3 hectares.

Nutritional education and HIV and AIDS awareness

- 20 nutritional community groups were established distributing seeds and offering advice on nutrition-rich vegetables which included selenium-rich pumpkins and amaranthus.
- 20 community training sessions in food processing, preservation and storage were conducted in which advice was provided on breastfeeding and identifying early signs of childhood illnesses. This increased the participation of women and led communities

to demand better healthcare services from their rural health centres and to more fully utilise existing local foods.

- 12 community support groups received specialised training from programme partners such as HIV prevention and care training and help was offered to HIV and AIDS patients in terms of planting small areas of crops.
- 59 mt (Metric Tonnes) of produce from keyhole gardens were sold by participants across the programme.

Advocacy

- PRFSP partners were invited to contribute to agricultural policy discussions held with 15 influential Traditional Tribal Chiefs (House of Chiefs). Successful PRFSP-implementing farmers made presentations to the chiefs.
- PRFSP partners held meetings with the Zambian Government to advocate for support and promotion of sustainable agricultural practices.
- PRFSP partners presented to the five partnering district councils and provided recommendations on how to implement sustainable food security activities included in the districts' Sixth National Development Plan (SNDP) adopted by the national government.
- Sustainable agricultural policy papers were prepared for the national government, with particular focus on the need for an allocation of government resources to promote and implement sustainable agricultural systems.
- Internationally, JCTR held meetings in Washington DC with the following: Congressman McGovern, Administrative Directors to Congressman Jesse Jackson and Congresswoman Betty McCollum. Throughout these meetings JCTR pressed for sustainable agricultural systems to be included in the US Administration's new food security initiative.

Case Study 1: Alfred Misika's organic farming story

Mr Alfred Misika, is a 50 year old organic farmer who lives with his wife and 11 children. Thanks to the help of Caritas Livingstone Alfred has been able to sustain his organic farming



Making fertiliser tea.

practices over a two year period. Previously Alfred was using inorganic fertiliser. Alfred said that since using organic fertiliser his "vegetables became more tasty than using synthetic fertiliser. When you use [inorganic] fertiliser, vegetables are bitter and sometimes, you may have stomach ache."

Alfred has also received a range of vegetable seeds from Caritas Livingstone, such as carrot, aubergine, onion, cabbage, rape, as well as maize. Alfred said, "From my 5kg maize seed last year I produced four oxcart of maize – that's about 20 bags, each 50kg!" Alfred is adamant that he has better harvests because of organic farming and he is even able to sell surplus produce at Maramba Market in Livingstone.

Alfred explained how organic farming has changed his life: "There is a big change in my household. I don't starve now, I have enough food for my family all year round. I buy soap, making me a gentleman!"



Model farm.

Challenges



For the participating farmers their journey to an improved, ultimately sustainable future has started.

Photo: Sean Sprague

Political

The Zambian Ministry of Agriculture and Livestock currently favours subsidised inorganic mass fertilisation programmes to increase agricultural output, rather than promoting sustainable agricultural systems. The PRFSP has therefore found it challenging to influence such a dominant, politicised, agricultural policy. KATC has held meetings with influential political and traditional decision makers, who concede that sustainable agricultural practices have changed the food security status of those farmers who have been visited. However, these groups cite the lack of scientific data as a reason for the government's reluctance to actively support this approach. Fertiliser companies, profiting from the subsidised fertilisation programmes of the Ministry of Agriculture and Livestock, offer counter messages to farmers, making it difficult for farmers to know what is best for them.

Land tenure

Some PRFSP participating farmers were hesitant in making long term investment in sustainable agricultural system practices, especially the adoption of agroforestry (benefits ≥ 5 yrs), due to traditional restrictive land tenure systems that don't offer secure tenancies to the farmers.

Gender issues

Female engagement in agriculture as 'lead farmers' is less frequently observed when compared to males, even though the majority of farm work is undertaken by female household labour. It became clear that it was much harder for female farmers to attend residential training as it took them away from their domestic and childcare responsibilities. PRFSP partner KATC responded to this issue by developing training approaches within the farming communities that allowed and encouraged female participation.

Infrastructure and local economy

Local markets are difficult to access for farmers due to the limited investment in infrastructure, often making market roads impassable, especially during the rainy season. There were also no farmer associations able to negotiate with buyers a collectively agreed price for the farmers' products. As a result farmers often ended up selling well below a reasonable market price, thereby undermining the market as a whole.

Case Study 2: Namukolo and Geoffery Kabindalala's farm transformed by sustainable practices

Namukolo Kabindalala and her husband Geoffery live with their three children and three elderly parents in Liru village in the western district of Mongu.

PRFSP transformed the family's approach to agriculture. The introduction of water irrigation furrows and treadle foot pumps bring water to the crops, along with training on intercropping and composting, boosting production in the village. "We just used to harvest a little because we were watering with buckets. When they introduced the treadle pump to the community, watering was easy. That's when we expanded," says Namukolo.

The Kabindalala family, and their neighbors, used to eat only two meals a day consisting of nshima, a thick porridge of maize with little nutritional value. In 2008, the Kabindalala's harvested 5x50kg bags of maize, which they consumed themselves, and made \$39/mth on vegetable sales. Following their training the 2011 harvest brought 15x50kg bags of maize and \$100/mth in vegetable sales on the same area of land, putting their family above the poverty line for the first time in their lives. "We never used to be able to give our parents enough food to last the whole day, now we can." Namukolo said.

Promising practices and recommendations



Sustainable agriculture encourages a more gentle approach to farming.

Photo: Sean Sprague

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The Promotion of Rural Food Security Programme in Zambia has illustrated a number of Promising Practices which should guide future agricultural programmes. Highlighting Promising Practices will ultimately help SCIAF and its partners offer better support to small-scale farmers who face the daily struggle to survive in our changing world.

Soils

In a recent UK parliamentary inquiry and report into supporting African agriculture called *Growing Out of Poverty*¹⁰ there was a glaring omission. Throughout the publication the word soil is mentioned only once. Whilst its focus on developing links between small-scale farmers and markets, improved crop storage and weather forecasting are non-contentious the report singly missed the major factor affecting the production capacity of small-scale farmers, namely the quality of their soil. In many areas soils are highly depleted and need to be farmed differently if there is any hope for rural resource-poor farmers to be able to sustainably increase their yields, especially given the vagaries of the felt effects of climate change.

Understand the participating farmers

The PRFSP highlighted a growing concern that farmers are not copying practices successfully adopted by neighbouring farmers¹¹. As mentioned in the foreword, the underlying assumption that neighbouring non-participating farmers would readily adopt practices shown to work by 'innovative' farmers has not held. Without a wider uptake of sustainable agricultural systems by farmers struggling with declining soil fertility and changes in rainfall pattern and volumes, the benefits will only accrue to innovative farmers in societies. To address this issue the Kulima Programme has linked with Edinburgh University's Centre of African Studies to carry out research that will allow the programme to better understand the factors that affect a farmer's decision whether or not to adopt a beneficial change.

Recommendation 1:

That all current and future Sub Saharan agricultural development programmes and projects carefully consider the current fertility of the participating farmers' soils and build into the proposed programme or project measures to sustainably improve the fertility and health of the farmers' soils.

Recommendation 2:

State all development assumptions underpinning agricultural development plans and if they assume a wider-spread uptake outside the participating group it needs to be closely monitored. Anthropological research of factors affecting farmers' choices to adopt new or change old farming practices is needed to improve the implementation strategy and impact of the programmes.

Programme relationship to participating farmers

The PRFSP programme reviewed how it worked with participating farmers and developed the following approaches which have been adopted by the Kulima Programme.

Each participating farmer chooses to take part or not after hearing about the objectives and methodologies of the programme.

If they select to participate they are taken through a Memorandum of Understanding (MoU) that outlines the consortium and partners' roles and responsibilities towards the farmer as well as the farmer's roles and responsibility towards the programme. This has decreased dropout rates and improved farmer participation.

Most importantly the PRFSP's quarterly contact with participating farmers was deemed not intense enough to effect the depth of change hoped for.

To address this, the Kulima Programme has introduced:

- A reduction in the number of farmers targeted from $\geq 4,000$ down to 1,300;
- Each participating farmer will have an assigned named extension officer;
- In the first year the farmer can expect two visits per month and latterly one visit per month;
- The interaction between the extension worker and the farmer is organised around a farmer's diary that records agreed, planned and completed tasks.

Recommendation 3:

Work more intensely with fewer farmers with a maximum ratio of farmers to extension workers of 20/1.

Visit participating farmers individually at least once per month.

Formalise the relationship between participating farmers and the programme through jointly owned MoUs that outline the roles and responsibilities of both parties.

Move away from the terminology of 'beneficiaries' towards 'participating' farmers and from 'poor' farmers to 'resource-poor' farmers to reflect the fact that their family and community life also has value.

Training methodology

PRFSP experienced difficulty in getting female farmers to attend short (five day) residential training courses as attendance meant they had to travel a distance from their homes and were therefore unable to fulfil other domestic and childcare responsibilities.



Maize seedlings.

Recommendation 4:

Develop field-based training programmes and activities to enable female participants to gain all the training opportunities and knowledge transfer open to residential training participants.

Prioritise farmer-to-farmer exchange visits to encourage knowledge and skill sharing and learning.

Where feasible take senior agricultural staff on study tour(s) within Africa to increase their exposure to new ideas and innovations in agricultural development. A PRFSP study tour to the International Center for Research in Agroforestry (ICRAF) in Malawi highlighted the need to focus on soils and investigate the potential of trees in helping to restore soils to health.

Advocacy

Advocacy has a very important part to play in moving small-scale farmers towards environmentally sustainable ways of farming, which increase the health and fertility of soils, and are better able to consistently provide the food needed for rural households to survive. Without changes to governmental priorities, small-scale farmers will not receive the support and mentoring they need to successfully move towards a sustainable increase in their production and food security. The PRFSP worked hard to persuade senior political and traditional leaders of the merits of sustainable agricultural systems.

While privately many expressed gratitude and support for the PRFSP approaches they were collectively reluctant to advocate themselves for a change in policy, citing a lack of scientific evidence. Anecdotally KATC has proven year after year that farmers' soils are improving along with their yields but rigorous scientific testing of the soils was lacking. The Kulima Programme has joined up with the James Hutton Institute to test farmers' soils at the start of the Kulima Programme and again after three and five years

to provide objective evidence of the benefits of sustainable agricultural practices on soils, thereby making it harder for decision makers to dismiss sustainable agricultural systems as unproven.

Recommendation 5:

Seek partnerships with specialist institutions that can help strengthen the scientific basis for agricultural projects, which in turn will strengthen the advocacy drive to change or strengthen governmental policy toward small-scale farmers.

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'The problem of food insecurity needs to be addressed within a long-term perspective, eliminating the structural causes that give rise to it and promoting the agricultural development of poorer countries.'

*Pope Benedict XVI,
Caritas in Veritate, n.27, 2009*

