Myanmar Dry Zone Development Programme

Scoping Report

December 2014

FAO Investment Centre

Foreword from the LIFT Fund Director

This report was commissioned by the Livelihoods and Food Security Trust Fund (LIFT) as part of the process of designing a new LIFT programme for the central dry zone (DZ) of Myanmar. The report was written by a team from the FAO Investment Centre following field work in 2013 and 2014.

The report includes the results of field work carried out in the preselected target area for the programme: Myingyan, Taungtha, Natogyi and Mahlaing in Mandalay Region and Pakokku and Yesagyo in Magway Region.

The report presents a number of options for LIFT's future DZ programme with a special focus on increasing on-farm and off-farm incomes and improving the well-being of the rural poor, and building on the learning of current and previous projects in the region by both LIFT partners and other development partners.

However, the FAO team did not participate in the consultations that the LIFT Fund Management Office conducted in July and August 2014, and the report does not reference the new LIFT strategy on 2014. Therefore, the report should be read as an important contribution to the development of LIFT's DZ programme, but it should not be construed as a description of the final programme that will emerge.

We expect that a series of calls for proposals will be launched in January and February of 2015, each of which will articulate more precisely the outcomes of the programme and the kinds of activities that LIFT would like to implement as part of the programme.

Thank you to all the agencies and individuals who have participated to date in shaping the LIFT DZ programme. I look forward to working with you in 2015.

With my best regards,

Andrew Kirkwood

Fund Director, Livelihoods and Food Security Trust Fund

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Exchange Rate: USD 1.00 = Kyat 981 (January 2014)

ACRONYMS

3MDG	Third Millennium Development Goal
ACIAR	Australian Centre for Agricultural Research
ADRA	Adventist Development and Relief Agency
AWF	Auxiliary Midwife
CA	Conservation Agriculture
CAHW	Community Animal Health Workers
CBO	Community Based Organization
CDZ	Central Dry Zone
CfW	Cash for Work
CSA	Conservation Agriculture
DA	Department of Agriculture, MOAI
DAR	Department of Agriculture Research, MOAI
DDCD	Demand Driven Community Development
FAO	Food and Agriculture Organization
FFS	Farmer Field School
GIS	Geographical Information System
GOM	Government of Myanmar
HH	Household
ICRISAT	International Crops Research Institute for Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
IHLCS	Integrated Household Living Conditions Survey
IPNS	Integrated Plant Nutrient Systems
IRRI	International Rice Research Institute
IWMI	Integrated Water Management Institute
JICA	Japan International Cooperation Agency
LBS	LIFT Baseline Study
LIFT	Livelihood and Food Security Trust Fund
LPC	Livestock Productivity Committee
LPF	Livestock Productivity Fund
MADB	Myanmar Agricultural Development Bank
MFI	Microfinance Institutions
MLFRD	Ministry of Livestock, Fisheries and Rural Development

MOAI	Ministry of Agriculture and Irrigation
MOH	Ministry of Health
NGOs	Non-Government Organizations
PACT	Private Agencies Collaborating Together
PLW	Pregnant and Lactating Women
PPP	Public Private Partnership
PRA	Participatory Rural Appraisal
PRF	Poverty Reduction Fund
PVS	Participatory Varietal Selection
PwD	People with Disabilities
SALT	Scoping Agricultural Land Technology
SFG	Self Reliance Group
SLA	Savings and Loans Associations
SP	Social Protection
SUN	Scaling Up Nutrition
UNDP	United Nation Development Programme
UNICEF	United Nations Children's Fund
VDC	Village Development Committee
WFP	World Food Programme
WHO	World Health Organization
WRUD	Water Resources Utilization Department
YAU	Yezin Agriculture University

Myanmar Dry Zone Development Programme

Scoping Report

1. Introduction

The following report, together with the Concept Note for presentation to the LIFT Board of Directors, constitute the findings and recommendations of the Scoping stage undertaken by the FAO Investment Centre in order to prepare a Dry Zone Development Program for eventual funding by LIFT. Undertaken in January/February 2014, and supplemented by a field survey of target communities conducted in September 2014, it was preceded by an initial Inception Mission undertaken in October 2013 that presented recommendations as to the general scope and targeting of the program.

During the course of the mission the formulation team visited six potential beneficiary townships within the Central Dry Zone, as identified during the Inception Mission, as well as meeting with representatives of the Government of Myanmar (GOM), international agencies and LIFT implementing partner organizations in Yangon, NayPyiTaw and Mandalay.

In accordance with the terms of reference agreed upon by LIFT and FAO, the formulation team comprised specialists in: soil and water management; agriculture and livestock; marketing and value chain assessment; rural finance; sociology and social protection and; nutrition. The technical reports covering these thematic areas are provided as Annexes 1-5 to this document.

2. Dry Zone Context

The Central Dry Zone (CDZ) of Myanmar is usually defined to include the majority of three regions (Magway, Mandalay and Saigang) occupying the centre of Myanmar and accounting for approximately 17 percent of national territory[1]. The zone is strongly influenced by its climate: although average annual rainfall levels (960 mm) are lower than in other areas of the country, they are nevertheless moderate. However, they are concentrated largely in the period May-October, with an intermediate dry period often occurring during June or July. The lengthy period without precipitation, relatively high average temperatures and generally light shallow soils, result in semi-arid conditions restricting agricultural potential in the absence of irrigation. Even where ground water is available, salinity levels may restrict its utilization.

It is widely reported that precipitation levels in recent years have become increasingly erratic, with significant declines in total amounts and, equally importantly, in its distribution during the rainy season[2]. These changes have significantly increased the perceived risks associated with agricultural production in the zone as well as increasing the difficulty of ensuring year-round water supplies for human and animal consumption.

[1] See Annex 2.

[2] The study 'Water Resource Assessment of the Dry Zone of Myanmar' in 2012-2013 undertaken by IWMI found that there had been a significant decline in June rainfall amounts and a very high variability in the onset of the wet season, but found no significant decline in overall precipitation levels.

2.1 Demographics and Poverty

Population density in the CDZ is above the national average[3]. Although over 40 percent of the rural population are landless, relatively little non-agricultural activity takes place in rural areas within the CDZ and supplementary off-farm income is generally obtained from labour migration (seasonal and long term). According to the 2010 Agricultural Census, almost one third of all agricultural households in Magway and Mandalay regions had members working outside agriculture and approximately 15 percent of all agricultural households were female-headed.

Poverty levels within the CDZ as indicated in a 2010 JICA study[4] were 33 percent for farm households but 55 percent for rural landless households. The 2011 WFP Dry Zone Food Security Assessment classified 17 percent of households as severely food insecure and a further 24 percent as moderately food insecure. Food insecurity is particularly evident among young children, with wasting estimated at almost 14 percent and stunting at over 30 percent in 2013[5]. According to that study, household dietary diversity is low (but see also below), with poor infant feeding practices frequently observed and more than 10 percent of young children aged 6-24 months having a nutritionally inadequate diet[6]. Furthermore, according to the same study, 25 percent of households in the dry zone do not use any sort of latrine, further increasing the risk of disease transmission and malnutrition.

The LIFT 2012 Baseline Study (LBS)[7] indicates an average family size in the Dry Zone of 4.9 persons and a dependency ratio of 60.2 percent. It is worth noting that this ratio is lower than in either the coastal/delta or hilly areas of Myanmar, despite average family sizes being similar.

The LBS found that although crop production was cited by almost 58 percent of households as an income source over the last 12 months, casual labour was almost as high, at 55 percent. Small businesses of all types were cited as an income source by almost 25 percent of households but sales of livestock and livestock products by only just over 10 percent. As might be expected, the proportion of landless households citing casual labour as their main source of income (48 percent) was much higher than the population in general (26 percent).

Although household incomes within the Dry Zone are low – 12 percent earned less than Kyat 25,000 per month, 42 percent less than Kyat 50,000 and 84 percent less than Kyat 100,000 per month – but the proportion of households with incomes below Kyat 50,000 per month was lower than in either the coastal/delta or hilly areas of the country. It is also worth noting that more households with less than 1 acre of land had average monthly incomes below Kyat 25,000 per month than did households with no agricultural land at all - 23 percent and 16 percent respectively. It is probable that this reflects the inclusion in the landless category of those in full-time employment (teachers, government staff, etc.), but no data is available.

Casual labour is central to the economy of the Dry Zone. Some 55 percent of households had members who had worked as casual labourers in the last 12 months, while 82 percent of those

[3] Average family size in the zone is 4.9 persons.
[4] *The Development Study on Sustainable Agricultural and Rural Development for Poverty Reduction Programme in the Central Dry Zone of Myanmar. Final Report*. JICA, August 2010.
[5] See Annex 5.
[6] *WFP/SC Food and Nutrition Security Survey 2011.* See Annex 5 for further discussion of these findings.
[7] *Baseline Survey Results – July 2012*. Livelihoods and Food Security Trust Fund. Yangon.

with land had employed casual labour in the same period. Even those with less than 1 acre of agricultural land had employed casual labour in 59 percent of households. One contributory factor to the widespread use of such labour may be the year round nature of demand. In both the coastal/delta and hilly areas, casual labour employment is far more closely associated with the monsoon season that is the case in the Dry Zone.

In contrast to the results of the WFP study of 2011, the LBS indicates that the nutritional status of Dry Zone populations is generally better than for the coastal/delta or hilly regions. A household dietary diversity score (HDDS) of 6.28 for the dry zone was considerably higher than for these other two area (4.8 and 5.45, respectively), while on average, Dry Zone households had food sufficient for 10 months of consumption. Even for those with no land or less than 1 acre, supplies were judged adequate for 9.75 months and the LBS comments that, despite the survey being undertaken shortly before the monsoon season harvest (traditionally the 'hunger season' for agricultural households), little or no indications of hunger were found.

2.2 Agriculture

Average farm sizes across the Dry Zone were found by the LBS to be 4.5 acres; less than in the coast/delta areas (10 acres/household), but more than in hilly areas (2 acres per household).

Where irrigation is available, rice is the dominant crop, but otherwise production is generally focused on pulses (chickpea, grams and pigeon pea), oilseeds (sesame, groundnut and some sunflower) and sorghum. The CDZ is the principal production area for these dryland crops in Myanmar. In addition, palm sugar (jaggery), cotton and tobacco are important crops in some areas. Fruit and vegetable production is generally limited to small household plots, although a few communities do grow onions and chillies on a commercial basis. Where rice cannot be grown in sufficient quantity, households rely on the sale of pulses, oilseeds and livestock to purchase it for consumption needs.

Table 1: Dry Zone - Frequency and Average Sown Area of Major Dry Zone Crops

Crop	Monsoon		Post-Monsoon	
	% of growers	ave area	% of growers	ave area
Rice	20.4	2.6	5.9	1.4
Sesame	34.7	5.0		
Groundnut	19.7	5.9	28.0	3.6
Pigeon pea	17.5	3.3	9.9	3.6
Chil	3.2	2.2	2.0	2.1
Green Gram			13.5	5.0
Chickpea			11.2	2.4
Onion			12.2	1.2

Source: LIFT Baseline Survey, 2012

As shown in Table 1 above, the LBS found that, for the monsoon season, sesame was the most widespread crop, being grown by 35 percent of all those with agricultural land. Rice and groundnut were second, being grown by 20 percent of farmers. Pigeon peas were also important by the number of growers, being found on almost 18 percent of farms. For post-monsoon crops,

groundnut was the most important, with 28 percent of farmers, followed by green gram, onion and chickpea. It is notable that sesame, the most important monsoon season crop, does not appear among the most significant post-monsoon crops.

According to the LBS, intercropping in the Dry Zone is extensive, with 77 percent of chili, 70 percent of sesame, 67 percent of pigeon pea and 58 percent of groundnut intercropped during the monsoon season. Lower, but still significant, levels of intercropping were found for post-monsoon crops. Animal traction is used by over 90 percent of farmers for all major crops. However, use of production inputs varies. Only in some of the vegetables did improved seed use exceed 15 percent, with rates for many crops less than 10 percent, while herbicides were used by less than 5 percent of growers, again with the exception of vegetables. Use of fertilizers was much higher. Inorganic fertilizers were applied by 50 percent or more of all growers (reaching 87 percent for sesame) for all crops except post-monsoon chickpea (35 percent) and organic fertilizer usage was even higher, reaching 100 percent for some crops.

Probably largely as a result of water scarcity and the low rates of improved seed use, current agricultural productivity levels within the non-irrigated areas are low – from one quarter to one half of the yields obtained for the same crops in China, for example[8].

Livestock comprise an important element in the Dry Zone production systems: Cattle, with their essential role in land preparation and transport, were the most common animal, being held by nearly one-half of all farmers, but chicken were also widespread (see Table 2 below). Small ruminants were much less commonly owned. Ducks, buffalo and horses were virtually absent.

Table 2: Dry Zone - Frequency of Ownership and Numbers of Livestock Held

Species	% of farmers	ave number
Cattle	49	3.5
Chickens	46	10.2
Pigs	20	2.3
Goats & Sheep	7	15.6

Source: LIFT Baseline Survey, 2012

Nevertheless, it is worth noting that few animals are slaughtered or eaten at village level, and most animals are kept as a saleable asset in case of need.

2.3 Marketing and Credit

The marketing of crops is very widespread, even among those households holding less than one acre of land: the LBS reports that 70 percent of this group sold at least part of their output and rates are higher for households with more land. Yet nearly 90 percent of all households sold their crop within one month of harvest and only around 10 percent participation in group marketing activities.

The use of credit is widespread within the CDZ; the LBS found that 83 percent of respondents had taken a loan in the last 12 months. However, the cost and utilization of such loans varies widely by source. Loans from the Myanmar Agricultural Development Bank (MADB) are heavily

[8] FAOStat

subsidized, at 0.7 percent per month, but less than one in five LBS respondents who borrowed had obtained one. MADB loans are almost entirely limited to agricultural production – thus excluding the landless. The maximum amount lent under current MADB policies (approximately USD20/acre for non-rice crops) is well below input costs. By contrast, 70 percent of borrowers had taken loans from moneylenders or shopkeepers, who charge interest rates of 5-10 percent per month or more. Often such loans are not taken for productive purposes; among those with less than 2 acres, the primary use of loans was for food purchase. The need to borrow such high cost funds for family food needs not only reduces resources for production but also appears to be giving rise to increasing indebtedness over time, according to the LBS.

Some communities are served by microfinance institutions (MFIs) or cooperatives, which usually charge interest rates in the range of 2.5 percent per month and offer a broader range of uses than MADB[9], but the LBS found that less than one third of borrowers had accessed these loans; a reflection of the limited coverage of these institutions. There are relatively few genuine community-based savings and credit associations (SACs) although both MADB and the MFIs use village groups. Despite the high cost of much rural finance, repayment rates on loans are reported to be very high. However, according to the LBS, more than 20 percent of Dry Zone households owed over Kyat 400,000 – more than 4 months income for the 84 percent of farmers with incomes below Kyat 100,000 month – and debt was reported to be increasing across all income levels.

3. Target Area Characteristics

The target area considered during the mission comprised six townships, four within the Mandalay Region (Myingyan, Taungtha, Natogyi and Mahlaing) and a further two in Magway Region (Pakokku and Yesagyo)[10]. This equates to approximately one half of the townships (13) in these two regions[11]. While the initial focus at inception was upon the Mandalay townships, there was strong interest in LIFT to include at least one Magway township in order to facilitate collaboration with 3MDG activities that are expected to encompass these latter townships within their implementation area.

Much of the information below derives from the initial Scoping Mission conducted in January/February 2014 and a subsequent detailed survey of the six townships conducted for FAO during September/October of the same year. Together the 42 communities surveyed amount to only around 3.5 percent of the total of 1,210 rural villages registered in the six townships, although the samples were taken only from communities without extensive irrigation facilities, which excluded perhaps one third of the total, as they are located along waterways or within major irrigation schemes. The full survey results (from both the missions) are provided in a separate document[12] which permits a more detailed analysis in specific areas and is considered to comprise an important data base for future use. However, it should be noted that not all of the statistical analysis in the following section is drawn from the full 42 samples, as the data

[9] Including, in the case of PACT, a form of insurance covering death serious illness or crop failure.

[10] The translation of Myanmar place names into English varies considerably. This report has used the naming system adopted by the Myanmar Information Management Unit (MIMU), operated by the UN Joint Agencies.

[11] Both Magway townships fall within the Pakokku District. However, while three of the Mandalay townships are part of the Myingyan District, Mahlaing Township forms part of the Meiktila District.

[12] *Dry Zone Development Program Field Survey Results, 2014*

subsequently collected on the 30 communities is more detailed and not always comparable with that collected earlier.

Table 3: Villages per Target Area Township

Township	# Villages/1
Pakokku	197
Yesagyo	212
Magway Total	**409**
Myingyan	165
Taungtha	228
Natogyi	182
Mahlaing	226
Mandalay Total	**801**
Target Area Total	**1,210**

1/ Excludes villages within marked township urban capital area

Source: Myanmar Information Management Unit
UN Resident Team (http://www.themimu.info/)

It should also be stressed that much of the information gathered by the surveys relates to the entire village (e.g. crop area, yields, use of inputs, etc.) and cannot therefore be used to analyze differences between individual producers. This is unfortunate, but the collection of data on individual households would have required considerably more time and resources than were available. However, as a result, care should be taken in interpreting the results. For example, when a community reports the use of fertilizer or the provision of healthcare for livestock, this may be the general pattern, but it is probable that poorer households do not have the resources to participate in these activities.

Little statistically valid information is available in Myanmar with respect to poverty levels at the level of individual townships. However, on a regional basis, recent survey data[13] indicates that rural poverty levels in Mandalay and Magway, at 31.6 percent and 28.2 percent respectively, are close to national averages (29.2 percent). Both Regions improved significantly in the five years since the last IHLCS in 2005, when estimated poverty levels for both regions were in the region of 44 percent.

Township officials interviewed estimated that, on average across the six townships, 27 percent of villages would be classified as poor, although the lack of either a standard definition or a statistical basis for the estimation renders the estimates open to argument. Interestingly, however, Pakokku officials placed 60 percent of their villages in the poor category (see Table 4); far higher than for any of the other townships.

[13] *Integrated Household Living Conditions Survey in Myanmar (2009-2010). Poverty Profiles*. UNDP. June 2011

The six reviewed townships had a total rural population of almost 1.2 million in 2011, of a total for the two regions of 7.5 million. Just over 63 percent of rural inhabitants were female[14]. Rural population per township varied from a minimum of almost 141,000 in Mahlaing to a maximum of 229,000 in Yesagyo.

Table 4: Summary Target Area Township Data

Characteristic	Myingyan	Natogyi	Taungtha	Mahlaing	Pakokku	Yesagyo	Total
Total Population	276,190	196,874	240,607	157,674	292,700	234,992	1,399,037
% Rural Population	52%	93%	93%	92%	71%	90%	80%
Number of Villages	186	193	243	247	264	245	1,378
% Villages Deemed to be Poor	27%	21%	31%	n.d.	60%	19%	27%
Total Cropped Area (ac)	164,830	222,044	235,871	180,543	135,450	314,800	1,253,538
Total Irrigated Area (ac)	5,600	6,842	102,414	2,584	9,394	39,249	166,083
% of Cropped Area Irrigated	3.4%	3.1%	43.4%	1.4%	6.9%	12.5%	13%
Poverty Definition[2]:	Low per capita income; irregular agricultural output; many casual labourers; lack of technical knwledge;						
Poorest Villages[1]:	Lack of access to irrigation water; limited job opportunities; poor soils quality; dependance solely on agriculture						
Poorest Households[1]:	Households with no farmland; large households with many dependents; female-headed households; few members employed, lack of financial capital						
Village population[2]	404-3,032	406-1,036	862-1,552	308-2,292	393-1,015	454-920	
Range of Landless Households[2]	35-74%	46-68%	68%	4-92%	26-70%	28-84%	
Range of Poorest Households[2]	37-83%	50-62%	9-37%	9-40%	20-44%	16-46%	

1/ In order of stated importance
2/ From survey villages

3.1 General Village Characteristics

Of the 42 villages examined in detail, **population** size ranged from just over 300 to almost 2,300, averaging 183 households per community (see Table 5). The proportion of landless households varied widely, from only 4 percent to 92 percent (both in Mahlaing Township), but averaged 56 percent.

A similar strong variation existed in the proportion of **poorest households** in each community[15]. According to village elders and administrators interviewed, this ranged from just under 10 percent (Mahlaing) to over 80 percent (Myingyan) and averaged 24 percent across all surveyed communities. The average proportion of female-headed households was 30 percent.

The number of **landowners** and the extent of **land farmed** per village varies widely (see Table 5), but averages 146 farming households with 640 acres per village. If these two figures are correct, this implies an average farm size of 4.4 acres/household, but respondents provided figures indicating an average farm size of 6.9 acres/household. Stated average household farm sizes per community varied from 1.5 acres in a village in Natogyi to 28 acres in Taungtha, while total community farmed areas ranged from 35 acres in Pakokku to 2,400 acres in Taungtha.

The proportion of **household income** derived from different activities is shown in Table 5. It can be seen that major crops provided just over one quarter of all income, with another 16 percent from livestock sales and just over 20 percent from agricultural labor. Off-farm employment, remittances and the production of handicrafts contributed a further 10 percent each. Income from the production of vegetables was insignificant, at around 3 percent. However, there was significant variation between villages. One village derived half of all income from livestock sales, while another received one third of total income from handicraft sales. The proportion of income derived from off-farm labor ranged from zero to 40 percent. One village in Myingyan Township stated that 80 percent of all household income derived from agricultural labor.

As might be expected from the very limited community production of rice, the preferred staple, the proportion of total income devoted to **expenditure** on food varied according to income level.

[14] *Township Health Profile 2011*. Department of Health Planning, Ministry of Health
[15] Self-defined by community respondents

Those households with the highest incomes were estimated to spend less than one quarter of total expenditure on foodstuffs. This rose to two thirds for the poorest households. Wealthier households expended much of their income on their agricultural holdings, but this category was negligible for the poorest families.

Table 5: Target Area Village Data Summary - General

Characteristic	Number	% or ave	Characteristic	Number	% or ave
Total Households	7,502	183 ave	Non-farm eployment[/1]		
FHH		30%	- Weaving/textiles	44	0.6%
Landless HH		56%	- Carpentry/woodwork	322	4.3%
Proportion of HH classified as poorest		24%	- Machinery/metalworking	18	0.2%
			- Pottery/Brickmaking	95	1.3%
Cropping pattern (acres):			- Food processing (incl jaggery)	58	0.8%
Annual crops	31,256	66%	- Restaurant/cafe	105	1.4%
Subsidiary crops	13,018	28%			
Perennial crops	278	0.6%	**Services** (villages receiving)		
Pasture	323	0.05%	Agricultural extension	24	80%
Total farmed area	47,314	100%	Animal health	17	57%
Irrigated area (% of total farmed area)	2,196	4.7%	MFI credit	26	87%
			MADB credit	29	97%
Woodlot (villages)	11	37%	Irrigation	14	47%
			Electricity	15	50%
Income sources (of total income):			Domestic water supply	3	10%
Major crops		25.7%	Latrines	17	57%
Vegetables		3.3%	Primary school	29	97%
Livestock		16.3%	Self-Reliance schemes	22	73%
Handicrafts		9.2%			
Agricultural labour		21.3%	**Community Organizations** (villages)		
Off-Farm Employment		10.5%	VDC	28	93%
Remittances		9.60%	Credit association/group	24	80%
			Marketing group/cooperative	18	60%
Expenditure on food			Revolving fund	5	17%
Above average HH		24%			
Average HH		42%	**Under-Nutrition** (villages)		
Poorest HH		67%	Occurring sometimes in children under 5	16	53%
			Training or support in nutrition (last 3 yrs)	10	33%
Migration					
HH with seasonal migrant workers		26%	**Any other form of training received**	15	50%
Seasonal/short term migration					
- male		41%	**Community Priorities**		
- female		32%	Availability of water (primarily for domestric use)	18	60%
- below 15 yrs		12%	Irrigation water	7	23%
- male & female		2%	Financial services	15	50%
Long term migration			Roads/bridges	10	33%
- households		12%	Education (incl infrastructure)	9	30%
- male		43%	Electricity	8	27%
- female		30%	Health services	7	23%
- below 15 yrs		6%	Employment skills/opportunities	3	10%
			Market support/services	2	7%

1/ Other off-farm eployment noted included cigar rolling, mason, gold mine worker, casual labourer, livestock care and well digging

As might be expected given the above figures, over 50 percent of communities stated that **under-nutrition** occurred sometimes among children under five years of age, but only one third had received any **training** or support in nutrition during the last three years. In fact, only one-half of all communities surveyed had received training of any form in this period.

Migration was a common feature across almost all villages surveyed. One community in Myingyan stated that there were no seasonal migrants at all, but in Natogyi, one village reported that 84 percent of households had at least one member engaged in seasonal migrant work. On average, just over one quarter of all households (26 percent) were identified as including a seasonal migrant. While male migration was more common, female migration was also frequent. Child migration (below 15 years of age) was also observed in over 10 percent of households.

Long-term migration (2 years or more) was less common, occurring in an average of 12 percent of all households.

Off-farm employment in the surveyed communities takes many forms, but is seen in little more than 10 percent of all households in total. The most common form of off-farm employment found by the field survey was carpentry – accounting for nearly half of all off-farm employment although employment in such areas as restaurants and cafes, pottery and brickmaking, food processing (including the manufacture of jiggery) and cattle raising, were also significant. Most employment did not require migration, but work in gold mines was a major exception.

The surveyed communities were perhaps surprising well served by **government and other services**. Almost all villages had access to MADB credit and a primary school, and more than 80 percent stated that they received agricultural extension and MFI services. Half had electricity, but domestic water supply was available to only 10 percent of communities.

Within the communities surveyed, over 90 percent had **Village Development Committees** (VDCs), although interviews with Township level officials indicated that many were not active. According to informants, 80 percent of surveyed villages had credit groups or associations and 60 percent had marketing groups and cooperatives. Not all will be active.

3.2 Crop Production

According to Township Planning Office records, the total land area classified as agricultural across the six townships is estimated at 1.7 million acres, varying from a maximum of 325,000 acres in Taungtha to a minimum of 240,000 acres in Myingyan. In total, 1.25 million acres were cropped. Total irrigated area was recently estimated by the International Water Management Institute (IWMI) as in the region of 5,000 acres per township, with the exception of Taungtha, which had nearly 11,000 acres[16]. However, figures provided by the six township authorities placed irrigated acreage at a total of 166,000 acres (of which 102,000 acres in Taungtha - see Table 6). Thus, an average of 13 percent of cropped land in the six target townships is estimated to be irrigated[17].

By far the most important crop in terms of harvested area within the six townships is monsoon season sesame, which accounts for an estimated 456,000 acres, or almost half of the entire cropped area[18]. Other important crops by harvested area include pigeon pea (264,000 ac), groundnut (145,000 ac), green gram (137,000 ac) and sorghum (128,000 ac). As a consequence of selecting townships where there were few extensive irrigation systems, rice accounted for less than eight percent of the total cropped area.

These township level numbers were largely borne out by the results of the village surveys (see Table 6). Although **sorghum** was cropped in 93 percent of surveyed villages, the area harvested (averaging 121 acres/village) was considerably less than that for **sesame** (301 acres) which was cultivated by 90 percent of all communities, or even for **pigeon pea** (225 acres), cultivated by 87 percent of the surveyed communities. **Groundnut** cultivation was widespread, occurring in 87

[16] *Water Resource Assessment of the Dry Zone of Myanmar. Final Report for Component 1*. Mathew McCartney et al. IWMI. LIFT. 2013 (undated). Note that no estimate was provided for Mahlaing.

[17] As is discussed later, in the surveyed villages the irrigated area averaged less than 5 percent of farmed area, but the survey communities were selected in part for the absence of significant irrigation infrastructure.

[18] Extensive double cropping, however, means that this is not almost half of all harvested area.

percent of villages, but the acreage grown, at 111 acres, was less. The other important crop was **cotton**, which although grown in only 50 percent of the villages, averaged 121 acres in extent. **Rice** – as would be expected given that surveyed villages were selected to exclude those with substantial irrigation systems – was grown in little more than one third of all villages, but with an average of 151 acres. **Vegetables** were of surprising limited importance and were cultivated in only 37 percent of villages, with an average area of only 14 acres. Other significant crops within the survey area included green gram (67 percent of communities) and chickpea (53 percent of communities). Both averaged around 50 acres/village.

Table 6: Target Area Village Data Summary - Crop Production

Characteristic	No. or %	Notes
Average Farm Holding (ac)	6.9	Range: 1.5 ac (Nahtogyi) - 28 ac (Taungthar)
Number of HH/village with agricultural land	146	Range: 20 HH - 2,010 (both villages in Pakkoku)
Total agricultural land holding of the village	640	Range: 35 acres (Pakkoku) - 2,400 acres (Taungthar)
Key Crops (in order of average harvested area)		
Sesame		
Frequency of village cultivation	90%	
Average harvested area (ac)/1	301	Range: 5ac (Myingyan) - 1,970ac (Mahlaing)
Percent irrigated	0.3%	
Average yield (Kg/ac)/2	59	Range: 0 kg/ac (Nahtogyi) - 314 kg/ac (Myingyan)
Use of fertilizer	44%	
Use of manure	48%	
Sale of output	78%	All villages in Taungthar used output on-farm
Pigeon Pea		
Frequency of village cultivation	87%	
Average harvested area (ac)	225	Range: 3 ac (Yesagyo) - 1,920ac (Pakkoku)
Percent irrigated	0%	
Average yield (Kg/ac)/1	87	Range: 0 kg/ac (Nahtogyi) - 314 kg/ac (Myingyan - where generally high yields)
Use of fertilizer	27%	
Use of manure	54%	
Sale of output	100%	
Cotton		
Frequency of village cultivation	50%	Prodn. Concentrated in Taungthar, Pakkoku and Mahlaing
Average harvested area (ac)	121	Range: 5 ac (Pakkoku) - 473 ac (Taungthar)
Percent irrigated	0%	
Average yield (Kg/ac)/1	98	Range: 49 kg/ac (Pakkoku) - 652 kg/ac (Yesagyo)
Use of fertilizer	47%	
Use of manure	33%	
Sale of output	100%	
Sorghum		
Frequency of village cultivation	93%	
Average harvested area (ac)	121	Range: 6 ac (Pakkoku) - 510 ac (Taungthar)
Percent irrigated	0%	
Average yield (Kg/ac)/1	120	Range: 0 kg/ac (Nahtogyi) - 418 kg/ac (Myingyan - where generally high yields)
Use of fertilizer	25%	
Use of manure	50%	
Sale of output	89%	
Ground Nut		
Frequency of village cultivation	87%	
Average harvested area (ac)	111	Range: 5 ac (Yesagyo) - 378 ac (Taungthar)
Percent irrigated	0%	
Average yield (Kg/ac)/1	581	Range: 0 kg/ac (Nahtogyi) - 1,045 kg/ac (Myingyan)
Use of fertilizer	62%	
Use of manure	15%	
Sale of output	96%	Only village not selling output grew only 5 ac
Rice		
Frequency of village cultivation	37%	
Average harvested area (ac)	151	Range: 5 ac (Myingyan) - 237 ac (Yesagyo)
Percent irrigated	25%	
Average yield (Kg/ac)/1	580	Range: 523 kg/ac (Nahtogyi & Mahlaing) - 1,881 kg/ac (Myingyan & Yesagyo)
Use of fertilizer	91%	
Use of manure	9%	
Sale of output	27%	
Vegetables		
Frequency of village cultivation	37%	
Average harvested area (ac)	14	Note: 100 ac of 157 ac total from one village in Myingyan
Percent irrigated	3%	
Average yield (Kg/ac)/1	50	Note: Village noted above averaged over 2,000 kg/ac
Use of fertilizer	0%	
Use of manure	45%	
Sale of output	27%	
Chickpea - Average area harvested (ac)	54	53% of villages harvested Chickpea
Green Gram - Average area harvested (ac)	51	67% of villages harvested Green Gram
Sunflower - Average area harvested (ac)	57	20% of villages harvested Sunflower
Tomato - Average area harvested (ac)	7	37% of villages harvested Tomato
Chili - Average area harvested (ac)	30	27% of villages harvested Tomato

1/ Average harvested area per village
2/ Average yields are weighted by area

However, such averages obscure considerable **village-to-village variation**. The acreage of sesame, for example, ranged from 5 acres in one village in Myingyan to nearly 2,000 acres in another village in Mahlaing. Similarly, pigeon pea cultivation varied from 3 acres in a village in Yesagyo to nearly 2,000 acres in a village in Pakokku. Of the total of 157 acres of vegetables grown across all surveyed villages, 100 acres derived from a single village in Myingyan, presumably supplying Mandalay commercially, while almost all cotton was grown in Taungtha, Pakokku and Mahlaing.

Such factors as the availability of land, water and local microclimates, as well as commercial opportunities influence such variation.

Yields of these crops also showed wide variation (see Table 6)[19]. In some villages in Natogyi in particular, crops had failed entirely within the past year, particularly in the case of sesame, sorghum, pigeon pea and groundnut. In other communities, however, much better harvests were obtained. These same crops generally yielded well in Myingyan, while rice yields ranged from just over 500 kg/acre in some Natogyi and Mahlaing communities, to nearly 2,000 kg/acre in Myingyan. Cotton yields were particularly low in Pakokku communities (averaging only 59 kg/acre), but achieved an average of 625 kg/acre in Yesagyo.

In addition to land, water and climatic factors, yield variation may also be linked to the use of agricultural inputs, although here the difference may well not be predominantly locational so much as dependent upon the income level of the individual farmer. Almost all villages producing rice used inorganic **fertilizer**, as did around half of those growing sesame, cotton and groundnut, but fertilizer use was uncommon on pigeon pea or sorghum, and there was no recorded case of fertilizer applied to vegetables at all. Where inorganic fertilizer was not applied (and often even when it was) farm manure was usually used. This was particularly the case for pigeon pea and sesame (approximately half of all surveyed communities), but manure was also used by one third of cotton growing villages. Surprisingly, despite not using fertilizer, only slightly less than half of vegetable producing communities applied manure.

Because few of the communities surveyed grow significant quantities of rice, the preferred staple, most crops are intended for the **market**, and are usually sold through visiting brokers (or sometimes to traders) who travel to the villages. Only rice and vegetables (both 27 percent marketed) are grown predominantly for home consumption, although other crops such as sorghum and sesame may be partially retained for family or livestock use. It is worth noting that – unusually - all villages surveyed in Taungtha Township retained their sesame for household use. The reason for this unusual pattern is not apparent, but they may be processing the oil seed within the community.

3.3 Livestock

Livestock constitute an important resource across almost all communities surveyed within the target area (Table 7). Cattle were present in all but one of the communities surveyed, and poultry in all but two. Pigs and goats were also present in the great majority of villages. Sheep, however, were present in only just over half the villages and horses and ducks were much less common, being found in only two villages each.

Table 7: Target Area Village Data Summary – Livestock Production

[19] In a few cases, survey results showed extremely high numbers for a particular village. These few cases (never more than one village per characteristic) have been discarded from the analysis, but are still shown in the complete survey data.

Characteristic	No. or %	Notes
Cattle		
Proportion of villages holding these animals	97%	
Average number per village	297	
Main purpose		
Draught	79%	
Milk	3%	Single village in Nahtogyi - also listed sale
Sale	31%	Almost half of these villages did not list draught as well
Sold to visiting buyers	34%	
Villages feeding supplements to animals	90%	In addition to grass (includes corn cobs, oil cakeremains of pea and bean plants
Proportion receiving healthcare	83%	
Proportion provided with housing	93%	
Villages reporting deaths in last 3 years	55%	Reasons listed as lameness, digestive, and respiratory problems
Sheep		
Proportion of villages holding these animals	57%	
Average number per village	212	
Main purpose - sale	100%	
Sold to visiting buyers	100%	
Villages feeding supplements to animals	0%	All are fed at pasture
Proportion receiving healthcare	76%	
Proportion provided with housing	100%	
Villages reporting deaths in last 3 years	24%	Reasons listed as diarrhea, cold and heavy rain
Goats		
Proportion of villages holding these animals	83%	
Average number per village	375	
Main purpose - sale	100%	
Sold to visiting buyers	96%	
Villages feeding supplements to animals	0%	All are fed at pasture
Proportion receiving healthcare	64%	
Proportion provided with housing	96%	
Villages reporting deaths in last 3 years	44%	Reasons listed as diarrhea, cold, rain, enterotoxemia
Pigs		
Proportion of villages holding these animals	90%	
Average number per village	56	
Main purpose - sale	100%	
Sold to visiting buyers	100%	
Villages feeding supplements to animals	100%	Bran, , oil cake, leftover rice,
Proportion receiving healthcare	81%	
Proportion provided with housing	81%	
Villages reporting deaths in last 3 years	22%	Reasons listed as swine flu, diarrhea, fever and 'common' illness
Poultry		
Proportion of villages holding these animals	93%	
Average number per village	979	
Main purpose - sale	79%	
Mian purpose - meat/home	21%	
Sold to visiting buyers	79%	Remainder not sold
Proportion of villages feeding animals	61%	Rice & maize are principal foods. One village reported using commercial feed.
Proportion receiving healthcare	18%	
Proportion provided with housing	14%	
Villages reporting deaths in last 3 years	57%	Generally given as due to 'common' chicken disease
Ducks - Proportion of villages	7%	Both in Myingyan
Horses - Proportion of villages	7%	One village each in Myingyan and Taungthar

Despite their widespread presence across the target area, the surveys indicate that **cattle** populations per village are lower in the Magway townships than in those in Mandalay region. In Pakokku, villages averaged under 100 animals and in Yesagyo less than 150, in comparison with an average of over 300 per village in the Mandalay townships. Draught work comprises the most common principal purpose for cattle, being chosen by almost 80 percent of villages, but almost one-third also listed sale and a single village in Natogyi stated that dairy was the main function of their animals[20]. Perhaps unsurprisingly, given their value, cattle appear to be generally well taken care of. Some 90 percent or more of villages provided supplemental feeding (particularly maize cobs and oil cake) and housing, and more than 80 percent healthcare. Nevertheless, more than half

[20] Respondents could select more than one purpose.

of all surveyed villages reported cattle deaths in the last three years (due to lameness and digestive and respiratory problems)

Presumably as a reflection of their low value, **poultry** receive much less attention than cattle. With a population averaging nearly 1,000 birds per village, few were provided with housing or healthcare, although 60 percent of villages reported that they provided supplemental food in the form of maize and rice. Only a single village reported using commercial poultry feed. Despite the lower level of care, the losses suffered by poultry were very close to those for cattle, at 57 percent of communities experiencing death of birds over the last 3 years. Although 80 percent of villages reported that poultry was raised primarily for sale, over 20 percent stated home use or meat as their main objective.

Pigs were the third most widespread domestic animal in the surveyed villages, although populations are much lower – averaging only 56 per community. Pig numbers are greatest in Taungtha and Mahlaing townships. In part, the lower populations are a result of the need to feed pigs; all communities reported supplemental feeding of their pigs with bran, oil cake and rice. This is possible only for the more wealthy households and is confirmed by the fact that over 80 percent of villages stated that both healthcare and housing was provided. Mortality appeared noticeably lower than for cattle or poultry, although this also reflect the lower populations; only 22 percent of communities reported the death of a pig over the last three years. All villages reported that pigs were raised for sale and some communities saw pig raising as a form of savings – exchanging small daily or weekly expenditures for a significant sum when the animal was sold.

In one third of the villages reporting sheep, respondents were unable to separate out the numbers of **sheep and goats** and provided a combined number. It is therefore likely that the number of sheep given in Table 6 is over-reported and goat numbers correspondingly under-reported. Even ignoring this potential error, however, it is clear that goats are much more important in the target area than sheep, with over 80 percent reporting their presence in the community. Sheep occur in just over half of the surveyed villages. Although widespread, sheep and goats are found in greater numbers in villages in Mahlaing, Taungtha and Pakokku than in the other townships

Both sheep and goats are provided housing in almost all communities and the majority also provide healthcare to these animals. However in none of the villages was supplemental feeding provided to either sheep or goats, and all are raised for sale.

3.4 Water, Sanitation and Soils

Just under a half of the communities surveyed had **irrigation**; averaging 70 acres per community with irrigation (see Table 8). Five of the communities were able to access irrigation infrastructure and water from larger schemes, using ditches to supply the water, but most relied on pumped supplies, generally from local reservoirs or ponds. Two communities used boreholes for irrigation.

Irrigation systems in use are almost equally split between those developed by government and those established by private actors. Only one village had an irrigation system provided by an NGO. Most irrigation is used for rice production and all irrigation is flood type; no sprinkler or drip irrigation schemes were present in the surveyed villages.

Water supply for domestic and livestock use derives from a mixture of tube wells, dug wells and ponds. A total of 24 villages (80%) had functioning tube or dug wells, with an average of 71 per

village, but only approximately one third possessed reservoirs or tanks. The tube and dug wells were generally able to provide water 12 months per year, but the ponds and reservoirs lasted on average only 6-7 months, drying up for most of the dry season.

Less than half of respondent villages classified the quality of the water accessed as good, and four villages (17 percent) stated that the water derived from wells was not fit for drinking. Rainwater was collected by at least some households in 80 percent of all communities and was used both for drinking and household gardens. On average 24 households per village collected rainwater, although it was more common in Myingyan and Yesagyo.

Table 8: Target Area Village Data Summary – Water, Sanitation and Soils

Characteristic	No	% or ave	Notes
Communities with irrigation systems	14	47%	
Irrigated area (acres)	996	71 ave	3.1% of cropped area is irrigated
Type of irrigation			
Pump	8	57%	
Ditch	5	36%	
Tubewell	2	14%	
Comprising part of a larger scheme	5	17%	
Key irrigated crops			Principally rice, but some vegetables
Funding for system			
Government	6	43%	
NGO	1	7%	
Private	7	50%	
Water Supply (by village)			
Number of villages with working wells	24	80%	
Number of wells (incl tubewells) in community	2,116	71 ave	Range: 0 (Nahtogyi/Thaungtar - 150 (Myingyan)
Months usable	12		Except one village (8 mos) in Mahlaing
Water quality			
- Good	11	46%	
- Moderate	9	38%	
- Not good for drinking	4	17%	
Ponds			
Number of villages	24	80%	
Number of ponds	88	3.7 ave	Range: 0 to 22 (Nahtogyi)
Months of use		7.1 ave	Range: 1-12 months
Reservoirs/Tanks			
Number of villages	11	37%	
Number of reservoirs	167	15 ave	Range: from 0 to 70 (Myingyan - all tanks)
Months of use		6 ave	Range: 1 to 12 months
Dug Wells			
Number of villages	23	77%	
Number of wells	550	24 ave	Range: from 0 to 120 (Myingyan)
Months of use		12 ave	All 12 mos except 2
Rainwater storage (villages)	19	63%	
Average number of houses/village	24		Range: 1 to 70 (Myingyan and Yesagyo)
Latrines			
Villages with latrines	30	100%	
Number (households)	3,314	44%	
Soil erosion/land conservation a problem			
Villages identifying significant soil problems	11	37%	Many problems said to arise from land left uncultivated due to lack of water

Only five of the surveyed villages had no problems with water, although the severity of the issues faced in the other communities varied widely. Water quality was a common complaint, and many villages wished to increase the number of wells, but were constrained by a lack of capital. The absence of a distribution system for water within the village was frequently also mentioned.

All villages surveyed possessed at least some **latrines**. On average, just under half of all households had access to a latrine.

Soil erosion and land conservation was identified as a problem by 37 percent of villages surveyed. The most common complaint was issues arising from being left fallow due to lack of water, although erosion was occasionally mentioned.

3.5 Marketing and Services

Current **marketing systems** for agricultural products and livestock within the area generally function well, and marketing a significant concern in only a few of the communities surveyed. Most output – both crops and livestock - is sold at village level to visiting buyers or brokers and then traded through local commodity exchanges at low commission rates or, in the case of cattle, through township markets. Livestock markets operate in all six townships and four also have agricultural markets. All townships except Natogyi have commodity exchanges.

Little storage or processing of harvested crops occurs at village level, although rice is held in silos in some villages, as most output is sold directly after harvest in order to pay back loans or meet immediate cash needs. Prices of key food crops rise over the dry season but, given the current cost of financing, it is not clear that local storage would result in benefits for producers.

All six townships within the target area are staffed by planning officers, agricultural officers and livestock officers, and four also have water specialists. Only Pakokku has a marketing specialist and Taungtha and Yesagyo have community development specialists.

All townships except Myingyan have access to **financial services** through at least one bank, although the number varies widely. Pakokku has a total of 14 banks (11 private) while Natogyi has only two (both state-owned). Microfinance activities were recorded in all townships, although none had more than two organizations active in microfinance; typically either PACT or a cooperative. A greater variation was observed in the number of non-finance NGOs operating in the townships, with Taungtha and Yesagyo recording only one each. Pakokku, by contrast, recorded eight active NGOs. It should be noted, however, that there did not appear to be a standard classification of NGOs, and this range may in part reflect the attitude of the Township Planning Offices to classifying organizations within their jurisdiction.

3.6 Target Area Farming Systems

The types of farming systems developed by target area households are influenced by a number of factors, including average holding size, labour availability and access to finance, but no factor is as important as water availability. Furthermore, the general descriptions of farming systems presented below should be understood to represent points along a continuum, rather than discrete systems and although presented on a community basis, different elements will often be found within a single community according to household access to the factors above.

Where **sufficient water** is available for irrigation purposes, the production of rice – the principal food staple in most of Myanmar – predominates. Paddy production will often be followed by a subsidiary vegetable crop or where irrigation cannot continue during the dry season, a crop such as groundnut grown on residual moisture. Livestock will play a limited role but many households will keep cattle for draught purposes, as well as poultry for eggs and sale. In a few cases, the commercial production of vegetables such as onion and tomatoes for sale in nearby towns will occur at the expense of some of the paddy area, but these are generally isolated cases and rice will continue to remain important for household consumption. Migration and other forms of off-farm

employment may well occur, but would generally be limited to those households with limited access to land as communities with adequate water resources will be comparatively wealthy. As the target communities assessed for the Scoping Report were intentionally selected to exclude those with significant irrigated areas, no examples of this farming system were found in the surveys undertaken.

Where only **limited irrigation water** is available, paddy will still be grown but, if cultivatable land is available, there will be an evolution towards supplementing the rice with increased areas of rain-fed crops, particularly oil seeds (sesame and groundnut, sometimes sunflower) and pulses such as pigeon pea, chickpea and green gram. Livestock will typically grow in importance as an alternative income source, particularly small ruminants. Where resources are available or there are markets nearby, individual communities may develop non-agricultural specializations such as weaving, pottery or other forms of handicrafts. Seasonal migration for employment will increase in importance and average household holding sizes will tend to increase.

Where **few, if any, irrigation sources** are available, rice production becomes much more difficult and will probably be limited to a few acres on seepage areas below ponds or in low-lying areas where moisture is naturally captured. Oil seeds and pulses become the dominant crop and may be accompanied by the production of cotton where the land is suitable and holdings are large enough. Livestock becomes a major contributor to household livelihoods. This is especially the case for communities where average land holdings per household are small. Households with larger holdings and greater resources may focus on cattle production (as occurs in Taungtha). Agricultural wage labour and seasonal and even long-term migration for employment become increasingly important elements in the livelihood pattern, rendering labour intensive crops (such as rice) even more difficult and pushing households further towards a reliance on grazing livestock which require few inputs or labour. Communities facing these circumstances will often also have to dedicate significant labour effort to the collection and transport of water for themselves and their livestock.

3.7 Key Constraints and Opportunities

Despite the lack of evidence for reducing levels of rainfall in the CDZ, it is apparent that most communities in the target area face increasingly severe problems in making a living from agricultural operations. Furthermore, the data collected by the field surveys probably overstates the use of inputs and services (and hence outputs) by considering only community level responses. Where possible, therefore, the survey findings have been augmented with the LBS and other sources considering conditions across the Dry Zone as a whole.

Constraints:

- **Water** is clearly the most significant constraint facing the majority of Dry Zone producers and households. Even those communities fortunate enough to form part of a larger irrigation scheme are likely to have households with little or no access to irrigated land.
- Lack of **access to land** is a widespread constraint to development and poverty reduction in many target area communities. More than half the households in the survey villages had no agricultural land. For them, agricultural labor and migration offer the only widely available opportunities for a livelihood.

- **Input use** for crop production is moderately high in the case of fertilizers (organic and inorganic), but very low for improved seed, severely limiting the genetic potential of the crops sown. While shortages of financing may play a major role in this low usage rate, the limited availability of suitable seed and, even more importantly, the inability of many poorer farm household to assume the risk involved in purchasing such seed, are probably key factors.
- Most households with land appear to own cattle. For poorer and landless households, however, the raising of **small ruminants and poultry** provide an important source of income. However, only cattle and pigs are widely provided with food, and although quantitative data is lacking, it is likely that poorer households also cannot afford access to veterinary care or even housing. Few communities have access to forest areas, and improved pastures are still largely unknown. These factors constitute an important constraint to improved livestock productivity.
- The **employment off-farm by** family members in 55 percent of area households is undoubtedly important to household incomes for many poorer families, but may comprise a serious constraint to labour availability for agriculture. This also is likely to apply to the high percentage of households engaged in casual agricultural labour, as the period of peak demand for their services is likely to coincide with needs on their own holdings, if they have land of their own.
- According to the LBS, some 70 percent of households in the Dry Zone have taken loans from unofficial sources (money lenders, traders, etc.) at rates ranging from 5-10 percent per month, indicating a continuing shortfall in accessible and timely credit provision for rural households. This high level of high-cost borrowing is probably, in turn, linked to the high level of **indebtedness** found among households. With a quarter of all households owing debts equivalent to more than 4 months of total household income, this situation imposes a major constraint on future investment and development.

Opportunities:

- An improved **knowledge of the location, quality and sustainable yield of water resources**, particularly aquifer-based resources, would provide a critical opportunity for the more effective provision of water to target area communities and thus address the most important constraint within the area. Such knowledge would have to be linked to improved access to drilling and pond digging services from government and the private sector to be effectively utilized.
- Opportunities also exist to improve **water utilization management** through such activities as small collection systems and rainwater harvesting. Such measures would likely be of most value in developing dry season vegetable production for both income and nutrition.
- The JICA study referred to in Section 2.1 showed clearly that significant **yield increases**, reaching 35 percent, are possible in a number of Dry Zone crops, as a result of proper management and input use.
- Similarly, if **mortality rates and other debilitating illnesses can be reduced and weight gains increased** - particularly for small ruminants and poultry, the two livestock types of most importance to poorer households - considerable opportunities are likely to exist for improved income generation from livestock production, although little comparative data appears to exist on the scale of such increases.

- Given the prevalence of casual agricultural labour in the target area, improvements in agricultural production could be expected to indirectly benefit landless and poorer households as demand for labour increases. Nevertheless, major reductions in poverty would probably require an expansion in the **quantity and value of off-farm employment**, both through increased employment skills or the expansion of specialist local employment in activities such as weaving, pottery and carpentry. However, as discussed below in Section 4.2 available evidence suggests that employment creation depends on a range of factors, including market contacts and access, and the availability of capital, which have rendered previous efforts of limited usefulness.
- The significant expansion of formal credit sources, generally through MFIs, would provide an important opportunity for poorer households to reduce their debt levels and, if linked to some form of crop and animal loss insurance, provide incentives for increased investment in key agricultural inputs and other costs.

While there are many common aspects across the six target area townships, differences can be observed and are summarized in Table 8 below. It is worth noting that some villages have developed specialist livelihoods, whether in weaving, vegetable production or migration to work in the gold mines, which provide significant additional income. However, many villages have few, if any, specialist or non-agricultural income sources. There is no obvious pattern in these more entrepreneurial villages by township.

All surveyed communities were asked to identify their three **highest priorities**. Giving an equal rank to all three responses, the availability of water (primarily for domestic use) was the chief area of concern, generating 60 percent of all responses. A further 23 percent mentioned water for irrigation. Financial services were a key concern for one-half of all communities, followed by roads and bridges and education, accounting for one third each. Perhaps surprisingly, employment skills and opportunities and marketing support and services were raised by 10 percent or less of the communities.

Table 9: Key Characteristics and Possible Focus Areas for Target Townships

Area	Notable chacteristics	Possible Focus Areas
Magway		
Yesagyo	Irrigation relatively common, many wells, rice production, significant migration	Increased investment and agricultural productivity, employment skills development
Pakokku	Commercial centre, smallest farms, little irrigation, cotton production, highest % expenditure on food by poor households, undernutrition frequently reported	Nutrition,climate smart agriculture, value added processing
Mandalay		
Mingyan	Best crop production yields, extensive irrigation (including large schemes) many wells, smallest % of rural population	Increased investment, agricultural productivity, value added processing
Natogyi	Least irrigation of all townships, high rate of crop failure, high rate of migration, many ponds, no training received in last 3 years	Climate smart agriculture, water management, agricultural training
Taungtha	Largest villages and farms, many livestock, cotton, little irrigation, many ponds, undernutrition frequently reported	Livestock production & animal health, nutrition, land management
Mahlaing	Smallest villages, irrigation relatively common, cotton production, major sesame production area, few external support institutions	Climate smart agriculture, community development, agricultural technology

4. Previous Interventions and Lesson Learned

4.1 Previous Interventions within the Dry Zone

Despite the relative isolation of Myanmar during much of the two decades prior to 2012, a wide range of development interventions have taken place within the Dry Zone over this period. Many of these interventions were undertaken by state entities, especially the Ministries of Agriculture and Irrigation (MOAI) and Health (MOH), but the launch of the UNDP Human Development Initiative in 1997 – initially supporting a range of development activities in Shan State, the Delta Region and the Dry Zone, and later expanded to other areas - marks the first significant international operations in the zone in recent times.

Given the semi-arid nature of the zone, probably the largest number of interventions have focused on water supply for both drinking and irrigation purposes, but support has also been provided for microfinance, community development, climate adaptation, crop productivity and livestock health.

International agencies and NGOs active in the water sector, in addition to UNDP, include ADRA, Proximity, Action Aid, and Bridge Asia Japan (the latter in collaboration with the Department of Rural Development in the construction of community water facilities). Water sector interventions have included tube wells, ponds, rain storage tanks, reservoirs and pumping technology.

Agricultural development activities within the Dry Zone have involved ICRISAT, FAO and ACIAR, and have included interventions in pulse and legume productivity, farmer field schools and animal health.

One of the biggest areas of intervention within the zone has been in microfinance. Most microfinance providers have followed the Grameen model, involving lending to members of small groups who provide mutual guarantees for the loans in lieu of collateral. PACT, which also follows the group-lending model, is now the most active microfinance lender in Myanmar and has a major presence in the Dry Zone. PACT is also active in support to women and local level institutions.

Many interventions do not fit within a single category and can best be described as community development initiatives, including social protection (SP) and nutrition focused activities. The UNDP Human Development Initiative, described above, is the forerunner of a number of interventions, which now include projects financed by USAID, the World Bank, LIFT and a range of NGOs.

Community-based schemes to support the development of social infrastructure (rice banks, savings groups and other community-based SP schemes) have been actively supported by LIFT. The main SP schemes supported have included: distribution of hand tools to poor families (Save the Children); improved stoves (ADRA); seed banks (ADRA, Save the Children); savings and loan groups (ADRA, Save the Children); food preservation (CESVI); and vocational training (ADRA). The LIFT-funded **REVEAL**[21] project, which was partly implemented in 15 villages in Mahlaing Township (ending in early 2014), provides a good example of an effective model for poverty reduction, focusing on social and economic inclusion and empowerment. Lessons have emerged from a recent impact assessment providing useful insights into the approach of exploring the underlying causes and patterns of vulnerability amongst the most marginalized and excluded

[21] REVEAL: Reducing Economic Vulnerability through an Equitable Approach to Livelihoods.

households.[22] Action Aid's **Socio Economic Development Network (SEDN),** comprised of government departments, NGOs and community-based organisations (CBOs) is currently developing a comprehensive approach to a "multi-sectoral referral system" linking communities to a wide range of services provided by government, non-government, civil society groups and the private sector. The initiative is expected to develop mutual understanding of the needs and difficulties for both parties and to increase the visibility of poor people and their needs. The results of this approach are still to be seen but are expected to produce useful learning for the implementation of Dry Zone SP initiatives.

The LIFT-funded "Community Initiated Livelihoods and Poverty Reduction (CILPR) Project" was implemented by **ADRA & ActionAid** for a period of three years in Magway Region and ended in October 2013. The project targeted 5,152 poor/vulnerable families (including landless labourers, small scale farmers, toddy palm workers, female-headed households, older people and PWD) from 50 villages in Pakokku, Myaing and Seikpyu Townships. In terms of social protection activities, useful lessons can be drawn from this project[23] on methods to increase assets and incomes through regular saving functions and revolving fund mechanism in the community. Interventions have included SHG loans for start-up of potential income generating activities, improved personal hygiene and sanitation through health education and kitchen waste management, financial assistance through CfW and SEM Kits, as well as seed and livestock banks.

More recently, adaptation to climate change has become a major focus of development interventions within the Dry Zone. Once again, UNDP has been active in this area providing support through the Adaptation Fund for a project focusing on adaptation and resilience among producers within the Dry Zone, but a number of NGOs, including GRET and Solidarity International are also implementing projects related to climate change.

4.2 Lessons Learned

The interventions within the Dry Zone described above have generated a wealth of conclusions on factors influencing the impact and sustainability of such activities[24]. The following lessons learned are drawn from these studies.

With respect to **Water and Soil Management and Sanitation**, the following lessons learned are largely drawn from Annex 1 to this report:

- The availability of sufficient water for both drinking and crop/livestock production needs is the most critical constraint to development within the zone and efforts to increase crop yields, establish household gardens and provide fodder for livestock are all likely to fail unless adequate water supplies are available;

[22] Leave no-one behind: research based Strategies for Poverty reduction and Social Protection in Myanmar: Applying the Research Findings of the Social Policy & Poverty Research Group (2012-2013)

[23] *Community Initiated Livelihoods and Poverty Reduction (CILPR) Project: End of Project Evaluation of Magwe Division*. Khin Maung Lwin & Win Win Myint. SMART Consultancy Group - November 2013.

[24] Of particular importance to the conclusions presented in this section is the draft report '*Lessons Learned from Livelihoods Interventions in the Dry Zone of Myanmar*' LIFT, 8 October 2013. Lessons are also drawn from a wide range of pilot activities conducted and monitored under *The Development Study on Sustainable Agricultural and Rural Development for Poverty Reduction Programme in the Central Dry Zone of the Union of Myanmar. Final Report*. August 2010. JICA

- Maintenance and desilting of ponds at least every 2 to 3 years is critical to maintain viable volumes. NGOs working in the Dry Zone report that regular maintenance is often neglected, which means that more expensive and difficult renovation is then needed;
- Because the hydrogeology of the area is poorly understood, siting of wells is largely exploratory and yield and water quality cannot be assured before drilling. Villages often have some wells with good quality water and others that are salty. In some cases, wells have gradually become more saline over time. More than 60% of villages visited by the mission in January 2014 reported salty water in at least some of their wells;
- Many existing rural water supply tube wells are in poor condition or not functioning. This may be due to poor siting and construction, lack of trained villagers for operation and maintenance, salty water, or people being reluctant to pay for water where other water sources such as ponds are available without charge. In some villages tube wells (for which a fee is often charged) are only used towards the end of the dry season when other sources dry up;
- A critical lesson from current programs is the importance of embedding water into broader village livelihood strategies, taking account of the full range of needs and users. ActionAid and ADRA have developed participatory methods for working with communities to ensure that water interventions are closely linked into village development plans, with clear delineation of responsibilities for construction, operation and maintenance;
- Most villages have some latrines. Generally aid agencies provided the pit and squatting slab leaving households to build the shed, but the poorest households sometimes cannot afford the wood needed for the frame and the door so the latrine remains unused;
- Many small dams fail because they are overtopped in a flood, often because there is no spillway, the spillway is inadequate, or spillway maintenance has been neglected (Cyclone Giri in 2010 destroyed many ponds and dams in the CDZ). Consultation with the community as to design, construction and maintenance requirements and responsibilities is critical;
- Given the high rates of seepage and evaporation experienced within the zone (in the region of 3-4 metres per annum), and limited rainfall, large catchment areas are needed if a pond is to accumulate sufficient water to retain supplies throughout the dry season. Calculations presented in Annex 1 indicate that for a 0.5 ha pond, with a target depth of 5m, this would typically involve a catchment of 20-25 hectares;
- The impact of soil conservation and other resource management activities requires considerable time to become apparent, reducing participant commitment, but they are nevertheless important for the long-term sustainability of agriculture within the zone. The LIFT Annual Report for 2012 notes that natural resource management training "*is not itself a significant determinant of whether households participate in improved resource management and rehabilitation activities. For example, MSN only trained 916 people, but over 8,000 people actually participated in such activities. Similarly, Help Age reported that although they did not conduct any training sessions on resource management, 2,700 households took part in resource management activities. Conversely, GRET reported that it trained 3,750 people of which only 176 went on to participate in specific resource management or rehabilitation activities. More investigation is required to determine what motivated people to participate or not to participate in resource management/rehabilitation activities*".

With respect to **Crop and Livestock Production**, the following lessons have been identified:

- The most common underlying determinant of the adoption or non-adoption of a new technology is the level of risk perceived by the farmer in relation to the practice;
- Farmer Field Schools and related extension methodologies are often applied for too short a time to permit beneficiaries to feel confidence in the approach tested. The LIFT *Lessons Learned* report recommends a minimum of three years of support and found that yields could be increased by 30-50 percent. The 2012 LIFT Annual Report identified the following factors in the success of FFS operated by their implementation partners: (a) the degree to which the curriculum is specifically adapted to local conditions; (b) the availability of good-quality learning materials; (c) the level of training of FFS facilitators; (d) the existence of FFS "champions" within the community, and; (e) established links with government extension agents
- Higher yielding varieties of chickpea, pigeon pea and groundnut could improve yields by as much as 35 percent over traditional varieties, but further research is needed, particularly on barriers to adoption;
- Due to the lack of sufficient seed supply, the establishment of village seed banks can be critical in permitting the adoption of improved varieties, and have been found to contribute to the strengthening of the organizational capacity of participating communities;
- The identification of new crop diversification options is not an easy process, despite support from agronomists working with communities, and results have often been inconclusive;
- Adoption of household gardens has been limited due to difficulties in guaranteeing adequate water supplies, especially through the dry season;
- Participatory varietal selection (PVS) by farmers has been very productive in identifying high yielding varieties;
- The introduction of reforestation programs has to be very carefully managed if it is to be successful. Areas suitable for forestation may conflict with existing land uses for crop production, native species are essential to ensure survival of saplings, and villagers prefer to focus their efforts on income generation rather than the long-term benefits from reforestation. In addition, tree nurseries, although often well managed during the project period, seldom continued to operate beyond this due to lack of demand;
- Access to quality animal health services is essential if appropriate vaccination and treatment are to be available to livestock producers. While vaccination is a critical factor in the success or failure of livestock breeding, villagers may not readily understand its importance;
- Chicken raising is an appropriate and strategic activity for poor households, but attention to management and housing is important. Goat breeding can also yield good returns within a short period but successful pig production is heavily dependent upon access to feed and quality stock and requires significant financial outlay. It is therefore unlikely to be suitable for the poorest households;
- A series of pilot projects implemented by JICA, found that although significant benefits were possible, mortality among purchased sheep, goats and piglets distributed to participants could be high. Care needs to be exercised in both the timing and procurement procedures for any animal supply.

For **Marketing**, there are significant differences between the findings of the *Lessons Learned* study and the conclusions of the Scoping Mission team. While the former study identifies weak linkages to markets as a 'key barrier' to increasing incomes in the agriculture and food processing

sector, Annex 3 to this report concludes that - given the generally effective functioning of the existing marketing system for most traditional crops and livestock, which are marketed in their raw form and immediately after harvest - significant initiatives in market and value chain development would not be appropriate until communities are able to generate larger surpluses and/or diversify into new products. These conclusion are supported by the results of the field surveys conducted as part of this scoping study (see Section 3), which found that marketing was not a priority issue for most communities.

Most crops are sold through brokers or traders working on commission and margins on these trades are relatively small. Cattle are often sold at local auction markets, although some concerns exist with respect to the trade in small stock and pigs, which are generally purchased by itinerant traders and animal weights are estimated by eye. The Scoping Team's community-level interviews revealed that there was little demand for community level storage.

Credit

The LIFT *Lessons Learned* study does not generally address credit provision, but the findings of the Scoping Mission indicate that the group lending methodology, accompanied by extensive training and community level support has been a successful one. In addition, the provision of credit for a range of activities, rather than just for production costs, is also an important element as considerable borrowing occurs for purposes other than production. It should be noted in this respect, however, that the relatively high transaction costs associated with the generally small loan amounts associated with emergency or food loans suggests that some of these types of borrowing could be more efficiently managed at community level, rather than through an external provider. The *Lessons Learned* study indicates that there are many good examples of revolving funds managed by self-help groups.

One aspect of existing loan approaches that was commented upon by interviewed communities was the historically limited duration of most production loans, although this appears to be changing and service providers such as PACT are increasing the flexibility of loan durations. As is common in microfinance, however, there is still little possibility of obtaining loans for the extended periods required for investment and this may become an important constraint if crop diversification or agro-enterprise development is supported by a project.

The LIFT 2012 Annual Report states that a lack of business skills in the target communities has led to the suggestion of supporting beneficiaries with skill-development training and marketing after conducting value chain analyses.

Given the findings presented above with respect to the importance of risk in the adoption of new technologies, as well as the significant risks of crop and even animal loss due to drought within the zone, the development of some form of insurance associated with microfinance loans is considered important. PACT already offers micro-insurance covering death, hospitalization and, at the discretion of the organization, other forms of loss, but this could be extended into a more complete package.

With respect to **Community Development** (including social protection and nutrition), some key findings include:

- The experience and skill of village level facilitators is a key success factor, although many NGOs rely on young and inexperienced field staff;

- Where a large number of activities are undertaken simultaneously in a community, village level staff (and community members) often feel overwhelmed;
- Reaching women, who play a key role in many community economic and social activities, is vital and requires a careful approach to ensure their participation;
- Where linkage can be achieved between community-based organizations (CBOs) and government service providers, this linkage not only provides the CBOs with a greater voice in determining activities and priorities at local level, but can also constitute a key exit strategy for the project-implementing agency. However, this must be taken in the context of often weak government service capacity;
- The time, duration and continuous support provided to community livelihood networks are identified in the LIFT *Lessons Learned* study as crucial factors in the development and functioning of such organizations;
- The potential role of CBOs in generating economic benefits for community members, especially through the bulk purchase of inputs and group marketing of produce, is not sufficiently exploited in many projects;
- Water Users' Groups provide a strong potential for developing into important community level organizations over time;
- The results from vocational training programs have been mixed, in part because of limited consideration of the demand for the skills being taught;
- Cash-for-work (CfW) schemes do not contribute to long term benefits for recipients, but can have a significant effect on current financial problems;
- Interventions to reduce malnutrition through increased breast-feeding can be very effective, but attitudes can be slow to change and it is important to include grandmothers as well as mothers as they are often influential in decisions as to feeding strategies.

4.3 Summary and Conclusions

The following summary and conclusions are drawn both from the preceding section and from the results of Scoping Mission surveys conducted at field level (see Section 3). Although, as is pointed out in the introduction to the LIFT Lessons Learned study, contradictory observations can and do occur, there are number of broad points that stand out clearly. These are summarized below:

a) Access to adequate quantities of suitable (i.e. non-saline) water is the single most critical factor for poverty reduction in the rural Dry Zone target area. Yet, to ensure such a supply will require better knowledge of the location and quality of existing resources and a greater focus on maintenance of facilities. Given the relative weakness of government institutions, improved maintenance would appear to be possible only with the greater involvement of the communities themselves, primarily through Water User's Groups (WUGs) which would not only undertake maintenance activities that were within their competence, but would also represent the community to government and attempt to ensure the outside technical support needed. The creation and establishment of WUGs would also provide important social capital to the community and could later be linked to community-based activity in other areas (e.g. marketing, animal health etc.).

b) Although improvements in agricultural productivity appear possible (through, for example, access to improved seeds), clearly the availability of water is a prerequisite for substantive change. However, in the light of the current situation facing most target area farmers, no real improvement of agricultural production can be possible without reducing risk for the participants. This will probably require changes such as: extended Farmer Field Schools (FFS) to convince producers of the benefits of the proposed changes; the use of community banks or other low-cost approaches to improving seed and livestock availability; the incorporation into loans of some form of insurance against losses, and the improvement of animal health services to reduce mortality among livestock. Livestock productivity must be seen as particularly important in the target area given the high number of landless families

c) As shown by the field survey, improved marketing services are not a high priority for target area producers at this time. However, it may prove possible and beneficial to commence group activities through joint purchasing of inputs, storage of output (where not sold at harvest) and through these lead into joint sale of output, particularly if yields increase and diversification into new products occurs. Expanded credit provision is a high priority but should, if possible, be linked to some form of loss-related insurance.

d) The LIFT Lessons Learned study provided some very important findings related to community-based activities, particularly the determination that it is easy to overwhelm participants through undertaking too many activities simultaneously, and the need for a relatively long-term presence if benefits are to become sustainable. This suggests that any development program working at community level in the Dry Zone should work with beneficiary communities to identify their key priorities and only gradually bring in other aspects as the initial activities become accepted. This does not, of course, exclude activities that take place largely outside of the communities themselves, such as strengthening of water-related maintenance capacity, micro-finance provision or animal health services. Addressing the needs of landless and near landless households may require supporting interested communities in developing specific skills areas, whether in food processing, handicrafts or other areas.

It is believed that the Lessons Learned study has been a very useful exercise, albeit limited by its desk-only nature, and it is recommended that this study be conducted in the future on a periodic basis, perhaps expanded to consider further the issues related to off-farm employment beyond just vocational training. However, any future studies should be linked, if possible, both with field surveys conducted in relation to the LIFT Baseline Study and by other organizations, to provide greater knowledge of participant views and perspectives, as well as to regular feedback from implementation partners.

5. Institutional Context

5.1 Introduction

The Republic of the Union of Myanmar has undergone enormous changes in a wide variety of areas since reform commenced in 2010, encompassing political, economic and administrative aspects of governance. These changes, which extend through all levels of Government, derived initially from the 2008 Constitution, but were further elaborated through the Framework for Economic and Social Reform (FESR), approved in 2012.

One key set of changes from the perspective of the Dry Zone Development Program is the current decentralization process, by which a range of administrative, fiscal and political responsibilities have been, or are being, transferred from the Union level to the Regional and State level[25]. Changes have also occurred at the District, Township and Village levels.

The decentralization process is far from complete, and is in any case still strongly controlled from the centre through a number of mandatory requirements[26] which limit local controls over planning and budgets, among other aspects. Nevertheless, some aspects are already becoming visible.

5.2 Union and Regional Governance

Under the system that is currently evolving, two separate but interlinked governing structures are emerging. The first structure comprises the Union, including the President and his offices, the national parliament (the *hluttaw*), and the union level line Ministries. The second structure comprises the regional or state structure[27], including a Chief Minister, a partially elected regional *hluttaw*, a cabinet of regional ministers, and regional juridical institutions. Below this regional structure, but reporting to it, are the District, Township, Village Tract and Village administrations. Magway comprises five districts and 25 townships, while Mandalay contains seven districts and 29 townships.

It is the exact relationship between the Union and the Regional structures, and their respective mandates and powers that are still being clarified and, in fact, defined. The Asia Foundation report previously cited identifies the current process in Myanmar as a blend of devolution and 'deconcentration', in which the to-date limited legal, political, administrative and financial powers of the Regional governments show some, but certainly not all, of the characteristics of full devolution.

For example, while some ministries exist as regional entities (the remainder continuing as merely regionally located Union ministry offices and therefore not under regional control at all), they do not, as yet, form an integral part of the regional government. Furthermore, although regional ministers exist, as of late 2013 there were still no regional ministries.

In fact all levels of Government are effectively coordinated by the union controlled General Administration Department (GAD, which is under military leadership. Equally, the selection of the Regional Chief Minister, the line ministers and many members of the regional *hluttaw* is controlled by the union government or directly by the President's office (in the case of Chief Ministers).

This central influence on local actions extends to lower levels of government as well, largely through the General Administration Department (GAD), which is primarily responsible for the management of District and Township affairs. This influence extends even to the Village Tract

[25] Regions and States are constitutionally equivalent. States contain significant minority ethnic populations while Regions are comprised primarily of 'Burman' populations. Both Mandalay and Magway are classified as Regions and only that term will be used in this section.

[26] These include a key role in Regional, District and Township level administrations for the General Administration Department (GAD) of the military-controlled Ministry of Home Affairs, as well as the direct appointment of the regional Chief Minister among other positions.

[27] There are also six self-administered zones or divisions and one Union territory containing the capital NayPyiTaw, which will not be discussed further here.

and Village level, where GAD officials still play a key role in the selection of administrators and GAD pays their salaries[28], even though most village heads are now elected positions, rather than being centrally appointed.

In early 2014, both Mandalay and Magway regional planning departments were in the process of completing long term, 20-year development plans for their respective regions. These plans comprise a range of activities and priorities submitted by township planning offices through the district administrations to the regional planning department. However, the responsibilities of the planning departments in this process did not appear to extend much beyond the compilation of the township proposals and the submission of the document for approval by regional government. Neither the Magway nor the Mandalay planning departments stated that they had played any role in the development of the township proposals and they had made no changes to these proposals. Equally, no decisions as to the funding of proposed activities are taken at the regional level. Final approval of the plan and the allocation of resources are both still the responsibility of the union level, although the

5.3 Financial Resources and Management

Ultimate responsibility for all budgets rests with two ministries – Finance and Revenue (MFR) and Planning and Economic Development (MPED) – although Regional Chief Ministers are members of the Union Finance Commission that finalizes all budgets for presentation to the *hluttaw*. The recent development (commencing with the 2012-13 Fiscal Year) of regional budgets has contributed to increased regional control of their resources, but as stated in the Asia foundation document (p.40): "The new state/region budget is also not fully devolved in the sense that the state/region has a free hand to spend its available resource on what it chooses. Instead, the budget consists of a proposal prepared at the state/region level on a department-by-department basis and then integrated, potentially with alterations, into the union budget. The final approval of the overall budget still rests with union institutions."

It should also be noted that regional budgets comprise a very small portion the total union budget. For the fiscal year 2013-14, only approximately 3.6 percent of the national budget was allocated to regional and state governments. In the previous fiscal year, Mandalay Region's total budget expenditures amounted to only 11,000 Kyat per capita. Magway's was slightly higher at around 16,000 Kyat per capita. A considerable proportion of these resources – almost 70 percent in Mandalay, but only around 35 percent in Magway - derive from taxes, fees and State Economic Enterprise (SEE) receipts, which together with the union allocated Poverty Reduction Fund (PRF) are the region's principal sources of revenue – the remaining coming from union transfers through line ministries.

In Magway region, the regional budget allocates approximately Kyat 40 million per annum for activities in each township.

Even the PRF resources, however, are only indirectly controlled by regional governments, as the allocations (currently Kyat 100 m per township) are made directly to the townships and the decisions as to their utilization are taken at that level. PRF funds may be used for agriculture and

[28] Among the responsibilities of the village administrator are tax collection, land registration, the reporting of demographic data and, in some cases at least, approving loan applications to MADB.

livestock, but are also applied to rural infrastructure, water and a range of other purposes. Partly in consequence of this, the Mandalay regional planning office stated in the interview that they were not aware of what the township budgets were.

5.4 Agriculture and Rural Development

Schedule Two of the Myanmar Constitution identifies eight specific areas over which "*the Region or State hluttaw shall have the right to enact laws*". One of these areas is agriculture and livestock breeding, although irrigation is not included. Agriculture and livestock thus, in theory at least, constitute sectors in which the regional governments have a strong mandate, while irrigation is still directly controlled by the union Ministry of Agriculture and Irrigation MOAI).

It is also important to note that the regional agricultural administration and staff were all formerly direct employees of the union MOAI, which still has control over their salaries and career paths.

The Department of Rural Development (DRD currently part of the Ministry of Livestock, Fisheries and Rural Development – MLFRD) is not referred to in Schedule Two, and nor is Fisheries, thus only the Livestock Breeding and Veterinary Department (LBVD) is currently expected to be managed at regional level.

According to information provided by regional level technical officers in Mandalay and Magway, regional offices responsible for agriculture and livestock have considerable freedom to determine activities supported at regional and even township level, although within a relatively limited envelope of resources. Township technical officers report both to the regional offices and to the township administrator in a form of matrix management. While all townships in the target area have agricultural and planning officers (sometimes more than one), only two of the townships possessed a community development officer and there are no rural development staff at all at township level.

Resources for these activities derive from a mixture of union funds (e.g. MAOI) and regional budgets. PRF funds at township level are not accessed by any of the agricultural, livestock or water units in Magway region. Department of Agriculture (DOA) operations are funded entirely from the regional budget, but office costs, salaries and similar expenses are paid from MOAI funds. A similar arrangement exists for the Department of Water Resources Utilization Department (WRUD), also part of MOAI at the union level. However, as a unit that remains completely centralized, all Department of Irrigation (DOI) funds derive from MOAI except those assigned to small-scale irrigation operations.

Collaboration between the proposed Dry Zone Program and regional and township technical staff can therefore be expected to focus principally upon crop production and livestock, with water also a potential area with the approval of the union level MOAI. The Mandalay planning office also indicated a strong interest expanding rural employment skills and opportunities.

Current priorities in the two regions are very similar (raising some questions as to the extent to which they are actually determined at regional level) and include:

Livestock (LBVD):

- training of Community Animal Health Workers (CAHWs) – more than 2,000 have already been trained across the 24 townships and further training is planned;
- loan financing for the purchase of goats (5 per household) for poor families;
- improved livestock feeding, including both the production of straw/molasses feed blocks and the establishment of Napier grass for zero grazing schemes (cut and carry);
- purchase and distribution of veterinary vaccines, particularly for foot and mouth disease;
- improved training and mobility for township level veterinary staff;
- artificial insemination (AI) – the scale of AI is currently limited by budget restrictions.

Crops (DOA):

- distribution of quality seeds (rice, maize, groundnut, sesame and green gram);
- strengthening of the extension service;
- free distribution of agrochemicals;
- intensified applied research in production systems.

Water:

- maintenance of existing dams and reservoirs (DOI);
- expanded provision of ponds and tube wells for drinking water (DRD) ;
- tube wells and river water lifting for irrigation (WRUD).

5.5 Summary and Conclusions

The current high degree of uncertainty concerning regional as compared with union level mandates for both technical activities as well as budgets and planning processes, renders collaboration between the DZP and regional authorities more complex than in most other countries. Certainly, any DZP proposed activities that correspond to existing regional priorities would form a strong basis for collaboration, especially if the program were able to contribute additional resources. In other areas, for example, decisions on the siting of tube wells and ponds, the program would inevitably have to consult with the design section of DOI, but such an approach would be recommended in any case.

Any efforts to involve regional technical staff in activities that are not current priorities would almost certainly require approval from the union level ministry concerned (e.g. MOAI) and could be expected to necessitate the program paying all additional expenses resulting from the activity.

It should be remembered, however, that many decisions as to activities at township level are made at the township level, and the relevance of regional offices would be primarily for activities that were expected to encompass more than one township. In addition to the township allocation from regional resources (which will be largely committed for recurrent expenses), the Kyat 100 million PRF allocation to all townships within the target area also comprises a resource that may be available, in part, to support activities agreed between township authorities and the program. However, PRF resources are also used for activities beyond the scope of the proposed program (such as roads and education) and so access to these funds for collaborative purposes may be limited.

6. Program Targeting and Phasing

6.1 Geographical, Activity and Beneficiary Targeting

Geographical Targeting

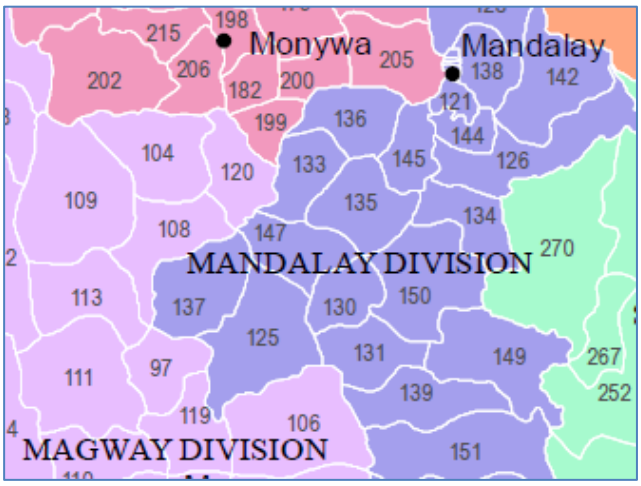
As a result of the Inception Mission conducted in 2013, six townships with limited access to irrigation and drinking water supplies were proposed for possible inclusion in the program and examination in detail during the Scoping Mission. These comprise four townships within the Mandalay region (Myingyan, Natogyi, Taungtha and Mahlaing) and two within Magway Region (Pakokku and Yesagyo). An additional factor in their selection is that all six townships are contiguous, with those in Magway separated from those in Mandalay by the Ayerawady River. The two Magway townships were considered as a result of the interest of LIFT in collaborating with the 3MDG program which will include these sites. Table 9 in Section 3.2 provides a brief summary of the key features of each township.

Pakokku and Myingyan are the most urbanized, with approximately 70 percent of the population being rural. In the remaining four townships, the rural population accounts for more than 90 percent of the total. The poorest township from an agricultural perspective is Natogyi, with little irrigation and a high rate of crop failure in the year prior to the field survey, while Pakokku has the highest percentage expenditure of household income on foodstuffs and frequently reported seasonal under nutrition, despite the township's role as a major commercial centre. Taungtha also reports high rates of seasonal under nutrition but has relatively large average land holdings and relatively extensive livestock holdings. Mingyan is the most favourable township for agriculture, with the highest yields in a number of crops and access to some major irrigation schemes. Mahlaing has received relatively little external support in recent years, although it is well provided with irrigation compared with some of the other townships.

As the intention of the proposed Dry Zone Program is not only to reduce hunger and poverty among participant groups, but also to test and demonstrate possible approaches to achieve this objective, it is recommended that all six of the townships be selected, as each one faces different sets of constraints and will require a different mix of interventions to address them.

Although the original intention was to select a single Magway township for inclusion in the project, it is recommended that both Yesagyo and Pakokku be selected. While Yesagyo has a higher proportion of rural population and reported levels of poverty, it is closely linked economically and administratively with Pakokku where most market operations for the region are conducted and the district authorities are based.

Map of Proposed Project Area Townships



Target Townships

MAGWAY:

Pakokku - 108

Yesagyo – 120

MANDALAY:

Myingyan – 133

Natogyi – 135

Taungtha – 147

Mahlaing - 130

There is clearly a trade-off between depth of focus and the number of communities participating. However, it is also necessary to ensure a sufficiently wide impact in relation to the investment levels under consideration. This will not be achievable with only a small number of participating communities.

Any specific number of communities proposed at this stage must inevitably be speculative, as the final selection will have to made at the full design stage and will depend not only on the level of resources available, but also such factors as the costs of individual interventions, the balance of community against township-level activities, and the implementing capacity of partner organizations and relevant government technical agencies. Provisionally, however, it is proposed that the project targets a minimum average of 40 communities within each of all six townships, for a total of at least 240 communities. This is equivalent to less than 20 percent of all rural villages in the target townships and, in any case, not all communities would participate in the program immediately. Although this number is slightly higher than the 233 villages being supported by LIFT within these townships in 2011, it is still considered a relatively low level of intervention for a relatively small portion of Myanmar given the investment budget proposed.

The total number of villages to be targeted is also influenced by the current four-year time horizon for the Dry Zone Programme, and the perceived need for the project to spend a minimum of three years in each community in order to obtain a sustainable response to project activities (see below). A maximum of two waves of implementation, covering Years 1 and 2, is thus considered the limit under current implementation period available.

The final selection of villages must await the final program design and occur in collaboration with regional and township government officers. However, some key factors in village selection can be indicated:

(a) A significant percentage of villages within the six townships are located along waterways and so can be presumed to have better access to water supplies than those further away

from such water bodies[29]. These villages, together with those already participating in sizable irrigation activities (no data is available on these numbers) should be excluded;

(b) A higher number of villages should be selected from those townships where the survey has revealed higher levels of poverty. Under this approach, preference would be given to Natogyi (high rates of crop failure) and Pakokku (highest proportion of income spent on food). However, it is argued that poverty and food insecurity is a problem for many villages in all target area townships. Furthermore, it would limit the usefulness of the program if some communities with greater potential for the development of water, agriculture, livestock or off-farm employment were excluded. Therefore, a maximum of 60 communities in the poorest townships is provisionally proposed.

(c) Selection would be assisted by the conduct of a brief survey for all villages more than, say, 3 km from a year round water body (lake or river). Each village would be invited to select a maximum of three priority areas from a menu of possibilities in accordance with the project elements laid out in the Outcome Map in Section 6 above. The selection of villages could then take place in relation to the demand for different types of support, as well as the institutional capacity of partner implementing agencies to deliver these services. This aspect is discussed further below.

Activity Targeting

It is proposed that not all program activities would be offered, at least initially, in all townships or communities, as needs and priorities will differ from area to area (see Table 9). Below the proposed initial core activities are listed and the townships which would be most likely to require activities in these areas shown, although if a demand survey were to be conducted at the design stage this might have to be revised at that time:

Irrigation systems development and water management : Pakokku, Yesagyo, Taungtha, Natogyi

Adoption of improved farming technologies:

(a) Risk minimization and CSA - Natogyi, Taungtha (livestock)
(b) Intensification and increased productivity - Mahlaing, Myingyan

Moderate cost financing: Largely a township level activity across all townships, but community level SACs would be developed where there was interest within the community

Skills development and non-farm employment: Pakokku, Natogyi, Yesagyo, Myingyan

A number of additional crosscutting activities, primarily related to community organization development, soil management, sanitation and similar would be expected to be offered across most or all target communities.

With an average of 100 households per village, this would equate to approximately 120,000 persons, or 10 percent of the rural population of these townships. It should be stressed, however, that a number of project activities are expected to have a much wider impact. For example, support to strengthened livestock services would partially occur in part at township level and potentially benefit more than one million rural inhabitants, while strengthening of seed production

[29] Although it should be noted that not all such water bodies may have permanent water, drying up during the dry season when most needed.

systems would have an impact across the entire CDZ. It is expected that a conservative estimate of these additional beneficiaries (to be undertaken during the Design Mission) will result in a beneficiary total exceeding 250,000.

Beneficiary Targeting

Production support measures would focus on areas of most importance to marginal farmers and landless households. Although landless beneficiaries would be relatively easy to identify (excluding those in regular employment or receiving a pension etc.), defining poor or marginal landholders is more difficult. Average land holdings vary significantly across the target area, ranging from 1.5 acres in one village in Natogyi to 28 acres in another community in Taungtha. It is not possible, therefore, to define ex-ante the maximum holding size within which a farmer would be identified as marginal. In any case, not all small landholders are necessarily poor, as they may also have other significant sources of income (including remittances from other household members). Instead, it is recommended that a small holding size be defined as one that contains no more than one third of community landholders, and that from this group, those enjoying significant external income be excluded. To be accepted within the community, the process of selecting beneficiary households would have to occur with the participation and agreement of the majority of community members, who would be best able to identify those households with significant external income sources or other relevant factors.

The areas of support which would be expected to be of most importance to the focus group defined above would likely include production technologies appropriate for small producers, small-scale vegetable production for nutrition and income (where water availability permitted), improved small livestock management and health and off-farm employment skills and capacities

Nevertheless, many of these skills and new technologies would also be relevant to larger landholding households in the community, although they would be provided less direct support in their adoption and utilization (e.g. participation in FFS). In addition, some of the interventions proposed under the program, including both the expansion and improved management of water supplies, the wider availability of moderate cost financing, and improved animal health services, among others, would benefit the entire community.

It is also important to remember that, in many cultures, it is often difficult to obtain general acceptance for group activities without some level of participation from members of better-off households within the community who can provide important skills and resources to the group. However, the participation of such persons must be carefully limited and controlled in order to avoid risks of elite capture and discouragement of poorer households who no longer view the activity as belonging to them.

6.2 Implementation Phasing

Although originally conceived as a one-year rolling programme with an initial duration of three years, the Dry Zone Development Programme is constrained by the current mandate of LIFT, which will only have 4 years remaining at the expected time of programme launch. As the proposed programme is largely built around a set of community level activities, this raises some serious concerns relating to the rolling framework. As emphasized in reviews of the results of prior interventions presented in Section 4.2 above, many community level support activities require a minimum duration of at least three years if sustainability is to be anticipated. Given this time requirement, if only a three-year implementation period is guaranteed no communities could be accepted into the programme after the first year, thus requiring the simultaneous launch of activities in all communities and putting a considerable strain on the field capacity of the Implementation Partners. In addition, the results of programme activities would be very difficult to assess after only the first year of fieldwork, rendering a one-year rolling review process uncertain, at best.

Instead it proposed that the programme be conceived as having an initial duration of four years (thus permitting communities to enter the programme in both the first and second years) and that, an integral monitoring and evaluation process be built in to the program design to allow a rapid response to evidence of success or failure and lessons learned (as far as they can be determined in such a short period). This should be supported by a more detailed evaluation after the second year of implementation when results should be more observable, as well as benefitting from a better understanding of whether LIFT's mandate is likely to be extended beyond its current duration. The mid-term review could therefore propose changes in the balance of activities over the remaining initial two-year period, in accordance with the results observed, as well as recommend whether planning should commence for an extension of activities in light of both the results and the future mandate of LIFT.

7. Possible Development Options

A number of possible entry channels to economic and social development of targeted Dry Zone townships and communities were considered in the course of the Scoping Mission. These included water management, demand driven community development, market access and value chains, rural finance, climate change and adaptation, and an integrated approach. The possible role of each of these elements in a Dry Zone Development Program are discussed below:

Water Management: It cannot be doubted that the largest single constraint facing the rural population within the Dry Zone is the lack of access to quality water supplies. Drinking water for human and animal consumption, as well as irrigation water for crop production, were the most frequently raised issues in interviews with community members. Sanitation and soil management are also concerns. Nevertheless, as the principal entry point for the proposed Dry Zone Development Program, water supply faces two significant constraints. Firstly, available evidence suggests that most primary sites for surface water capture and storage have already been exploited. Moreover, despite the existence of considerable apparent groundwater supplies within the zone, problems of salinity and even arsenic contamination, as well as poor knowledge of where subterranean resources are located, limit the scale of water supply development unless improved water resources data can be obtained.

Equally importantly, however, water comprises only one in a series of constraints faced by producers within the zone, and any alleviation of water constraints, although of importance, will not be sufficient to ensure inclusive economic and social development within targeted communities. The expanded availability of water is thus a necessary, but not sufficient, condition for success of the proposed program.

While there may be the opportunity for reservoir construction in some areas, both the land area needed and the cost of construction and maintenance is significant, while suitable topographic conditions must also exist. Most villages will therefore be limited to the expansion in the numbers of ponds, dug wells and tube wells that they have available. Although dug wells are the simplest in terms of maintenance and operations costs, they are rarely deep enough to yield drinkable water throughout the entire dry period. Nevertheless, they are often preferred by villagers, as there is normally no charge for the use of dug wells. This is not the case for tube wells where electricity or diesel pumping costs must be covered. Dug wells are also normally unsuitable for irrigation purposes beyond the smallest household gardens, due to the effort involved in obtaining the water.

Tube wells are often used for drinking water provision, but can be used for irrigation – especially if privately held by a single households or a small group of households. In addition to fuel costs, however, tube wells also need periodic maintenance, which must also be paid for. Under the program, the development of privately held and controlled tube wells would be inconsistent with the program's objectives, as poorer families would be unlikely to be able to afford to cover the associated costs. Program funded tube wells would therefore likely to be restricted to providing drinking water and livestock watering and would require some form of Water User Group (WUG) to operate and manage.

Ponds may offer the best opportunity for expanded irrigation, both from offtakes as well as from seepage under the dam, which frequently allows an acre of two of crops to be grown downstream from the structure. However, unless they are well designed and maintained, smaller ponds are rarely deep enough to hold water throughout the dry season, and they are easily damaged by uncontrolled livestock watering, the absence of periodic desilting, or a failure to maintain the spillways so that over-topping occurs during periods of heavy rains. Effective ponds, therefore, require both good design and adequate maintenance, once again emphasizing the importance of WUGs.

It is also important that water utilization within target villages be improved, as not all villages may be able to access significant additional water resources and those available must be used as efficiently as possible. Improved utilization not only includes capturing more of the water that is available during the rainy season through retention structures, improved storage, and rain water collection from rooftops and similar sites, but also that tube wells, ponds and any canals or delivery systems function efficiently with as little water losses as possible. Given limitations in the ability of Government to undertake the required periodic maintenance of larger structures or to provide necessary technical support, the establishment of effective WUGs is important. WUGS not only provide a focus for technical training through the project, but can also assist in ensuring that priority uses of water (e.g. for drinking) are agreed, as well as undertaking feasible maintenance activities and establishing linkages with both public and private sector technical support services.

Demand Driven Community Development: Demand driven community development (DDCD) can be a powerful tool for empowering rural communities and ensuring that investments made at

local level reflect the needs and priorities of the beneficiaries. It is also a powerful tool for strengthening social capital and managing community-based social protection. DDCD is especially effective for infrastructure investments that tend to be of community-wide significance. However, it is much less effective at ensuring the availability of such essential aspects as appropriate production technologies and husbandry techniques, the strengthening of service provision and the development and supply of inputs such as improved seed, financing and agrochemicals. All of these aspects are critical if long-term sustainable reduction in poverty and food insecurity are to be achieved.

As a result, it is proposed that, while DDCD comprise an important tool within the overall program, it cannot itself constitute the primary driving force of the intervention.

The inclusion of DDCD within the program necessitates consideration of the interface between the program and the selected communities. An obvious entry point is the Village Development Committee (VDC), as it (in theory at least) is responsible for all development activities within the community, and could supervise and monitor sub-groups such as Water User Groups or Family and Nutrition Groups. Community meetings with program staff would normally be called by the VDC and the process of selection of village priorities and beneficiary households should be the responsibility of the VDC (following consultation with the community at large). However, not all villages have functioning VDCs and, in these cases, it would be important to determine why this is the case. In some situations, the program may be able to provide the support (training, awareness, and basic materials) that will encourage a VDC to be established, or a dormant one to be re-activated. Where, however, the absence of a functioning VDC appears to arise from conflict within the community or prior attempts by elite groups to control activities, considerable care will be needed, and these factors may well be considered in the selection of target communities.

Market Driven: Although market development has been identified by other studies as an important constraint to economic development, this is not believed to be the case **at this stage** among the target communities of the Dry Zone. Existing market systems and value chains for traditional crops function well, with trading margins that are not considered to be excessive. Nor was any significant demand identified currently at community level for an expansion either of marketing services or of storage facilities.

It should be stressed, however, that this is the case because under current circumstances, all cash crop production is sold at harvest with little if any post-harvest treatment and the money earned used to purchase rice and other items for household consumption. It is anticipated that, should the program be implemented and generate significant increases in output and/or a diversification of production into new crops or livestock types or even non-agricultural goods (e.g. handicrafts), demand for both improved market access and community level storage would rapidly increase. A strong marketing component would thus be expected to comprise part of any second phase of the program.

Yet, a good knowledge of market demand and requirements would be essential in the selection of any new products for production, and this assessment would have to commence in the initial phase. Other preparatory activities that should be undertaken during the first phase include the establishment or strengthening of marketing groups to achieve economies of scale in input purchase and output sales, thus also strengthening social capital within the target community.

Finance: The availability of rural finance and the terms on which it is offered are considered second only in importance to water supply as a key constraint to economic development within the Dry Zone, despite a considerable expansion in recent years through the work of PACT and other NGOs. In a similar manner to that posited for water, however, finance can be viewed as a necessary but not sufficient condition for rural economic growth. Clearly, even the availability of abundant reasonably priced credit cannot provide the answer if there is insufficient water for human and productive needs, or if there is no appropriate genetic material available. Considerable care must also be taken to avoid increasing existing indebtedness levels and credit must be closely linked to activities yielding positive net cash benefits. Rural finance thus constitutes one, but only one, of the 'pillars' on which the overall program must be based. For expanded moderate cost credit availability to be successful, it is argued that attention must also be given to reducing the existing high levels of risk in using credit for productive purposes, probably through some form of built-in loss insurance related particularly to drought and animal mortality associated with all productive loans.

Livestock Development: For many poor households in target area villages, particularly those with little or no land, the raising and sale of livestock and livestock products comprises a vital source of income and the only readily available alternative to casual agricultural labor or migration. Few poor households can afford cattle, and in any case, the risks of losses from disease or other factors are simply beyond the capacity of such household to absorb, given the costs of the animals. Pigs are also a difficult option for poor households as their nutritional requirements necessitate the provision of relatively costly feedstuffs that are unaffordable on a daily basis over a period of months. The important species are thus small ruminants (particularly goats which have a higher twinning rate than sheep) and poultry. Yet small ruminants can have serious negative environmental impacts and the Dry Zone is already under considerable environmental pressure.

To avoid worsening this situation, the widespread expansion of small ruminant flocks would therefore have to be linked to some form of feed development. This might include such options as the establishment of Napier grass-based controlled grazing and cutting areas (where water and land availability permit), the expansion of hardy leguminous tree and bush species which can provide goats with food sources in the dry season and, possibly, the production of hay and silage based on rainy season vegetative growth.

Yet previous experience has shown that these approaches often fail and it is suggested the use of FFS for actual and potential small ruminant owners that focus on feeding strategies as well as health care would be vital to ensure the proposed approach is feasible in the location being considered and convince livestock owners of its value.

Climate Change and Adaptation: A further constraint to development within the zone arises from recent changes in climate affecting the area, together with the impact of past practices that have resulted in degradation of soils and the loss of vegetative cover. These changes present a real threat to the continued agricultural exploitation of the Dry Zone and, if ignored, could result in the desertification of the entire central zone of the country. Any intervention aiming to provide the conditions for sustainable and inclusive economic growth within the zone must take into account the need for husbandry and land management practices, as well as genetic materials, that are appropriate for the environmental conditions prevailing and anticipated into the medium term future. As a result, climate change adaptation and climate smart agriculture (CSA) form integral elements of both the water and soil management and agricultural and livestock development strategies proposed. However, climate adaptation and resilience cannot provide all of the

necessary conditions to ensure growth and it is not recommended that it comprise the lead element of the proposed program.

8. Programme Justification and Objectives

Background

Myanmar is still overwhelmingly an agrarian society. According to 2011 Ministry of Health data, 75 percent of the national population is rural, and this rises to over 90 percent in those CDZ townships without major urban centres. Furthermore, less than 20 percent of crop holdings in Myanmar exceed 10 acres (four ha) and less than five percent exceed 20 acres. Myanmar is thus a country of smallholder producers.

Myanmar is also much poorer than many other regional neighbours, despite its rich agro-ecological diversity and resources. Throughout the country, poverty and food insecurity is common and particularly affects landless and vulnerable rural populations. Attacking poverty and food security in Myanmar, therefore, means targeting rural smallholder communities. That producers can respond rapidly and effectively to the proper stimuli was evidenced by the response to the liberalization of pulse marketing in 1988. Within less than a decade, production had tripled and Myanmar had become one of the largest exporters of pulses in the world.

The primary justification for investment in the CDZ derives not only from its current levels of poverty and food and nutrition insecurity, but more worryingly, from the bleak future that faces many agricultural households within the area. Factors such as climate change, declining soil fertility, diminishing holding sizes and increasing pressure on scarce water resources render it almost certain that living conditions within the zone will decline significantly over the medium term future unless significant changes in production systems and livelihoods takes place. The CDZ is important not only as a key agricultural production area for the country, but also because it contains almost a third of the national population. This renders the sustainable development of the region a concern of importance not just for the local population, but also for the economic welfare of the country as a whole. As the program itself will directly affect only a small proportion of this critical zone, it is important that the results and implications of the programme (as well as prior interventions in the zone) be effectively communicated to policy makers in GOM, as well as to international financing agencies and NGOs active in Myanmar.

The Target Area and Group

Following an initial Inception Mission in late 2013, six contiguous townships (four in Mandalay Region and two in Magway region) were identified as having many communities with relatively high levels of poverty and food insecurity. The townships in Magway were also selected in order to promote collaboration and synergies with the 3MDG program. Communities which would be targeted by the proposed program would be those with little if any irrigated agriculture, and are thus dependent primarily on legumes, oilseeds and livestock production within the agricultural sector, supplemented by important contributions from casual labour and migration earnings (seasonal or long term). Average holdings per household within the target area are just under 7 acres, but vary widely from area to area and more than half of all rural households have no land at all.

Most crop production occurs during the rainy season, as the absence of adequate water resources renders crop production at other times of the year highly risky. Even rainy season production can fail if the rains are inadequate or poorly timed. A number of communities in Natogyi Township reported no harvest at all from a range of monsoon crops in 2013-14. Most agricultural output from these communities is sold to generate income to purchase rice and other key foodstuffs. Among poorer households within the zone, as much as 70 percent of total income is spent on the purchase of food.

The vast majority of rural households resort to credit as a dry season coping strategy, but only a minority obtain it at moderate rates; the remainder paying 5-10 percent per month to moneylenders, traders and other informal sources. As a result, indebtedness within the Dry Zone is rising and many households cannot access finance for production purposes.

The Development Concept

Given the range of constraints facing rural households within the Dry Zone, it is not believed that sustainable reductions in poverty and food insecurity can be achieved without addressing a range of limiting factors. Among the most important of these are: (i) access to, and efficient utilization of, water supplies for both consumption and irrigation; (ii) low agricultural productivity arising from water scarcity, under-investment in key inputs (especially improved seed) and limited capacity to accept risk; (iii) poor livestock productivity due to inadequate nutrition and lack of health care; (iv) inadequate access to timely and moderate cost financing linked to insurance protection against climatic and other catastrophic losses, and; (v) insufficient non-farm employment and other livelihoods offering reasonable returns to workers.

9. Potential Interventions

In accordance with the approach and conclusions outlined above, the proposed program would encompass interventions across a number of areas, including those related to: (i) soil and water management and sanitation; (ii) seeds, crop and livestock development; (iii) rural finance and marketing, and; (iv) community development, social protection and nutrition. Not all of these components would be implemented in each participating village to the same degree and at the same time, with each community identifying two or three areas of greatest priority. Climate adaptation would be reflected across both the soil and water as well as crop and livestock components. Key areas of intervention are derived from visits to the target area and discussions with development workers active in the Dry Zone (including government staff), as well as from the lessons learned presented in Section 4.2. Each of these areas is described in more detail below and further description can be found in the relevant annex to this report:

9.1 Soil and Water Management and Sanitation

The Component will have three sub-components: (1) Domestic water supplies and sanitation; (2) Irrigation; and (3) Soil and water conservation. The collection, collation and analysis of information on groundwater sources and sustainable extraction rates in the six proposed Townships and the establishment of a central well database, in collaboration with DRD, WRUD and DOI, would be initiated under the Programme.

An initial activity will be participatory baseline studies in villages to determine (i) domestic water availability and scope for enhancing supplies; (ii) suitable sites for irrigation development; and (iii)

the scope and scale of land degradation and possible interventions. TA will be needed to oversee some activities such as site selection for new ponds, their survey and design, to investigate the quantity and quality of groundwater and its adequacy for irrigation, and for training of DA extension staff in soil and water conservation techniques.

Domestic water supplies and sanitation: Sites for new ponds will be identified in Year 1 of the project as permits for construction can take a year or more to process. Construction will start in Year 3. Ponds requiring rehabilitation will be identified in Year 1, with implementation starting in Year 2. Works may include increasing the water storage volume, improving bunds and spillways, and reducing seepage. Most construction/rehabilitation will be undertaken through Cash-for-Work (CfW) but heavy machinery may be needed, particularly for larger ponds and dams. Improving and protecting the catchment area should be an integral part of implementation. The formation and training of community water user and maintenance groups is essential.

Implementation of hand-dug wells could start in Year 1, as soon as sites have been identified. Where communities are interested, low cost locally produced hand pumps will be provided for both new and old wells. Tube wells will be provided in areas where other water sources are severely limited. Suitable sites will be identified in Year 1 and implementation initiated in Year 2. Testing of all groundwater supplies, for both biological and chemical contaminants, is essential; traces of arsenic have been found in groundwater in some areas. Villages should establish maintenance committees and water charges should cover the cost of fuel and maintenance. The poorest and most vulnerable households will be provided with guttering and storage tanks for harvesting roof water, water filters and latrines. Hygiene education, starting in Year 1, will initially be targeted to pregnant women and those with young children.

Irrigation: Sites with suitable soils for irrigation and adequate water will be identified in Year 1 and construction will start Year 2. Both soil and water quality will be tested to ensure that irrigation is sustainable in the long term. Farmers will be encouraged to grow high value vegetables. Canals will be supplied to small areas of suitable soil below larger ponds and reservoirs. An irrigated area of 10-20 acres could be farmed by 20 to 40 households to provide vegetables for household consumption and for sale. Where lifts from wells are low, water quality is adequate and suitable soils are available, pumped systems will be provided to small groups of farmers. A typical irrigation system will include a pump set, a pump house, a water storage tank, pipes and hosepipes to irrigate about 5 acres, farmed by 5 to 10 households.

Soil and water conservation: Land degradation and other environmental issues will be identified in Year 1 and activities initiated in Year 2. Conservation works directly benefiting individual households will be unpaid, but groups testing new techniques may be provided with incentives such as implements and materials. Cash-for-work will be provided for larger public works. Participative, community based activities will be facilitated to:

- Raise awareness of natural resource issues including land degradation and its causes;
- Form and train common interest groups to plan individual land and water management activities identified as priorities by the community;
- Increase productivity and the incomes of farmers through:
  - the promotion of conservation oriented farming of rain-fed croplands;
  - improved rangeland and pastures;

- Increase the supply of firewood and timber for construction from sustainable sources, thus reducing pressure on rangeland; and
- Reduce accelerated soil erosion and protect assets such as cropland and ponds.

The main emphasis will be on agronomic and vegetative measures that make the best use of water where it falls, increase vegetative cover and generally improve soil structure and water holding capacity. This may include (i) contour planting, strip cropping, relay cropping; (ii) putting degraded sloping cropland under a permanent cover of fodder grasses and legumes; (iii) Conservation Agriculture (CA) techniques which are characterized by minimum mechanical soil disturbance, maintaining a permanent organic soil cover, and diversified crop rotations; (iv) planting of woodlots/leguminous shrubs for firewood, building materials and fodder. Physical techniques should be limited to those with a relatively low labour requirement and with which farmers and extension staff are familiar, such as contour ploughing, contour earth or stone bunds.

Links to other components and crosscutting themes: This Component links to Component 2 through provision of water for livestock, small irrigation systems and soil and water conservation activities. Cash-for-work for ponds and soil and water conservation activities will benefit the poorest households and has strong links to the crosscutting themes of social protection and nutrition as it will help to reduce indebtedness and improve household nutrition through increased income and an improvement in sanitation and health environment. Improved domestic water supplies and sanitation will lead to better health. Participatory community activities and group formation and training will be an important element of most interventions.

9.2 Seeds, Crops and Livestock Development

This major component would comprise four sub-components covering: (a) Improved seed supply; (b) Conservation agriculture; (c) Livestock production, and; (d) Enhanced vegetable production. Each of these is described in more detail below.

Improved Seed Production and Supply: This sub-component would focus on increasing the availability of improved high quality seed for pulses (pigeon pea, green gram, and chickpea), oilseeds (groundnut and sesame, possibly sunflower), and improved minor cereals crops (sorghum) mainly for fodder. Current availability of improved seed to farmers is negligible and there is a perceived risk among farmers to changing from their traditional varieties, many of which have been grown for long periods without even basic purity checks, with a commensurate decline in yield and vigor. Furthermore, climate change has affected the performance of the local varieties necessitating their replacement with improved shorter duration and drought tolerant cultivars.

The current low use of improved certified seed is a reflection of both demand and supply factors. Supply side issues include: (a) under-funded research, (b) under-funded extension, (c) problems with seed infrastructure, production, processing and storage, (d) the relatively low capacity of growers, technicians and researchers, and (e) the lack of incentives for growers and companies (private sector, PPP) to engage in seed production. On the demand side the important issues are: (a) lack of awareness and knowledge, (b) cost and risk, (c) limited market availability, (d) inadequate quality assurance, and (e) the need to show clear benefits from use of improved seed by a skeptical farming community.

Currently through the work of the GOM with development agency support, a significant amount of progress has already been made to breed, identify and initiate a seed multiplication system, more particularly for the major crops grown in the CDZ. Furthermore, the MOAI through the Department of Agriculture Research (DAR), Yezin Agricultural University (YAU) and Department of Agriculture (DA) has been working with the donor community particularly ACIAR, FAO, IFAD, IRRI and ICRISAT, to develop a range of new improved varieties for a range of crops grown in the CDZ, and these cultivars are now being multiplied by government using their seed farms and seed multiplication personnel. However, current levels of seed production for the crops important to the CDZ are completely inadequate to meet even the smallest demand for improved seed and there is little effective extension support to promote adoption.

It is proposed therefore that the program will support the MOAI at field level, through its Divisional Seed Production Unit in Mandalay and its two Seed Farms namely Mahlaing and Saikhtain, located in Mahlaing and Kyaukpada Townships respectively, for the preliminary levels of seed multiplication (for production of registered seed, obtaining foundation seed from DAR) with further support through contract outgrower schemes to farmers in the CDZ. At the seed supply level the input supply system will be supported with assistance to agro-input retailers, proper packaging and the potential use of seed banks at the village level for local seed supply. The final seed delivery system will be developed during program/project design as will the provision of seed processing and packaging. Support will also be needed for the main Seed Laboratory under the Seed Unit in Mandalay to ensure seed purity and viability and that the Certified Seed meets the standards required. The sub-component will endeavor to improve farmer awareness of the benefits of the improved seed with the provision for farmer field school training (FFS), staff training and the use of demonstrations. Furthermore, credit through the Finance and Marketing Component will be made available for seed purchase and this will comprise an integral part of sub-component activities.

Conservation/Climate Smart Agriculture: There is an important need to try to stabilize the environment and farming systems in the program target Townships where, as a result of climate change and increasing population pressure (human and livestock), the natural resource base is at risk with high levels of soil degradation and erosion. Dry land farming systems will be promoted in areas where rainfall and water to support crop cultivation is limited. In the CDZ there is limited rainfall, soil infertility, and inadequate use of agricultural inputs as well as poor farming practices which have led to low agricultural productivity and income. The Dry Zone is also an area of high levels of soil erosion, mostly due to a lack of soil conservation measures in the past, causing a loss of organic matter and a low infiltration rate of water. In addition, the vegetation cover in the area is highly vulnerable to erosion due to limited amount of rainfall and widespread grazing. It is important therefore to maximize available resources to support crop cultivation and stabilize village lands.

Measures likely to improve fertility and increase productivity include basic principles of crop management such as good and timely land preparation, correct planting techniques and maintaining a fine surface tilth or mulch to protect the natural moisture from evaporation. The development community, including FAO with its initiative on climate smart agriculture (CSA), can bring expertise in this area, and to support other important measures to promote cultivation

techniques that improve fertility such as mixed cropping, management practices to minimize soil erosion (for example leaving land fallow during the summer in alternate years), the use of both artificial and organic based products – fertilizer and compost – to increase yields, and enhancing varietal development and germplasm screening for high fertilizer efficiency. There is also a need to develop capacity in sloping agricultural land technology (SALT), rapid compost production, Integrated Plant Nutrient System (IPNS) and vermiculture.

In addition, agro-forestry has potential in the CDZ; for example, the development of the plum tree or Thanut Kha and other underutilized plant species. Integrated farming systems with an emphasis on food-feed-fibre-fuel production have the potential to improve the sustainability of livelihoods in the Dry Zone. Development agencies (FAO) and NGOs (e.g., GRET) can bring technical assistance in these fields. Close links to the Soil and Water Management Component will be important in this respect.

To achieve this, the program needs to scale up training and awareness raising on adaptive practices via Famer Field Schools (FFS) and through regular extension services to communities. These will include farm practices mentioned already such as seed selection and multiplication (covered under sub-component 1), soil fertility, pests and disease control, and water management. In addition, dissemination of a farmers' guidebook regarding farming knowledge and methods to cope with severe weather conditions and variability will need to be incorporated in the program support strategy in order to maintain dry land food security. Collaboration with relevant departments of MOAI and MLFRD, and research and development agencies (ICRISAT and FAO) will be essential for accessing research and development information.

It is therefore proposed through the project that a CSA approach to conservation agriculture is extended through the DA and appropriate service providers (NGOs with experience in NR management) to the farming communities. As mentioned a range of technologies already exist which would be appropriate such as: introduction of new drought tolerant cultivars for cash, food and fodder crops; minimum tillage, improved rotations and cropping patterns, improved composting, the use of rhizobium for legumes, improved farm implements, and other INM and IPM technologies. The project would support the introduction of these technologies to selected villages through the use of FFS to train farmers, noting firstly that it will be essential that DA extension staff be trained. The expanded provision of moderate-cost credit will also be required to ensure financing, community involvement and sustainability of the new conservation agriculture technologies.

Improved Livestock Production: As identified above, livestock health, nutrition and productivity is an area of concern for all categories of large and small livestock common to the farming systems in the CDZ. As background, it is important to note that FAO has submitted, with LIFT support, a Livestock Project proposal to the LIFT board and implementation is expected to occur concurrently with this program. The project will be targeted to the same six Townships as proposed for this program, and will pilot and develop systems, technologies and supportive policies to direct public and private investments to improve livestock productivity. It is essential that the design of the livestock sub-component of this program be informed by the FAO Livestock Project and that a high level of collaboration is assured during implementation of both projects.

The core township mechanism expected to be piloted in the Livestock Project is a Livestock Productivity Fund (LPF). This will fund sub-projects of two main types. Firstly, the strengthening of animal health services through township LBVD and networks of Community Animal Health Workers (CAHWs), as well as private sector input suppliers of some vaccines and medicines. Secondly, livestock productivity sub-projects across all species (cattle, sheep/goats, pigs, chickens), that incorporate husbandry, health, nutrition, and breed improvement. These latter would be coordinated through CAHWs who have received additional training to become "livestock productivity service providers", utilizing Farmer Field School principles. The livestock productivity sub-projects will be based on proposals which offer clear business plans, will link actors along the supply chain, and will be processed through a Livestock Productivity Committee (LPC) using criteria that assesses the use of project funds to improve the livelihoods of the project target households.

The CAHW sub-projects will largely protect the cattle population, but also the pig and to a lesser extent, the sheep/goat population from infectious diseases. The livestock productivity sub-projects will focus on cattle, sheep and goat and pig productivity, especially through improved reproductive management, management of late pregnant and lactating females, early weaning strategies, improved breeds, and flock structure. Chickens will also be the subject of sub-projects. However, the LPF process will be flexible enough to address identified priorities that can vary from area to area; for example, the establishment of new plant species that can be used to feed cattle, sheep and goats and pigs.

In the case that the LPF and the sub-projects it funds are found to be successful, the DZP will contribute funds to the LPF to fund livestock productivity sub-projects, on the assumption that the Livestock Project has completed the CAHW strengthening sub-projects across all target townships, and has begun the process of developing the CAHWs into "livestock productivity service providers". In summary, the Livestock Project would build the capacity, pilot implementation, and then the CDZ brings in more funds for the livestock productivity sub-projects.

In addition to the above, the program would include the provision for support to households most at risk of malnutrition in the target village communities through potential of the poultry intervention to directly impact on human nutrition at the producer community level. For this purpose, it is proposed to target households with pregnant and lactating women (PLW) or children under two, and is designed explicitly for these groups with the objective of increasing consumption of households and communities. It is a group activity which is managed (or at least has prominent involvement of mothers) and involves poultry and eggs which can be potentially consumed at community level, as well as sold. It is combined with a strong food and nutrition promotion/education activity and is viable from the livestock point of view in terms of linking up with animal health etc., as outlined above.

Enhanced Vegetable Production: This sub-component will primarily have the objective of improving the nutrition of the village communities through increased access to a diverse range of vegetable and fruit crops. Of particular importance in this regard is the nutrition of children to reduce malnutrition and stunting. There are three aspects to this intervention, firstly to provide support for household vegetable production through simple homestead garden plots, secondly the establishment of larger scale community run vegetable plots located near a perennial water source

in which a women's group would share the production workload and output. In this latter case, there could also be some element of cash sale as well as production of vegetables for subsistence purposes. The third possible intervention could be support to the establishment of school vegetable gardens to ensure that children are involved and exposed to the benefits of vegetable production and the health benefits of vegetables.

In regards to the homestead gardens where water availability is an issue, there are a number of technologies that can be used, namely a keyhole garden and a vertical garden. A keyhole garden is a waist height garden bed surrounded by rocks and stones, with a walkway ('keyhole') to allow easy access. The bed is comprised of layers of various organic materials that add nutrients and retain moisture. A vertical garden is made from a bag or other vessel, filled with a mixture of soil, ash and compost. Leafy greens are cultivated in holes, cut in the side of the bag, and on top. Some designs include a gravel column at the center of the bag to allow filtration of grey water.

It is important to note that vegetables can be grown in both the monsoon and the dry seasons; hence production can occur year round. The project would support the provision of vegetable starter kits to the households and community groups, with training and facilitation provided to these groups on improved vegetable production; various methods would be used including where appropriate FFS's. School curricula could also include vegetable production and nutrition elements which would be supported by the project. A number of NGOs working in the CDZ have already gained experience in this type of activity and will be core to the success of these interventions. The close involvement of DA extension staff is also important and they would be provided with training and involved in implementation. It is important to note that dry season vegetable production especially at the household level with the poor is challenging so careful thought will be needed in the design and implementation to ensure sustainability.

9.3 Rural Finance and Marketing

Considerable experience already exists with respect to successful microfinance operations within Myanmar in general and the CDZ in particular. The proposed activities under the rural finance component over a four-year period would build on and expand that experience, but test some modifications that may offer improvements to the current approaches. Among the key aspects of many of these approaches that would be adopted under the proposed finance activities are the following:

- The use of a group lending methodology without collateral;
- The formation of community level support and supervision organizations (VICOs);
- The provision of financial and business training by MFI field staff to all groups prior to their accessing loans and the continued monitoring of these groups by these staff;
- The requirement for compulsory savings as a condition of group membership combined with the opportunity for additional voluntary savings;
- The establishment of interest rates which will ensure the operational sustainability of the MFI over time;
- The availability of loans for a range of purposes, not just productive activities.

Among the elements for which modifications would be tested under the project would be:

- The linkage of lending activities to implementation activities of other programme components, including support to vulnerable groups participating in the programme and those wishing to adopt practices assessed during farmer field schools;
- The adoption of more flexible durations for agricultural loans, in order to permit those producers who are financially able to do so to retain the crop after harvest and market the product during times of higher prices;
- The expansion of the role and training of community level groups to include the establishment of a community-based savings and loan association which would focus on the mobilization of savings and the provision of small-scale loans for non-productive purposes (medical, educational, food purchase etc.);
- The expansion of micro-insurance coverage through the VICO to include all members of the community participating in microfinance activities for productive purposes;
- Where financial sustainability was assured, the MFI would return a portion of the net income generated to the community, probably on a matching grant basis, to support its growth and development. The MFI would thus gradually withdraw from non-productive loans (where transaction costs are highest);
- Trials would also be undertaken of longer-term loans of up to three years to finance the establishment of small enterprises, subject to an adequate feasibility assessment of the proposal.

The implementation mechanisms to be used in ensuring the availability of financing to profitable activities within target communities will be finalized during the Design Mission, but three choices were examined during the mission. The first, the creation of a new MFI, was considered overly costly and unnecessary in light of existing MFI organizations and activities within the country. The second option, of directly supporting one or more agencies in establishing or expanding their activities within the target area has the benefit on ensuring coherency of implementation, as the terms and conditions of savings and lending activities could be clearly laid out in the underlying agreements. A third option would be to offer matching grants and capital for specific purposes on an open basis; that is open to any agency meeting the criteria specified. While this approach risks some loss of coherence, it does increase the flexibility of recipient organizations to innovate and holds out the possibility of gaining greater experience of the advantages and disadvantages of different approaches. On the negative side, however, it also raises risks of multiple providers of credit and increased indebtedness among borrowers unless some form of register is established and maintained.

Marketing activities would not comprise a major element of the activities of the programme over the initial four-year period of implementation. Apart from a number of studies described below, only a limited range of activities is foreseen during this period. Activities include: (a) the training of VDC members in group marketing and procurement (transport and inputs); (b) where the production of sunflower seed is significantly increased, village level sunflower oil presses would be introduced on a trial basis; (c) providing marketing support for new producers of vegetables or other diversification activities (including non-agricultural products), and; (d) to ensure that village level sales of animals (sheep, goats and pigs) are based on accurate live weight basis, hanging livestock scales would be introduced in the important livestock villages.

9.4 Community Development, Social Protection and Nutrition

Although the activities described below are in all cases integrated into other components of the programme, it is considered useful to present them separately.

Community Development: The expected outcome of the community development activities funded by the project would be that well-functioning and self-reliant Village Development Committees (VDCs) are active in managing support for community development and social protection in the villages targeted by the project.

The program will work through qualified IPs to provide seed capital to VDCs to fund the social protection measures identified by the community. In addition, it would fund community mobilization sessions, various types of training for community facilitators and VDC members, as well as continuous coaching needed to bring VDCs to a level of self-reliance. In this process, the program will collaborate with national and international NGOs operating in the target area and, importantly, with relevant Township authorities who will play the role of facilitators in providing technical services, fostering linkages with service providers as required and organizing township-level meetings and learning events. For each target township, the project would recruit, train and provide transport costs for one township VDC coordinator, about three technical officers to cover relevant aspects of project support and a body of community facilitators, depending on number and size of villages selected (indicatively one for every five villages). The project would also pay for training, per diems and equipment (perhaps clothing items and gadgets) for village volunteers who will be mobilized at the community level and whose services would eventually be paid by the VDCs.

The Implementing Partner(s) will be required to use appropriate participatory rural appraisal and planning tools to ensure that project interventions reflect the needs and priorities of target populations, that decisions for any type of support are made in an inclusive manner and that community development plans are equitable, coherent and realistic.

It is assumed that the first year will be focused on definition of IPs, recruitment, initial training of key staff, and selection of target villages. Some initial community mobilization can be carried out in about 30 villages during the latter half of Year 1. Years 2 and 3 will see an intensive process of VDC formation (about 60 each year) with lessons from one year feeding into the process of developing new VDCs in the other years. Early Year 4 will see the development of 30 new VDCs, while support will gradually be phased out in the older VDCs, which will have reached maturity. More details on VDC formation and strengthening are presented in the following section.

Social Protection: The program will support vulnerable community members through three broad approaches: **community level measures, group activities** and **vocational training** of individuals. Vulnerable people are defined here to include: landless men and women with no assets (daily wage workers); marginal farmers (male and female); asset-less women headed households; and - within households - dependents with no support (including aged and persons with disabilities); pregnant women and young children.

Community-level measures will be aimed at enhancing resilience against shocks and protecting livelihoods. To achieve this, the project will channel financial support through the VDCs that will have been formed and strengthened through the activities proposed above. VDC members will act

as managers of SP in the communities, through appropriate sub-committees or village groups dedicated to providing specific SP services. Important inputs from the project would include provision of intensive training of committee members in all aspects of leaderships, management and accounting. The phasing of community SP activities would coincide with those for VCD formation, as activities will likely not start before VDCs have been formed and have at least reached the stage of planning. Five key **community level measures** SP measures have been identified as suitable for the Dry Zone townships visited by the mission. These include: (i) livelihoods protection funds; (ii) health emergency fund; (iii) education support for children; (iv) Cash for Work (CfW), linked to activities implemented under the Soil and Water Component; and (v) rice banks schemes, proposed on a pilot basis. **Group measures** will focus on support for the development of Self Reliance Groups (SRGs) for income generation and empowerment. Inputs from the project will consist of provision of matching grants, appropriate technical assistance and intensive training of group members in all aspects of business development, leadership, management and accounting. A variety of on and off-farm income generating activities could be supported (according to the needs of the group) including: livestock raising (goats/chickens); vegetable gardening; simple food processing; small trade, etc. About 240 SRGs (one per village, each with about 25 primarily female members) will be formed and made functional during the life of the project. Activities would likely link to interventions proposed under the Seeds, Crops and Livestock Development Component, especially on improved livestock productivity (small ruminants & poultry) and enhanced vegetable production (small scale household or community gardens). On the financing modalities, the measures would link with the Rural Finance and Marketing Component, especially relating to group loan mechanisms.

The programme will draw on experiences of UNDP's SRG and PACT's "WORTH group" models which have come a long away in testing methodologies to build transparent savings and credit groups throughout the country, including in the Dry Zone. **The criteria for selection** of beneficiaries would be defined with the facilitation of the VDC through participatory methods. SRGs will explicitly target the poorest and most vulnerable community members, and will be formed on the affinity principle in order to reflect equally the priorities of the poor, avoiding the influence of other segments of the community.

To ensure that the project-funded SP support measures build adequately on existing social networks, IPs would be requested to identify existing mechanisms in the target communities with the aim of adding value to them and institutionalizing them for effective SP of vulnerable people. IPs will identify or establish village groups (either as VDC sub-committees or as independent groups working through the VDCs) to be trained and supported in the role of taking responsibility for SP services in the community. The steps to be followed in this process would include: (1) identification of different categories of vulnerable groups; (2) classification/ mapping of vulnerabilities and existing practices in each group; (3) definition of the kinds of support required to address the vulnerabilities identified; (4) identification of potential community-led options for the implementation of such support; and (5) assessment of resources / assistance required.

A summary is provided in the table below of the results of the mission's findings regarding categories of vulnerable people, their vulnerabilities and relevant village groups that could possibly play the role of SP providers[30].

Categories of vulnerable people	Vulnerabilities/ risks	Community based groups who can provide support
• Landless men and women with no assets (daily wage workers) • Marginal farmers (male and female) • Asset-less women headed HHs • Dependants with no support (Aged and PwDs) • Within vulnerable HHs: pregnant women and young children.	• Climate variability • Poor asset base • Inadequate livelihood diversity (low returns on migration) • Restricted mobility (due to disability, need to care for dependents, or inability to afford transport costs) • Time-poverty (fetching water, firewood and caring for dependents) • Cash-poverty and un-affordability of health care and education • Limited skills and bargaining power • Limited participation in decision making	• VDCs • Women groups • Youth Groups • Village leaders • Farmers cooperatives • Monasteries

Nutrition: Proposed nutrition activities would not be implemented in all intervention communities but a package of interventions can be selected which are appropriate to the setting whilst still addressing the specific causes of malnutrition; food access and availability, hygiene and the household environment, and care practices. All activities should be underpinned by a nutrition education and behavior change strategy, which is informed by community based research, to improve food consumption practices and awareness.

In addition to the household and community gardens activity proposed under the Seeds, Crops and Livestock Development Component which would be expected to have a strong nutritional aspect, other proposed activities related to nutrition would include: (a) a study of the potential for wild food cultivation; (b) micro-scale poultry production; (c) the consideration of the nutritional value of crops adopted under conservation agriculture approaches; (d) potential expansion of the ultra-rice and bio-fortification activities currently being supported by LIFT in the Ayerawady and Yangon regions; (e) support for sanitation measures that would minimize negative impacts on health and nutrition; (f) expanding the adoption and sustainable use of water filters; (g) improved preservation and storage techniques for vegetables and other commodities to conserve micronutrients and reduce risks of aflatoxins and other contaminants; (h) increased knowledge of healthy snacks, such as dried fruits; (i) community level vegetable oil production (particularly from sunflower if adoption is feasible) and; (j) the design of social protection measures that support improved nutrition.

Beyond these specific measures to improve community level nutrition, the programme would also promote and support food and nutrition education as a core element to ensure that the nutrition sensitive interventions will in fact have an impact on nutrition outcomes. Breaking down some of

[30] Adapted from Thadar Consortium DELTA Project Study, June 2012.

the social and cultural barriers which prevent good nutritional practices is as essential as ensuring that the households are well informed to make appropriate decisions regarding food purchase and consumption for the different members of the household. Behaviour Change Communication strategies work when they employ several different coordinated approaches to reach different audiences but all of whom contribute to the decision making around food consumption patterns and household practices.

Nutrition education would include: (a) community wide sessions to inform the general themes around causes and consequences of malnutrition and those at highest risk. Detailing the linkages between the different interventions, such as latrines, sanitation, vegetable production, social protection measures for PLW; (b) education of more specialised groups such as the home gardening groups, poultry keeping groups and wild food cultivation groups to ensure that there is an understanding of the nutrition and health related purpose to the type of activity. This should be built into the broader training and facilitation guidance of the specific activities; (c) education for groups of pregnant women and mothers of children under two in conjunction with the midwife, auxiliary midwife (AMW) or public health supervisor.

As part of the behaviour change strategy and linking up with the Scaling Up Nutrition (SUN) initiative, a public media campaign can be a powerful tool when developed based on an understanding of the context and the barriers within the specific communities where the project is working. Based on research the campaign could target specific behaviours such as food avoidance, improved dietary diversity and consumption of ASF, good hygiene practices, food safety and infant feeding including breastfeeding and complementary feeding practices. A media communications campaign should use forms of media that are most readily available and accessible to the target communities such as radio, journals and billboards and should take place in collaboration with the township authorities and the SUN partners.

There are potential opportunities to maximise the impact on the development outcomes for the communities in Yesagyo and Pakokku through effective planning, coordination and overlap with 3MDG Multi-donor trust fund. Sharing work plans, coordinating and aligning key messages and outreach activities to specific communities will provide evidence of the improved impact on nutrition and food security of an integrated programme approach.

10. Recommended Research and Study Program

A number of proposed areas of studies and research have been identified in the course of the Scoping Mission. These are outlined below. All proposed studies are categorized according to their timing requirement (high, intermediate and other) and their expected broader impact beyond the target area or Dry Zone in Myanmar.

Soil and Water

Groundwater Resources Assessment

A necessary precursor to any large-scale development of groundwater within the CDZ is a detailed appraisal of groundwater resources including recharge, sustainable yield of aquifers and water quality. The study would include: (a) an initial desk study to determine available information, further information needs, how it should be obtained and costs; (b) initiation of a survey of existing wells, starting with the collection and analysis of well data in the six proposed

townships as a training exercise, then expanding to the rest of the program districts; (c) a survey of well-drilling companies and individuals to capture informal local knowledge of the location, extent and reliability of groundwater resources; (d) establishment and testing of a central GIS system and database for groundwater wells, building on data held in local WRUD offices, which would gradually be extended throughout the CDZ and eventually, countrywide; (e) training of government officials in GIS and database establishment, maintenance and use; (f) training of government staff and survey teams in data requirements, use and maintenance of survey equipment, the compilation, analysis and evaluation of data and information collected, and the use of the wells database, and; (g) workshops for potential users of the wells database – government staff, contractors, NGOs etc.

Timing: As much of the soils and water component of the proposed program will depend upon this information, it is considered essential that this work begin as soon as possible – even before the program is fully launched at field level.

Broader Impact: The approach and methodology developed in conducting this study would be applicable throughout the Dry Zone and it is hoped that either government of development agencies would extend the study to build up a picture of water resources across the entire area.

Seeds, Crops and Livestock Development.

Four major studies are proposed under this component.

Study on Seed Sector Development in the CDZ

This study will entail a detailed analysis of the seed sector as it pertains to the CDZ, more especially with regards to the streamlining of the supply of seed for pulse and oilseed crops and the need to improve farmer uptake. An important part of this study would be the development of implementation modalities for greater involvement of the private sector in seed multiplication and marketing.

Timing: Given the importance of improved seed supply to Dry Zone productivity and the time required to develop and institutionalize that capacity, this work should commence as soon as possible.

Broader Impact: The approach and methodology developed and applied in undertaking this study, which would include the entire Dry Zone, are applicable throughout Myanmar and it is hoped that they would provide a model for similar development elsewhere.

Studies on Farming Systems and Conservation Agriculture in CDZ

These studies will address the lack of detailed information on the farming systems in the area. It is proposed that two studies are undertaken to respectively address, (a) the detailed description and categorization of farming systems and (b) the requirements to properly operationalise conservation agriculture in the CDZ as well as to assess dryland farming/minimum tillage options.

Timing: As an intermediate priority activity, these research studies need not commence immediately but should get underway during the first year of program implementation.

Broader Impact: As these studies are addressed at issues specific to the Dry Zone agroecological ecosystem, their results would have little direct impact beyond this area, Nevertheless, they would be expected to provide a methodology that might be applied – particularly for farming systems definition – in other regions of Myanmar.

Study on fodder production in the CDZ

A study of this type is urgently needed to rationalise the key area of fodder production in order to better integrate the mandates and activities of MOAI and MOLFRD, with the emphasis on improved fodder and forage options and grazing management, their impact on livestock nutrition and productivity for the CDZ, and the anticipated linkages between improved fodder availability and reduced desertification within the zone.

Timing: This study should commence within the first year of the program in order to guide a considerable portion of the livestock related activities foreseen.

Broader Impact: As the Dry Zone faces very different agroclimatic conditions from other areas of Myanmar, many of the findings of the study would have little direct broader impact, but may inform other areas of the country on issues related to smallholder management of grazing and fodder resources.

Finance and Marketing

The Feasibility of Linkages between MFIs and the Commercial Banking Sector

This study would consider particularly the potential provision of commercial capital to expanding MFIs and the conditions under which such resources might be made available by banks. Key aspects to consider would be the likely cost and duration of funds provided, the nature and extent of any guarantees which would be required by the banks, and the volume of funds that the banks might be prepared to make available. Other linkage aspects which might be considered would include: (a) the establishment of a national credit reporting bureau, in order to monitor borrowers and their repayment histories, and the benefits and costs of MFI participation in such an agency, and; (b) the potential for MFI commercial bank collaboration in developing a mobile funds transfer system, as is used so successfully in East Africa.

Timing: The results of this study are not seen as essential for the expansion of moderate cost credit provision within the target area, as this can be initiated based upon existing models, with pilots of loss insurance provision. The study can therefore be launched in the second year of implementation.

Broader Impact: The long-term expansion of MFIs throughout Myanmar will depend ultimately on their access to commercial banking resources. The study is therefore expected to have a very broad impact on the credit sector within the country.

Input Value chains for Selected Products in Myanmar

This study would encompass local suppliers, importers, distributors, retailers, prices, trading terms and products available for a range of import inputs of relevance to the CDZ. The study would identify constraints to the development of an expanded and more competitive input supply

industry (seeds, fertilizers, agro chemicals and animal veterinary products) with greater involvement of the private sector. The study should propose appropriate policies and incentives to expand input supply and availability including financing and credit options to stockists and how to encourage increased private sector involvement and competition in the input supply industry.

Timing: This study is considered to be of intermediate priority and should be initiated during the first year of program implementation.

Broader Impact: Although the products selected for assessment will be those of most interest to the productive sector of the Dry Zone, many of these products will also be of importance elsewhere in the country, and the supply chain evaluations would consider the entire national system. The study would therefore considered to have a major impact across the rural sector nationally.

Social Protection and Nutrition

A Review of Existing Community-Based SP Mechanisms

This study would identify the different types of traditional community-based social protection mechanisms operating within the Dry Zone, their coverage, criteria, funding and administrative mechanisms. Such study would also define the likely benefits of a possible increased investment in community led social protection, as a key component of a broader national social protection policy.

Timing: This study is intended primarily to contribute primarily to national policy formulation, although it would assist in guiding program implementation. It is not a high priority, therefore, and could be commenced in the second year of implementation

Broader Impact: The focus on national policy formulation would render this study of considerable national interest and result in a broad impact.

Eligibility Criteria and Targeting Mechanisms

This study would examine the mix of different approaches and methodologies currently used in the Dry Zone for beneficiary identification by the communities. Such study would highlight the relative roles of VDCs and other CBOs in the process as well as define those methodologies that are worth replicating or scaling up as part of a regional or national social protection policy. The evidence from the Dry Zone would contribute to harmonizing the beneficiary identification mechanisms used by government and development partners, which are now fragmented and at times contradictory.

Timing: As the study would contribute to guiding implementation processes within the program it is considered to be of high priority and should commence as soon as possible upon program implementation.

Broader Impact: The issues addressed by this study are of relevance for all agencies, whether government or international, engaged in work requiring the definition of eligibility criteria and

targeting mechanisms. As such, it is seen as potentially having a very broad impact in the rural sector.

Appropriate Household Level Transfer Systems

This study would provide an assessment of new as well older LIFT-supported cash transfer schemes (including CfW), and drawing of key lessons that would (a) support the design of appropriate uses of cash and food assistance (or a mix of both) and (b) provide crucial inputs into national or regional social protection policy.

Timing: Although of relevance to the proposed program, the results of this review are not seen as essential for launching activities and it would be given intermediate priority – starting during the first year of implementation.

Broader Impact: As for the eligibility and targeting study, this review would be of relevance across a wide range of organizations working on social issues in the rural sector of Myanmar and would be expected to have a broad impact.

Transitioning from Donor-led to Government-funded and Implemented SP

Government and development partners have accumulated a wealth of experience in SP provision that has never been sufficiently analysed through one single analytical lens. The program could contribute to such a study, through integrating and analysing the findings of all assessments/ evaluations undertaken by IPs of relevant LIFT-funded initiatives in the Dry Zone, providing some recommendations for transitioning into a coherent government-led SP system.

Timing: Although of relevance to the proposed program, the results of this review are not seen as essential for launching activities and it would be given intermediate priority – starting during the first year of implementation.

Broader Impact: As for the previous study, this research would have broad impact social protection activities throughout Myanmar if the Government were willing to adopt a more direct role in this area.

Nutrition Sensitive Programming Impact Study

This study would comprise an assessment of nutrition outcomes, and could include: (*i*) the impact of nutrition sensitive agricultural production (cash crops) interventions on the nutrition outcomes of the target community and wider populations; (*ii*) the added value of water and sanitation interventions on nutrition outcomes of food security and livelihoods programmes; (*iii*) the impact of increasing household production on household consumption, assessing resource requirements against food and nutrition security benefits; (*iv*) evidence of increased income on increased diet quality and quantities at the individual and household level, and; (*v*) a comparison of the impact of stand-alone nutrition sensitive food security programmes as against when combined with health programming under the 3MDG to measure the relative impact of the multi sectorial approach.

Timing: As an activity drawing heavily upon the results of program activities, supplemented by information available from other interventions, this study should run parallel to the programme implementation process.

Broader Impact: The study would provide valuable information to any agency undertaking nutrition related work in Myanmar and would thus have a broad impact within this sector.