



Food Security Assessment in the Dry Zone Myanmar

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Prepared by Claudia Ah Poe, Food Security Analysis Services (ODXF)

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Key messages

The **food security situation** in the Dry Zone has improved compared to a year ago. Overall, 17 percent of households are severely food insecure, 24 percent moderately and 59 percent food secure. In the areas covered in both 2009 and 2010, the share of severely food insecure households decreased by 15 percent.

Households were able to enhance both **food consumption and food access**. In 2010, 10 percent of households had poor food consumption compared to 21 percent in 2009 in the areas assessed in both years. The share of households with an acceptable diet has increased from 36 to 58 percent. Households with poor food access who are depending on unreliable food sources decreased from 40 to 32 percent.

The situation has improved across the Dry Zone. However, food insecurity levels remained high among households in Zone B, which is characterized by poor access to land and physical access to markets. Households relying on wood/bamboo cutting or casual labour as well as female headed households and those with children under-5 are **more vulnerable to food insecurity** compared to other groups.

Agriculture is an important factor contributing to improved food security in the Dry Zone. Generally, farming households are amongst the most food secure households. They were able to benefit from relatively improved crop conditions compared to the previous year and increased marketing opportunities. Generally, there has been an increase in the area cultivated. In 2009, 40 percent of farming households cultivated a plot below subsistence level (< 2 acres), in 2010 the share was only 22 percent.

Despite improved conditions, 41 percent of farming households were affected by **dry spells or drought** during the 2010 agricultural season, which had a negative impact on their food security status. Households who were affected by both drought and high debts are amongst the most food insecure groups within the Dry Zone. The most areas affected by drought were Zone B and D.

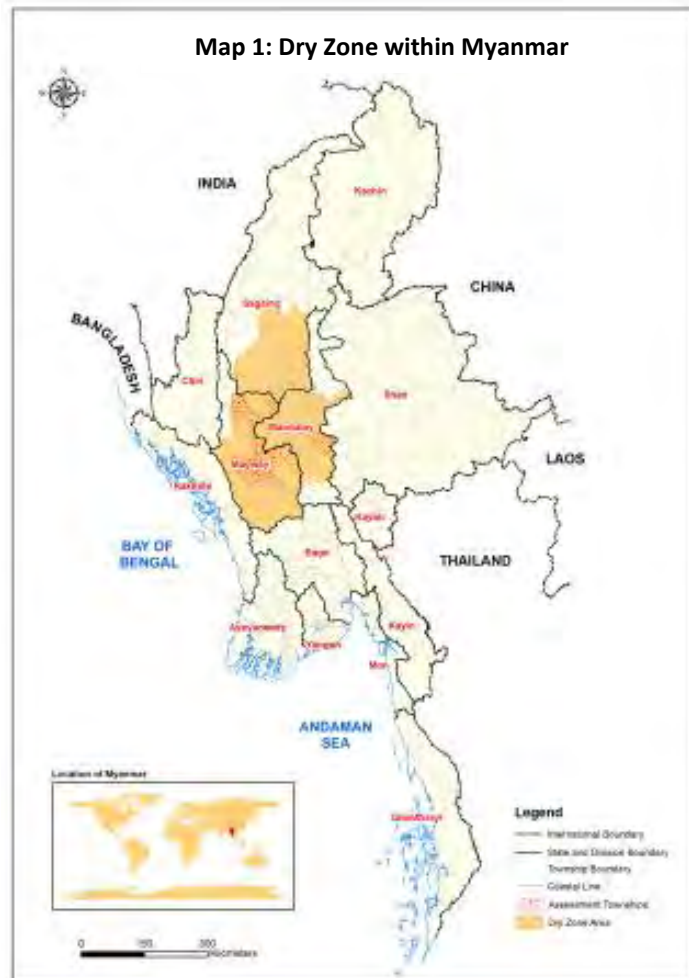
Households with poor food access are less likely to **enroll their children in school** compared to households with good food access. This illustrates how current food insecurity can hamper food security prospects for the next generation. On a positive note, households in Zone B, generally the most food insecure area in the Dry Zone, are more likely to send their children to school, which may be related to the existing Food-for Education-programme in most of the townships in this area.

Despite a general improved food security situation, there are several **risks factors** that should be closely monitored throughout the 2011 agricultural season: (1) potential dry spells that could reverse positive outcomes achieved in 2010, (2) increasing food prices that could put pressure on vulnerable groups relying heavily on food markets, and (3) seasonal water scarcity during the dry season which poses a serious health risk in some areas. Longer-term factors to be addressed are the continuous land degradation through poor agricultural practices, and gender inequality in terms of access to primary education despite the fact that women are contributing largely to the household income.

1. Background

The Dry Zone in central Myanmar, covering large parts of the Magway, Mandalay and lower Sagaing Divisions, belongs to one of the most food insecure areas in the country. Irregular and scarce rainfall leads to water shortages and constitute a regular threat to rural livelihoods. The area covers about 13 percent of the country's total area with a population of roughly 14.5 million, close to a third of the country's population. Livelihoods are heavily dependent on the south-west monsoon. The rainy season is mostly confined to the period mid-May to October followed by a dry cool spell from mid-October to mid-February and a dry hot season from mid-February to mid-May. Average annual rainfall is low ranging from 500 to 1000 mm compared to 5000 mm in other parts of the country.

Reports indicate that there has been reduced frequency and amounts of rainfall over the last decades. The area is prone to erratic rainfall and prolonged dry spells. The Dry Zone is characterized by clay and sandy soils with are at high risk of water and wind erosion leading to land degradation and declining agricultural production. The Food security and Agriculture Thematic Group prepared a multi-agency Framework for Action to support the Government of Myanmar in its efforts to improve food security and increase income generating opportunities in the area.



2. Assessment objectives and methodology

The assessment is a follow-up to the Food Security Assessment conducted in the Magway Division in November/December 2009 with the following objectives:

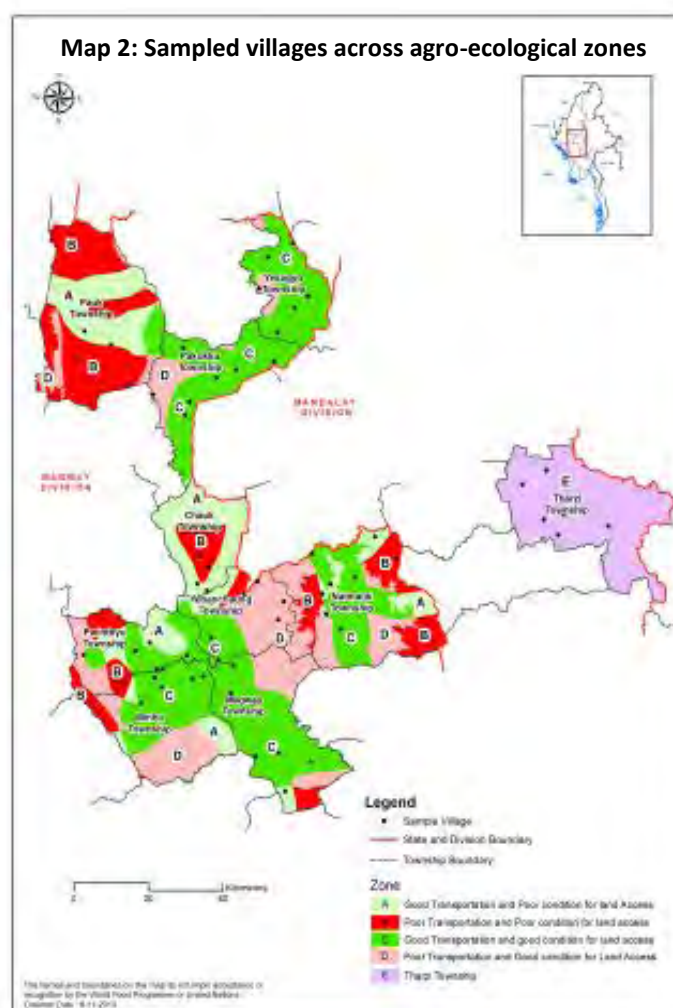
- Monitor trends in food insecurity and assess acute malnutrition in the Dry Zone
- Assess the impact of recent rainfall shortages on households' ability to produce and access food
- Provide recommendations to fine-tune and adjust responses to improve food security

The assessment covered 9 townships in Magway and 1 township in the Mandalay Division. Sixty-three villages were selected based on the probability proportional to size. In total, 630 households were interviewed.

The sample is representative for the area covered but findings provided at agro-ecological zone and township level are only indicative. Following a three-day training, data collection took place from 7 to 17 October 2010.

Table 1: Number of interviewed households						
	Agro-ecological Zone					Total
	Zone A	Zone B	Zone C	Zone D	Tharzi	
Chauk	20	20	0	0	0	40
Magway	10	0	50	0	0	60
Minbu*	0	0	60	0	0	60
Natmauk	31	10	30	9	0	80
Pakokku	0	0	70	10	0	80
Pauk	20	30	0	0	0	50
Pwintbyu*	20	0	30	10	0	60
Tharzi*	0	0	0	0	60	60
Yenangyaung	10	0	20	40	0	70
Yesagyo	0	0	60	10	0	70
Total	111	60	320	79	60	630

* Not covered during in 2009 assessment



The assessment was led by WFP in close partnership with Adventist Development and Relief Agency (ADRA), Cooperazione e Sviluppo (CESVI), Organization for Industrial, Spiritual and Cultural Advancement International (OISCA International), OXFAM, Progetto Continenti (PC), Renewable Association Myanmar (REAM), Save the Children (SCF), Terre des hommes Italia (TdH) and World Vision (WVI). Forty well trained enumerators support the conduct of the survey.

3. Household food security status and trends

3.1 How many are food insecure?

Achieving food security requires that the aggregate availability of food is sufficient, that households have adequate access to those food supplies through their own production, through the market or through other sources, and that the utilization of those food

supplies is appropriate to meet the specific dietary needs of individuals.

For the purpose of this assessment, households' food security status was assessed through a combination of (i) household food consumption (frequency and dietary diversity based on 7-day recall, a proxy indicator for current household food access), and (ii) reliability of food sources to provide an outlook for the future potential to sustain food consumption levels (see Tables 5 and 6).

Based on the analysis, **8% of households have poor, 30% have borderline and 61% have acceptable food consumption.** The new areas covered under the survey are slightly better off than the original areas (see Fig. 1). A poor diet is characterized by the daily consumption of rice, fresh vegetables, oil/fat and condiments. In addition to this, households with borderline diet have protein sources as they consume once a week pulses (peas or beans) and once a week fish or meat. Households with an acceptable consumption have a good

dietary diversity consuming all food groups on a regular basis (see Table 2). **Compared to a year ago, the situation has improved.** While last year 21% of households had poor consumption, this year it is only 10% in the areas covered by both 2009 and 2010 assessments.

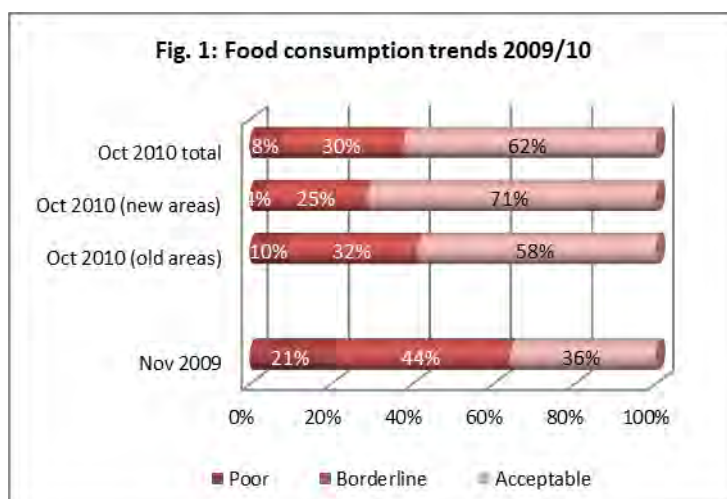
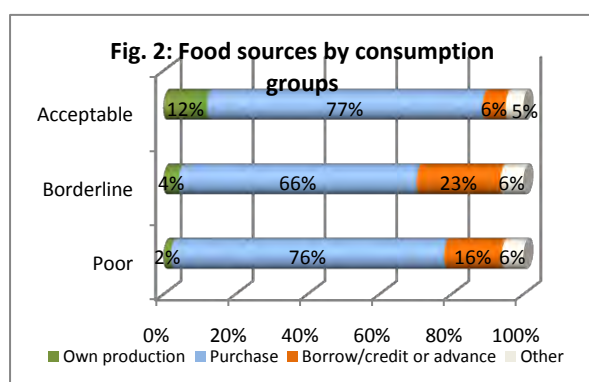


Table 2: Number of days food consumed by food consumption groups

	Rice	cereals	potatoes	Pulses	vegetable	Fruits	meat	eggs	fish	dairies	oil/fat	sugar	condiments
Poor	7.0	0.3	0.3	0.2	6.0	0.1	0.1	0.1	0.0	0.0	6.9	0.4	7.0
Borderline	7.0	0.2	0.6	1.2	6.2	0.6	0.6	0.5	0.6	0.0	6.9	0.8	6.9
Acceptable	7.0	0.3	1.0	3.3	6.5	1.5	1.8	1.8	2.2	0.4	6.9	1.5	7.0
Total	7.0	0.3	0.8	2.4	6.4	1.1	1.3	1.3	1.5	0.3	6.9	1.2	7.0



Across the sample, most households rely heavily on markets to access rice, 73% through direct purchase, and 12% through borrowing or crediting in advance, only 9% rely on their own production. Among the households with an acceptable diet, more rely on their own production (12%), while households with borderline consumption tend to rely more on borrowing or buying rice on credit compared to other groups (see Fig. 2).

Households' ability to access food in the short- to medium term was determined by an evaluation of the reliability of their food source using the classification described in table 3. Households currently relying on own food production to access rice were classified according to the size of their agricultural land, households relying on purchases according to their share of household expenditure on food, and households who accessed rice

through borrowing or credit according to their ability to repay those credit. Household with other food sources (e.g. gifts, food aid) were considered to have poor food access.

Table 3: Household food access classification

Main source of rice	%	Food access		
		Poor	Medium	Good
Own production	14%	Below subsistence: If land <2 acres	Subsistence: If land 2 to < 3 acres	Above subsistence: If land at least 3 acres
Purchase	61%	High food exp: 75% +	Medium food exp: 50- <75%	Low food exp: <50%
Borrow, credit or advance	5%	Highly indebted: Pay back more than 2 months	Able to pay back: Pay back within 2 months	
Exchange work for food(not food-aid), gifts, food aid, other source	20%	Unreliable food source: All		

Based on this analysis, 27% of households are considered to have poor, 33% medium and 40% good access to food. In line with food consumption, also food access improved compared to a year ago. In 2009, 40% of households had poor access, this year only 32% in the areas covered in both rounds of assessments. The new areas covered seem to be relatively better off than the old areas (see Fig. 3). The main difference is that in these areas more households are able to rely on their own production to access rice, 24% compared to only 4% in the remaining sample.

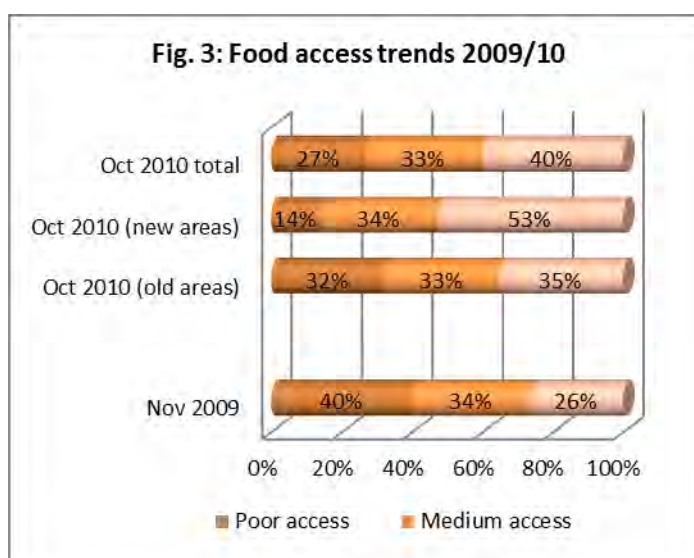
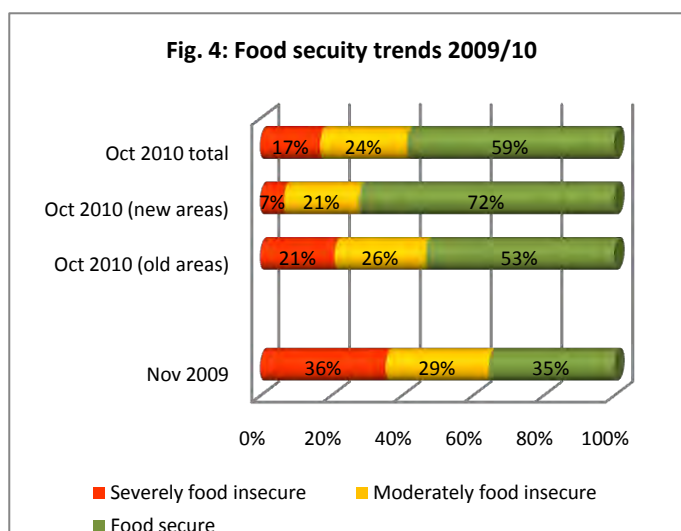


Table 4: Household food security classification (% table)

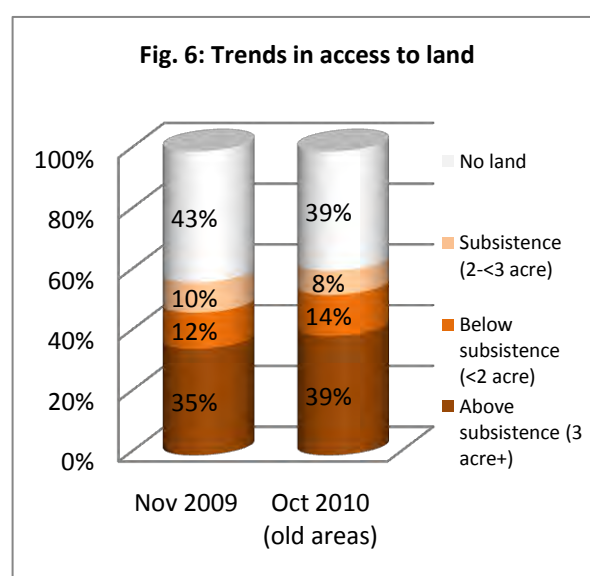
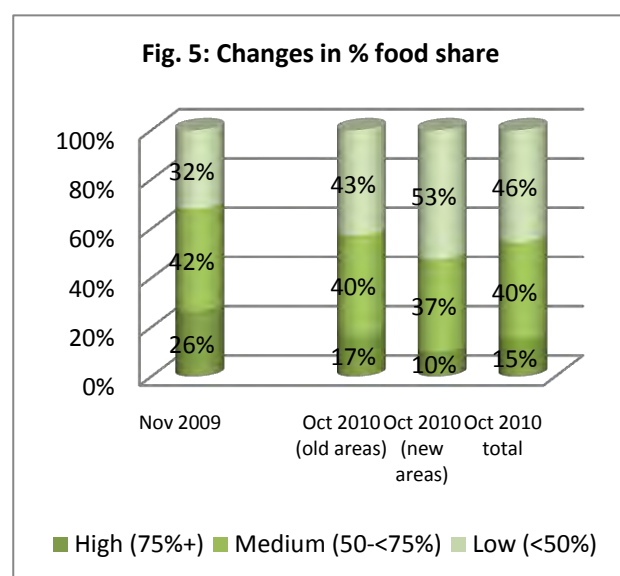
Food access	Food consumption			Total
	Poor	Borderline	Acceptable	
Poor (not reliable food source)	3.2%	11.5%	12.1%	26.8%
Medium (fairly reliable food source)	2.4%	9.9%	20.9%	33.2%
Good (reliable food source)	2.4%	8.8%	28.9%	40.0%
Total	8.0%	30.1%	61.9%	100.0%

When combined, 17% of households are considered to be severely food insecure, 24% are moderately food insecure and 59% can be considered food secure. The newly covered areas are better off compared to the areas covered in both 2009 and 2010 (see Fig. 4).

The food security situation has improved compared to a year ago. In 2009, only 36% of households were considered to be food secure, this year it is more than every second household (see Fig. 4). The main drivers for improved food security were increased food consumption, improved access to agricultural land and relative decreased expenditure on food (see Fig. 1, 5, and 6). This is an indication that on average households are less affected by rainfall shortages compared to a year ago.



Households relying on markets spent 50% of their total expenditure on food compared to 58% in 2009. Overall, households decreased their relative expenditure on food and utilities, while increasing their relative expenditure on agricultural inputs. Other type of expenditure, including health and education remained at the about same level. As prices of most key food commodities increased compared to last year (see Fig. 15 in Section 4.1), many households must have been able to increase their purchasing power either by increasing their production outputs due to improved conditions for agricultural production or increased income diversification (see also Section 3.3.2). The implementation of a micro-finance programme contributed to this positive development.



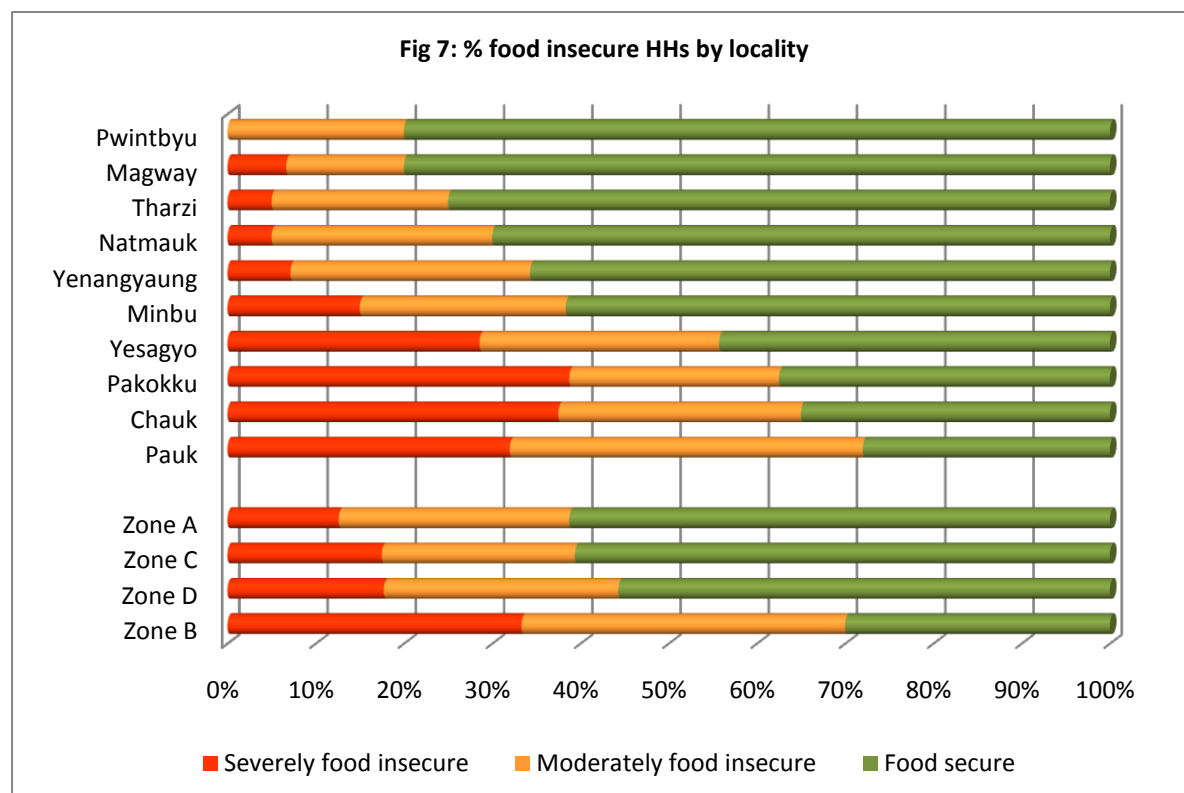
3.2 Where are the food insecure?

The assessment covered nine townships in Magway, one in the Mandalay Division, and 4 agro-ecological zones based on a classification taking into account elevation, slope, soil types, and proximity to roads, railways and rivers (see Map 2 and Table 5).

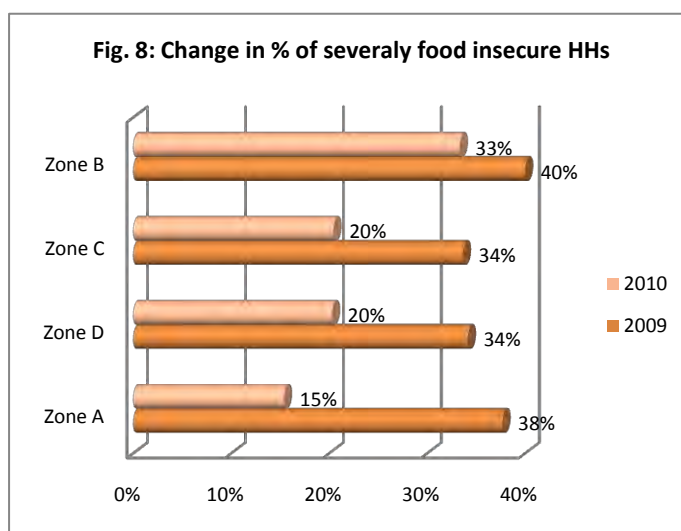
Table 5: Zone characteristics

	Poor access to land	Good access to land
Good physical access	Zone A	Zone C
Poor physical access	Zone B	Zone D

Within the 630 interviewed households, the majority resides in Zone C characterized by good access to land and physical access (51%); 18% reside in Zone A with good physical access, but poor access to land; 13% are in Zone D with good access to land, but poor physical access; finally 10% live in Zone B with poor physical access and poor access to land. The remaining 10% live in Tharzi, which is treated separately as it was not covered during the spatial classification exercise.



Not surprisingly, **households in Zone B characterized by poor access to land and markets are more likely to be food insecure** compared to households in other zones (see Fig. 7). Less than every third households has an acceptable diet and very few have good access to food. Compared to last year, only a small improvement in the situation could be observed (see Fig. 8). Largest improvements could be observed in Zone A, where in 2009, 38% of households were considered to be severely food insecure, in 2010, only 15% (see Fig. 8).



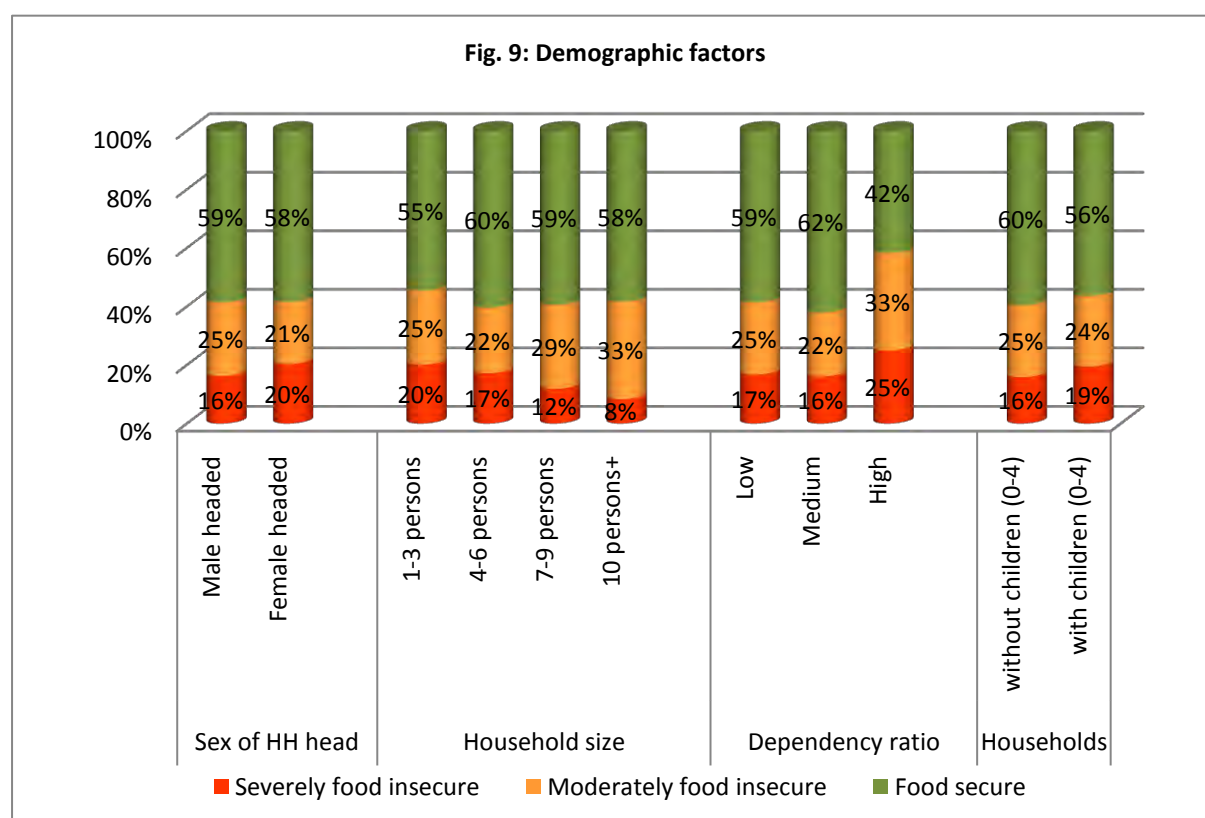
3.3 Who are the food insecure?

3.3.1 Demography

The Dry Zone is characterized by a relatively **high proportion of female headed households (18%)**, which is related to the relatively higher out-migration of male family members (see section 4.2). Females outnumber males as they make up 55% of the sampled population. The average household

size was 4.8 persons with an average dependency ratio of 0.6 dependent household members (0-14 years and 65 year above) per one household member in the productive age group (15-64 years). Compared to some other regions in Myanmar, the population is relatively old with only 7% of the sampled population below 5 years and 6% 65 years and above. Less than one in three families have children under-five (31%).

Though statistically not representative, households headed by women, with children under-5 and high dependency ratio (more than 2 dependents per one non-dependent household member) are probably more likely to be food insecure (see Fig. 9).



3.3.2 Livelihoods

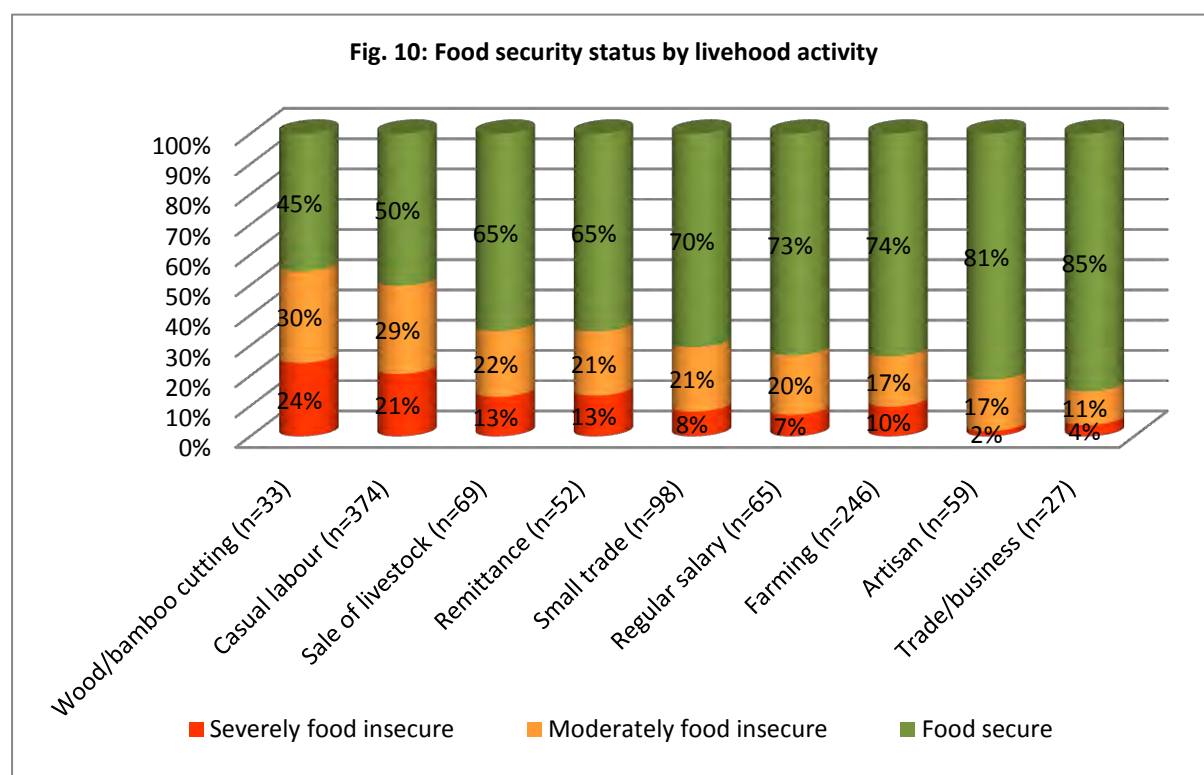
The most common livelihood activity is casual wage labour, followed by farming, small trade and sale of livestock. Farming is most common in Zone C, which is characterized by good access to land and physical access to markets, and least common in Zone B with poor land and market access conditions. In this zone, every fourth household engages in small trade. Zone A with improved physical access has the highest share of households receiving regular salaries (15%), while 8% are involved in trade or other larger business. Sale of livestock is most prominent in Tharzi, one of the newly covered areas. Both Tharzi and Zone D have the highest number of households engaged in wood/bamboo cutting (see Table 6).

Compared to the previous year, households have been able to diversify their income activities, thereby increasing their resilience and ability to cope with shocks and stress. The proportion of households engaged in casual labour has increased from 37% to 59%, farming households from 23% to 38%, petty traders from 8% to 16% and livestock sellers from 6% to 9% in the areas covered by both assessments in 2009 and 2010.

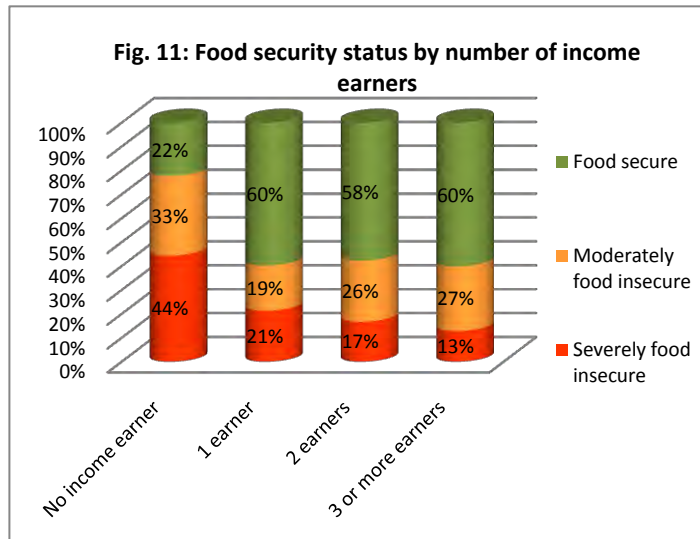
Households that engage in **trade business, artisan, farming or earn a regular salary** are more likely to be food secure. On the contrary, households relying on **wood/bamboo cutting or casual labour** are at much **higher risk to be food insecure** (see Fig. 10). Households involved in these activities are characterized by a high proportion of households with both poor food consumption combined with poor food access (see also Annex 2).

Table 6: % of households engaging in livelihood activities by agro-ecological zone and township

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Total
Casual labour	49%	61%	66%	57%	48%	59%	62%	60%
Farming	39%	31%	41%	39%	38%	38%	43%	39%
Small trade	18%	25%	14%	10%	18%	16%	15%	16%
Sale of livestock	12%	7%	10%	10%	18%	9%	15%	11%
Artisan	10%	0%	11%	9%	8%	10%	8%	9%
Regular salary	15%	3%	9%	3%	10%	9%	9%	9%
Remittance	11%	5%	8%	6%	8%	10%	5%	8%
Wood/bamboo cutting	3%	5%	3%	10%	15%	4%	9%	5%
Trade/business	8%	0%	4%	0%	7%	3%	7%	4%
Fishing	3%	0%	2%	1%	2%	2%	3%	2%
Other	4%	8%	5%	11%	3%	6%	4%	6%



Beside the type of activity also the number of income earners per household is a determining factor for achieving food security. **Households with more income earners tend to be more food secure** (see Fig. 11). The majority of households have two or more income earners (73%). The remaining 26% have one income earner, and only very few have none. Women contribute largely to the household income; on average 45% of income earners are female in the interviewed households.

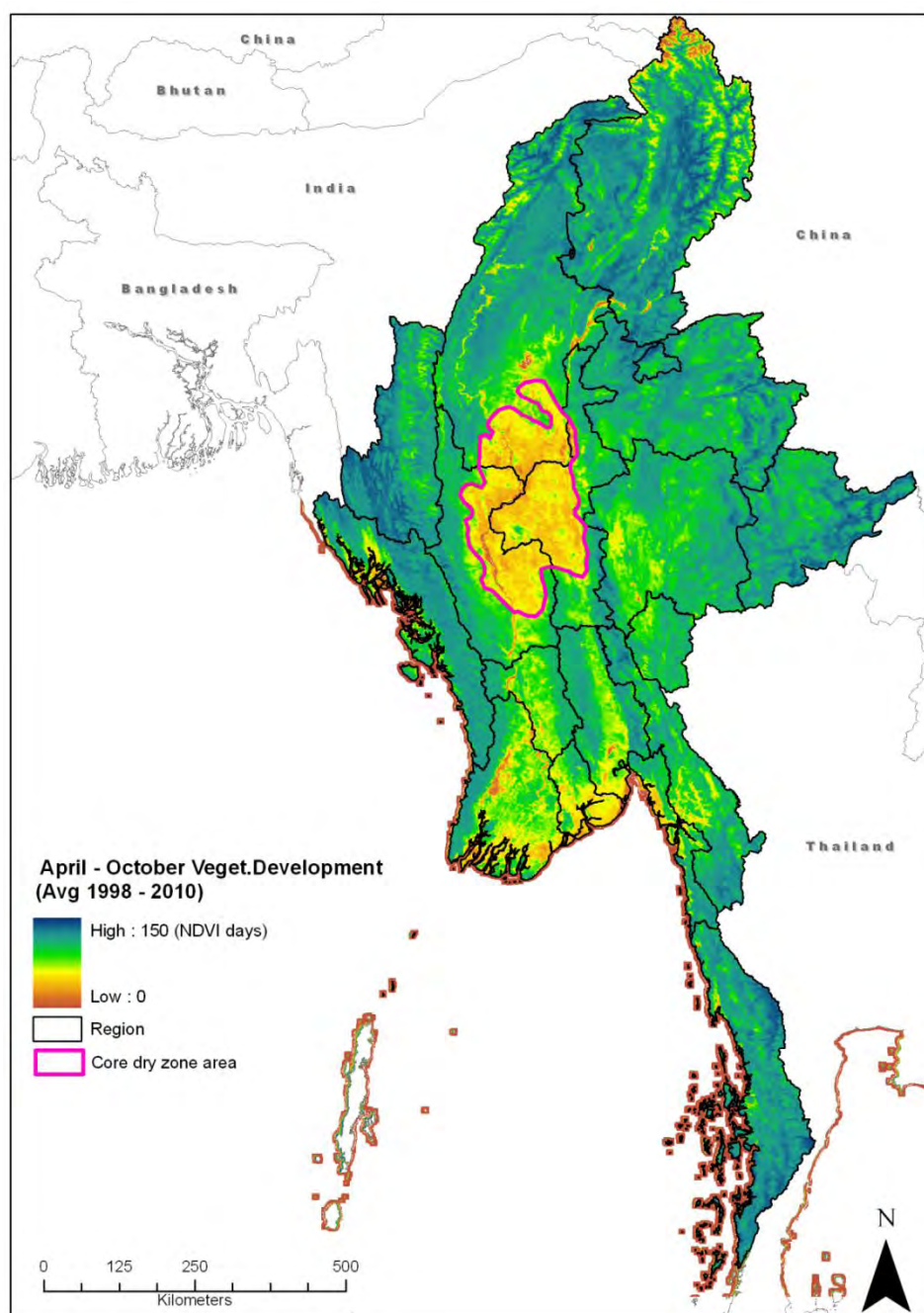


4. Key vulnerability issues and opportunities

4.1 Crop conditions and agriculture

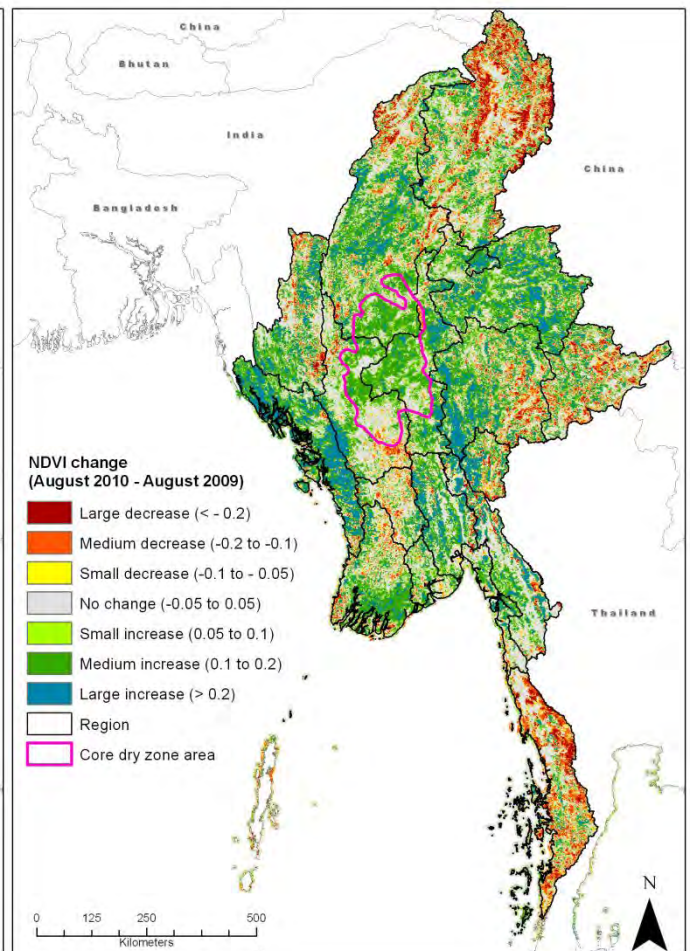
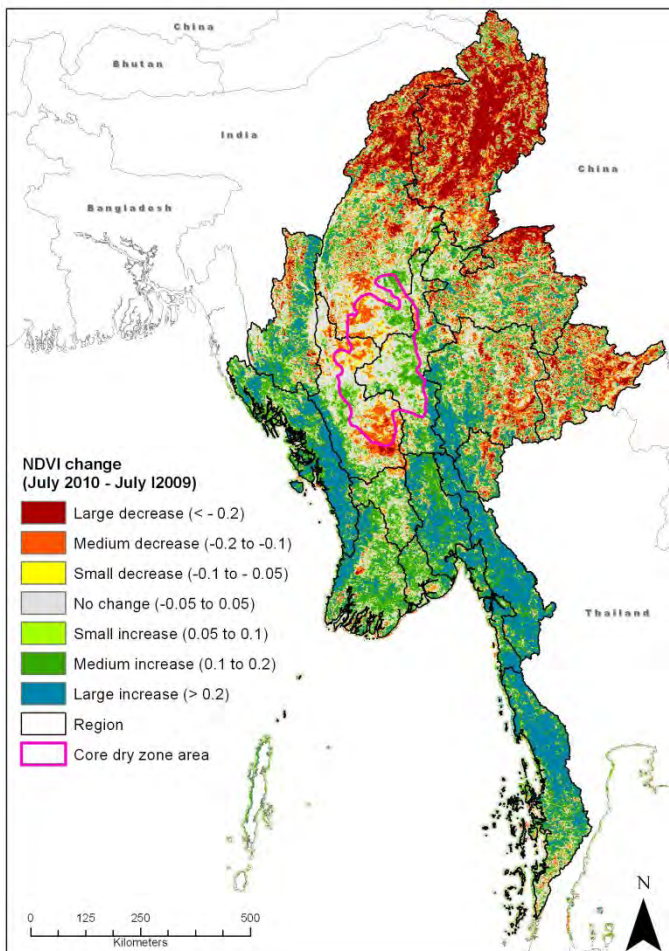
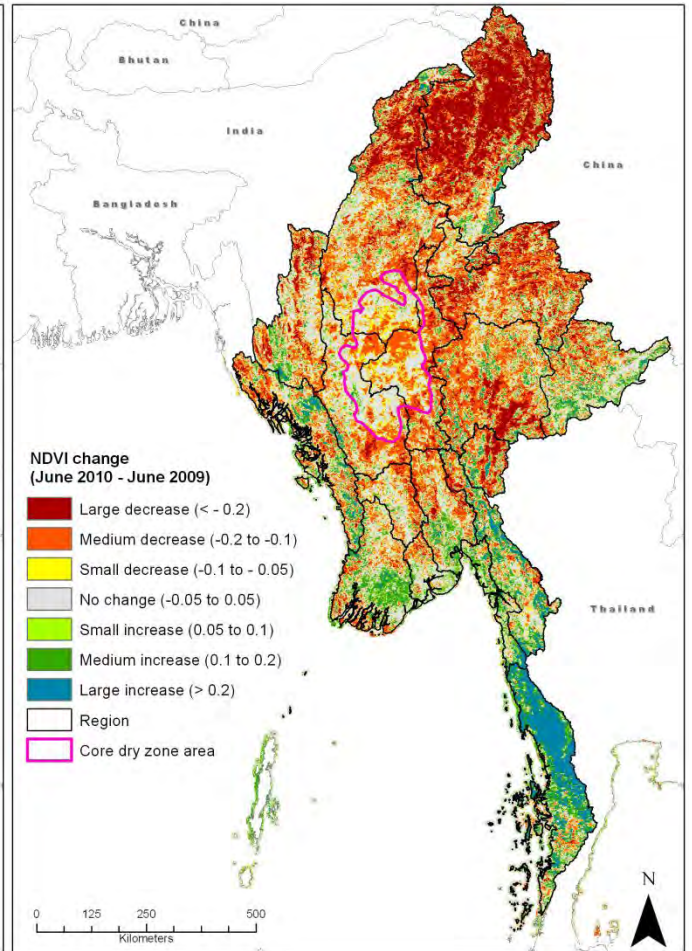
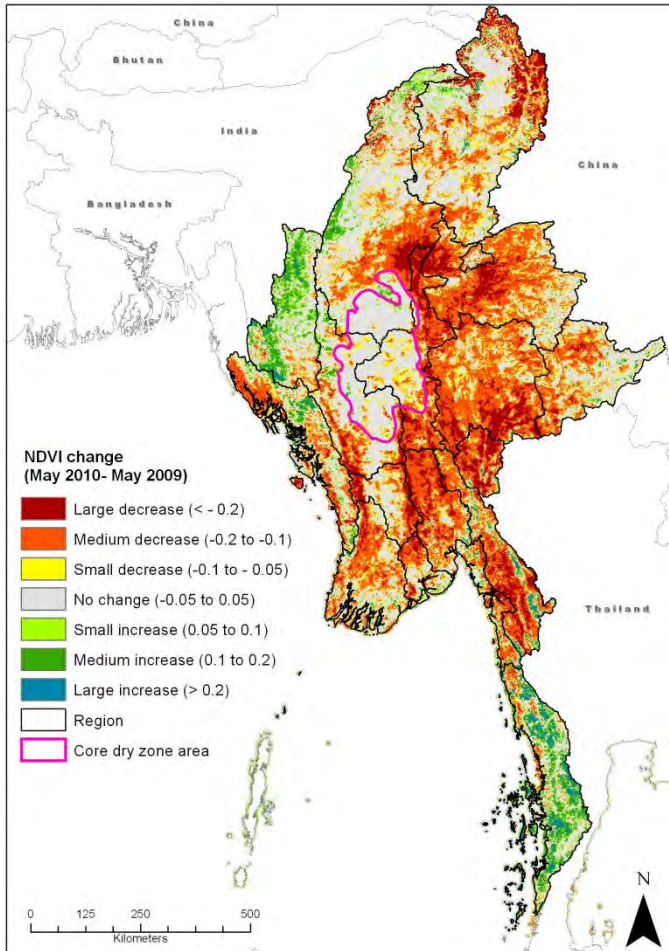
The Dry Zone in the centre of Myanmar is chronically receiving less rainfall compared to other parts of Myanmar resulting in a poor vegetation index. The core area of the dry zone can be easily distinguished using the 1998-2010 average vegetation index (see Map 3).

Map 3: 1998-2010 Average vegetation index



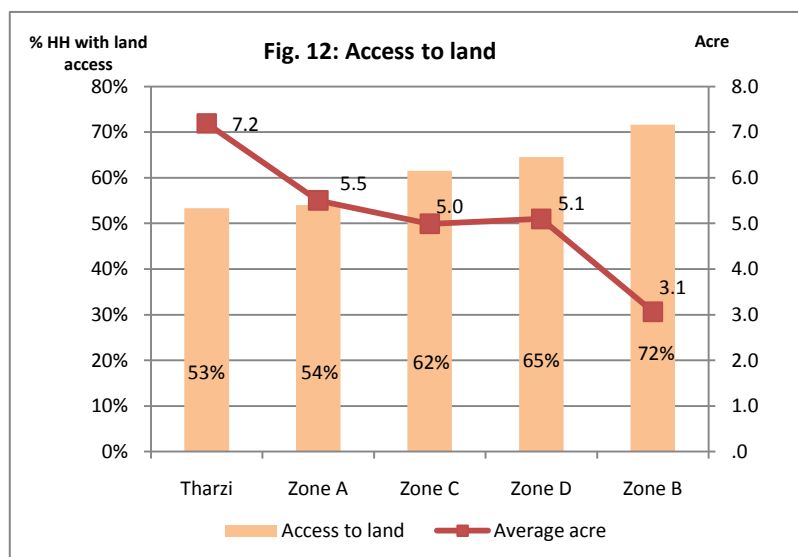
Both 2009 and 2010 were average or below average in terms of their rainfall pattern. The 2010 season started with delayed rainfall resulting in a poorer vegetation index compared to 2009 (see Map 4 – June). Then the conditions improved resulting in a relatively better vegetation index towards the height of the agricultural season in August 2010 resulting overall in an improved agricultural outcome compared to the previous year.

Maps 4: Vegetation index change (May to August 2009/10)



Agriculture is an important factor for improving food security in the Dry Zone where **61% of sampled households have access to agricultural land**, about the same proportion as in 2009 (59%).

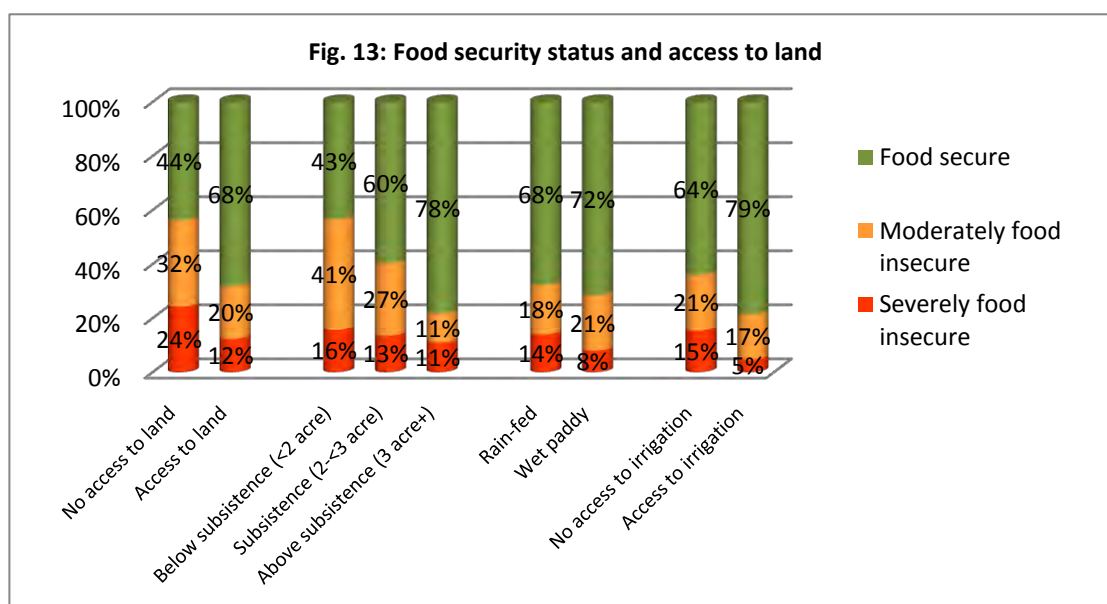
Those with access to land cultivate on average 5.1 but size of agricultural land differs largely between agro-ecological zones. Tharzi has the fewest number of households with access to land, but the largest plot per farming household, in Zone B



the situation is reverse (see Fig. 12). **Compared to last year, there has been an improvement in the area cultivated:** In 2009, 40% of farming households cultivated a plot that was smaller than 2 acre which is below the subsistence level; in 2010 it was only 22%. This is an indication that crop conditions and water availability in 2010 was relatively better compared to the previous year.

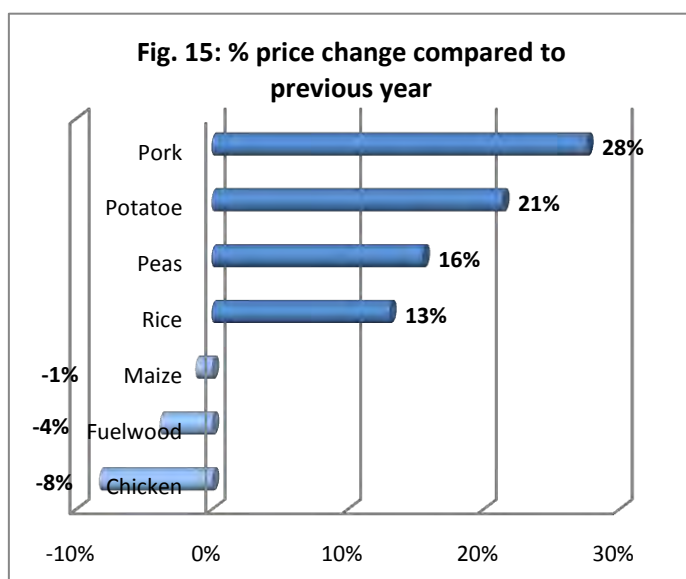
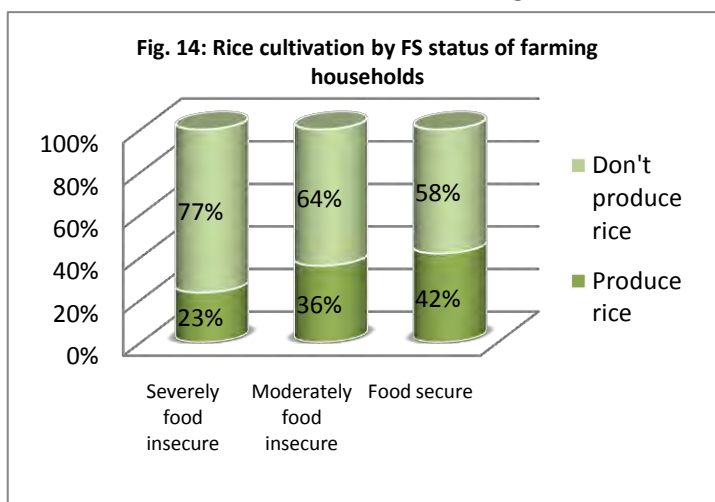
The majority of households rely on rain-fed cultivation on flatland (79%), 39% have access to wet paddy and very few engage in upland shifting cultivation, or have access to a garden or orchard. Nearly every third households in the sample has access to an irrigation scheme (29%), however, this is mainly due to the new areas covered by the 2010 assessment. Only 13% of households in the original covered area reported to have access to irrigation, less than one year ago (16%). Nearly all households (91%) have ownership of their agricultural land, rental of agricultural land is much less common in this area with the exception of Tharzi (see also Annex 3).

In terms of food security status, **households without access to land and those with small plot sizes below 2 acre are more likely to be food insecure.** In addition, farming households with access to **paddy** are more likely to be food secure compared to those who cultivate on flatlands and rely on rain-fed agriculture. **Access to irrigation** is a decisive factor for contributing to food security in the context of the Dry Zone (see Fig. 13).



Overall, the Dry Zone is characterized by large **crop diversity** with more than 50% of all farming households growing three or more different types of crops. In times of water scarcity, farming households in the Dry Zone tend to focus on one crop only. Compared to last year, the proportion of mono-cropping households has reduced remarkably from 27% to 17%, again an indication that water scarcity was less of an issue in 2010. The most common food crops grown are pulses (by 70% of farming households), followed by sesame (63%) and rice (38%). There are significant differences between the agro-ecological zones. In Tharzi, farmers have the largest crop diversity and the highest number of farmers growing rice and maize. Rice is also more common in Zone C with good access to land and markets. Zone B with poor soils and access to markets has the largest number of households producing groundnuts (see Annex 4).

Generally farming households cultivating more crops are more food secure than households with less crop diversity but the type of crop grown is a more decisive factor. Though very few households are cultivating sunflowers (2%), all of these were classified as food secure. Food secure households more often cultivate rice compared to severely and moderately food insecure households (see Fig. 14).



Generally, farming households are amongst the most food secure groups (see Fig. 7). This could be related to relatively improved crop conditions in 2010 but also increased market prices for key food commodities (see Fig. 15). Increased rice prices and generally improved Terms of Trade for rice producers were also confirmed by the market price monitoring system.

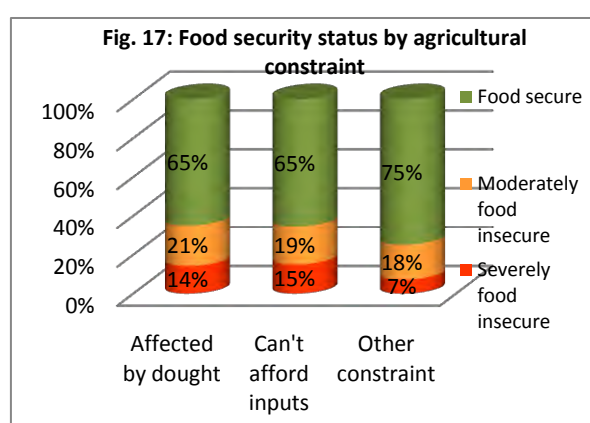
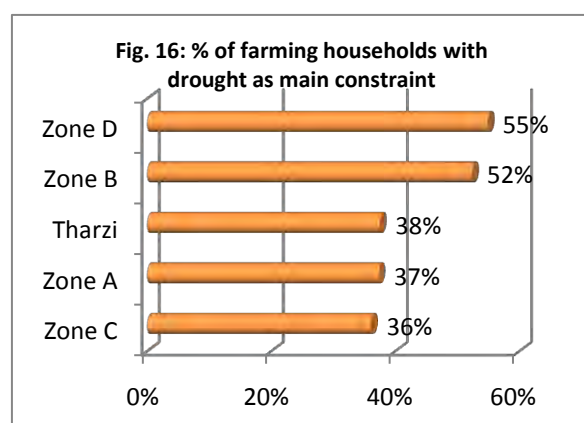
In order to use the full agricultural potential, it is important to understand some of the limiting factors hampering the expansion of agricultural land or agricultural productivity. Similar to previous years, the **main challenge was lack of rain or dry spells**, reported by two out of five households across the region. Worst affected were households in Zone B and D (see Fig. 16). This was followed by **lack of capital to pay for agricultural inputs** reported by nearly every third

Main agricultural constraints for farming households:

- (1) Dry spells/drought (41%)
- (2) High cost of agricultural inputs (30%)
- (3) High costs of labour (7%)
- (4) Plant diseases (6%)
- (5) Floods (3%)

farming household. In Tharzi, every fourth household reported plant diseases as their number one constraint (see Annex 5). Despite the fact that drought is still the most frequently reported shock, the **proportion of households affected by drought reduced** from 72% in 2009 to 45% in 2010 in the areas covered by both assessments. On the other hand, inability to afford agricultural inputs such as seeds or fertilizer increased from 10% to 30%.

In terms of food security, households who reported drought or lack of capital to afford inputs are more likely to be food insecure than those reporting other agricultural constraints (see Fig. 17).

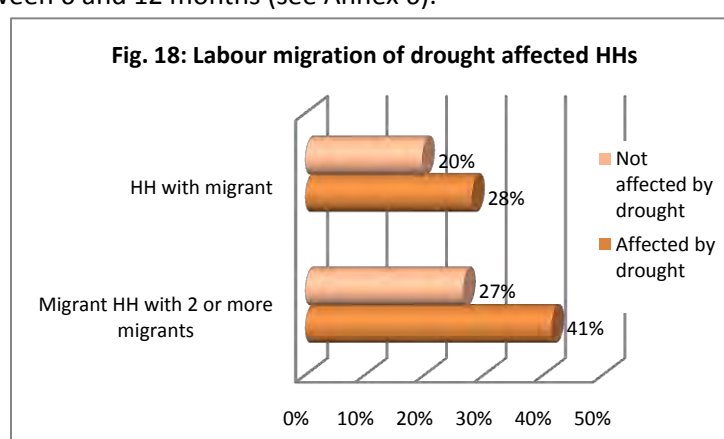


4.2 Labour migration

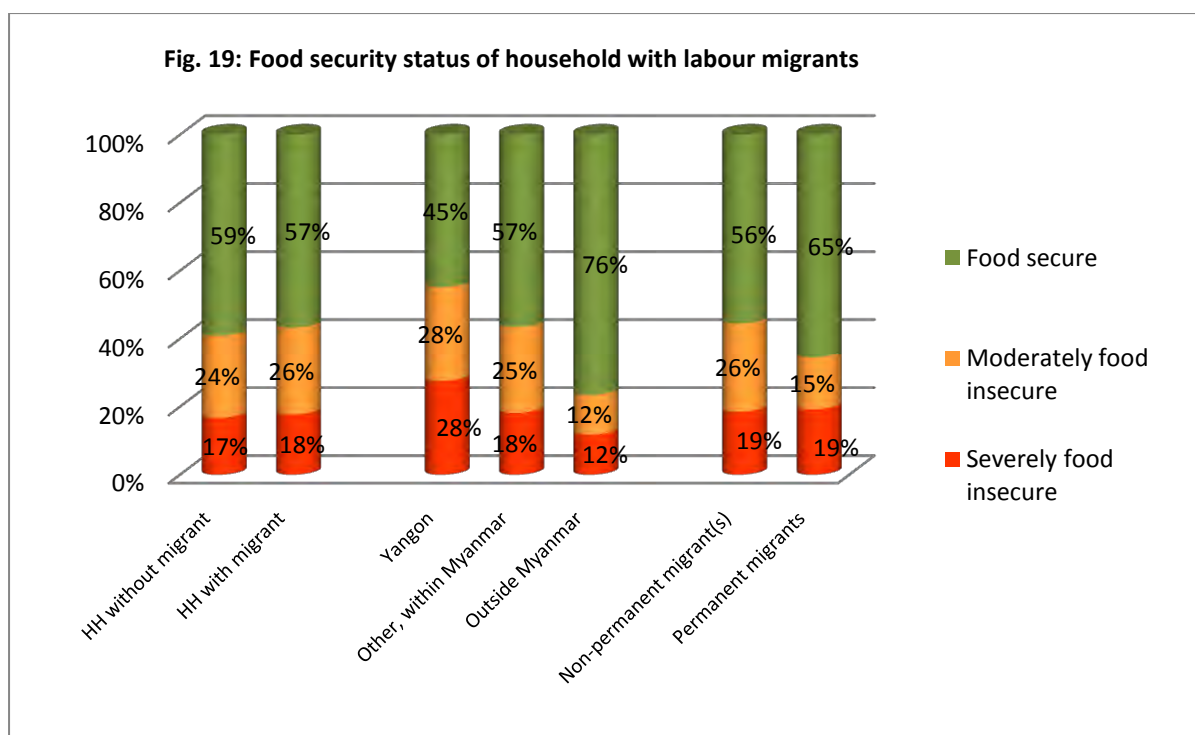
Labour migration is a common livelihood strategy in the Dry Zone. More than every fifth household has a labour migrant (22%). Out of these, every third household has more than one migrant. Also migration of women is common, in the total sample 7% of households have at least one female migrant, 18% of households have a male migrant. The proportion of households with labour migrants has slightly decreased compared to last year, from 31% to 27% in the areas covered by both assessments.

Most migrants stay within Myanmar, 21% work in Yangon, 71% work in other places within Myanmar and only 12% migrates outside Myanmar, mainly Malaysia. For both female and male migrants, about one quarter are permanent migrants, while three quarters migrate on a non-permanent basis, most commonly between 6 and 12 months (see Annex 6).

The food security status of households with migrants is not better than those without migrants, an indication that increased labour migration is applied as a coping strategy in difficult times. This is also confirmed by the fact that households who have been affected by drought in 2010 are more likely to engage in labour migration (see Fig. 18).

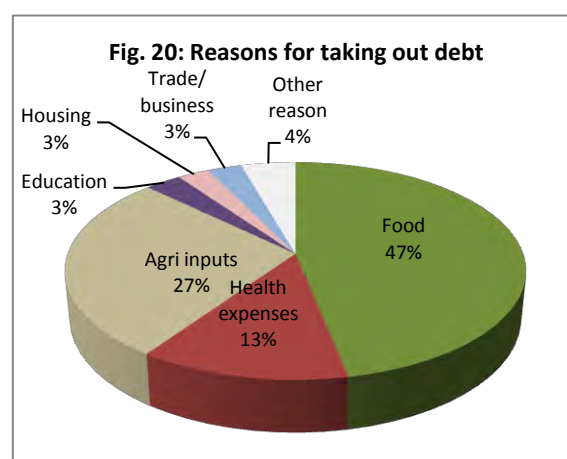


In term of destination and duration of migration, households with migrants in Yangon are more likely to be food insecure compared to households with migrants in other locations within Myanmar or international migrants and household with non-permanent migrants, especially those with shorter-term seasonal migrants are more likely to be food insecure (see Fig. 19).



4.3 Indebtedness

Similar to 2009, the majority of households is in debt and has to repay a loan (82%). **The main reason for most households to take out loans was to meet immediate food needs** (see Fig. 20). However, this figure was higher in 2009, when 58% of households reported food as the main reason. The second most important reason for both years was the investment in agricultural inputs. In 2010, 24% of households took loans for agricultural inputs compared to only 19% in the areas covered by both assessments. This is a positive trend as it shows that **some households have started to re-invest into longer-term food security goals rather than only meeting their immediate food needs**.

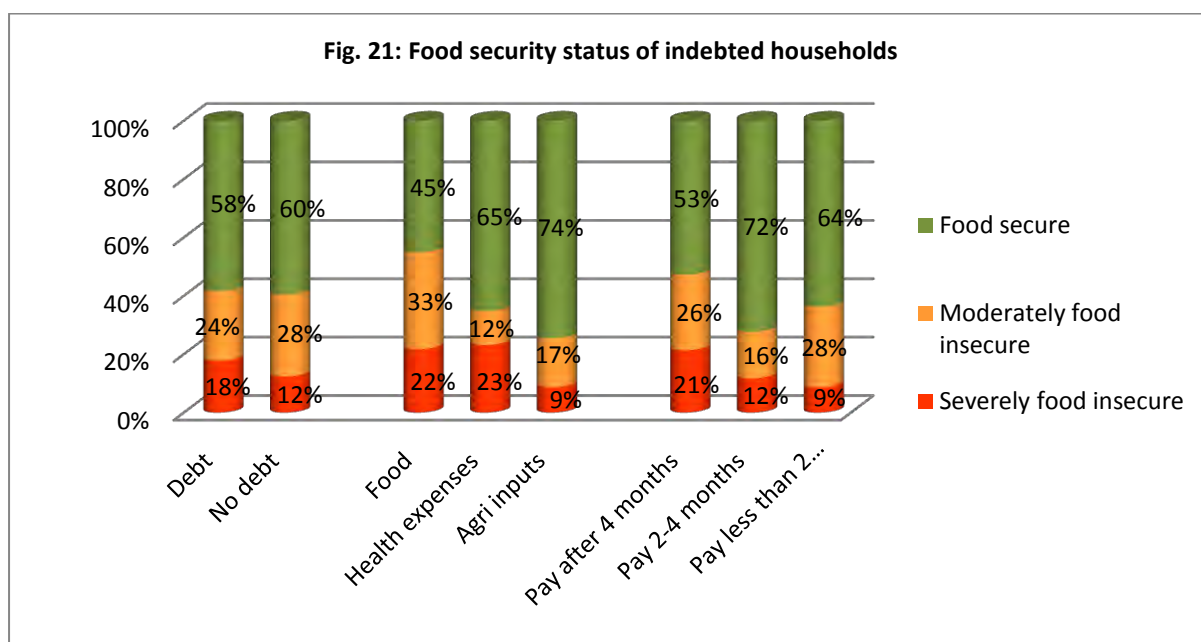


The average amount households with debts to be repaid is 200,000 kyats (median), which is about 235 USD. While last year, 55% of households had a debt that was higher than 100,000 kyat, this year, 65% of households fall into this category indicating that an **increasing number of households are at risk of being trapped in the vicious cycle of poverty and debt**.

Only 13% of households reported that they will be able to repay the loan within 2 months, 22% will be able to repay within 2 to 4 months; however, the majority (65%) will need more than 4 months. This is an indication that for most households it will be difficult to take out new loans to meet future food needs.

Figure 21 illustrates that households with debts, and particularly those with **debts on food, are more likely to be food insecure than those who are without debt**. They will also take longer to repay their

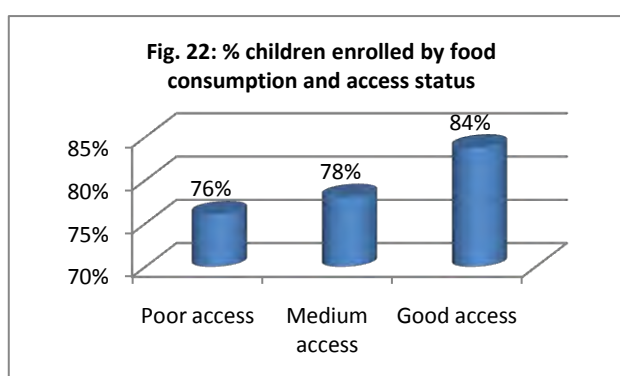
loans. On the contrary, households who took loans to pay for agricultural inputs are much more likely to be food secure.



4.4 Education

The entire sample covered 469 primary school-aged children. Out of these, 79% were enrolled in primary school in 2010. The highest enrolment was observed in Zone B (92%). Only 75% of school-aged girls are enrolled in school compared to 84% of boys. The largest gap was found in Zone D, the smallest in Tharzi and Zone B (see Annex 12). Compared to the previous year, enrolment has increased from 78% to 85% in Zone B, in areas which were assessed in both 2009 and 2010. Also the gender gap decreased: in 2010, 88% of boys and 83% of girls were enrolled in school compared to 83% and 75% in 2009. These improvements could be partly related to a Food-For-Education programme supported by WFP.

The food access status and households sending their children to school seem to be associated (see Fig. 22). **Households with good food access are more likely to enroll their children compared to households with poor food access.** This illustrates how food insecurity can lead to a **vicious cycle or poverty trap** as children from poor households are less likely to receive a good education, which will lessen their future economic potentials which again will determine their food security status.



Out of all enrolled children, 25% could not regularly attend school. Non-attendance was worse for boys (29%) compared to girls (21%). Children in Zone C tend to be more affected by non-attendance compared to other zones.

Three main reasons for not attending school	
Boys	
(1)	Illness (79%)
(2)	Domestic chores/ Cannot afford school-fees, uniform and materials (8%)
(3)	Cannot pay transportation fees/not interested (4%)
Girls	
(1)	Illness (68%)
(2)	Cannot afford school-fees, uniform and materials (14%)
(3)	Not interested (9%)
(4)	Cannot pay transportation fees/not interested/Girls has to work (5%)

4.5 Water and sanitation

Access to food, good care practices and a healthy environment are the underlying factors for determining the nutrition situation. One critical factor for a healthy environment and food utilization is access to safe drinking water and sanitation. One in four households in the Dry Zone does not have access to an improved drinking water source. The situation varies from zone to zone: Zones B and D which are more remote have least access to improved water sources (see Annex 7). Compared to last year, the situation has slightly improved with 67% of households now accessing improved water sources in the areas covered by both assessments (last year only 61%). Across the sample, 26% of households use an unprotected source, mainly open water streams or unprotected wells; 37% have access to a borehole with pump; and 32% use other protected sources such as protected wells. Only 4% of households have access to piped water. In terms of sanitation, 79% of households have a latrine or in other words more than every fifth household does not have access to sanitation. Again, Zone B and D are more disadvantaged compared to other zones. Similar to water, the situation improved compared to last year when 36% of households were without sanitation facilities. Seventy-three percent use a fly proof latrine and 5% a direct pit latrine. Surface latrines are not common in this area.

Improved drinking-water sources are more likely to provide safe drinking water than unimproved sources but they are not a direct measure of 'safe' drinking water as they may still contain harmful substances, and clean water can be contaminated during transport and storage. Therefore, the treatment of drinking water is an important factor. Across the sample, it is positively noted that most households treat their drinking water before

Table 7: Household at risk of consuming contaminated water

	No treatment	Treatment	Total
No improved source	3%	25%	27%
Improved source	13%	60%	73%
Total	16%	84%	100%

consumption (84%), a slight improvement compared to last year. Most commonly households treat their water by using a filter (73%); only 11% of households are boiling their water. If combined (access to improved water plus treatment), **60% of households have a low risk, 38% have a medium risk and only 3% have a high risk of consuming contaminated drinking water** (see Table 7). Overall, this is an indication that water and sanitation programmes including health and hygiene awareness initiatives had a positive impact in this region. Across the sample, 34% of households benefitted from health education in the past.

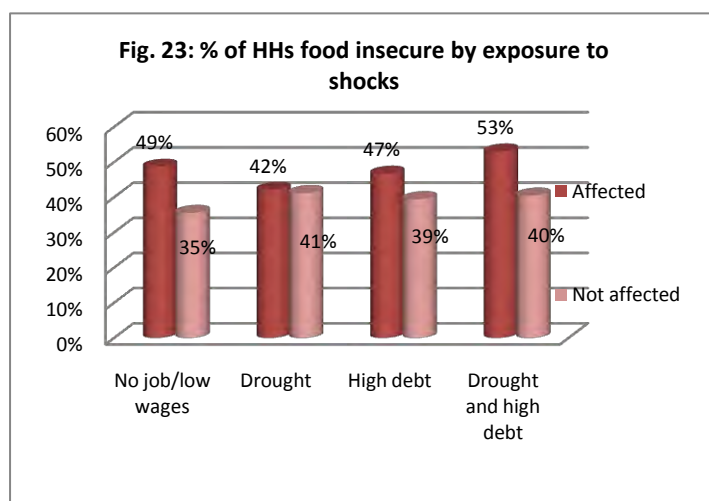
One remaining concern is the **seasonal scarcity of water**, only 77% of households reported to have access throughout the year, and 19% have only sufficient water during the rainy and winter season, 5% even during the rainy season only. The situation is similar across all zones, only Zone C is better off as 88% of households reported having access to sufficient water throughout the year. Any programme to improve access to water should attempt to address this issue as it poses a serious health risk especially among children under-5.

4.6 Shocks and coping

Exposure to shocks - including natural hazards and economic shocks – as well as household ability to cope with the impact of these shocks will affect both current and future food security status. Respondents were asked to list the three main shocks or difficulties their households faced during the past six months. Number one constraint reported this year was **few job opportunities and low wages**. **Drought** was only the second most important shock reported by every third household followed by health related reasons and high debt. Most heavily affected area by drought was Zone B (see also Annex 8). In terms of livelihoods, every second farming household reported to have been affected by drought and more than every third farming household was affected by indebtedness (see also section 4.1). Not surprisingly,

Four main shocks/difficulties:

- (1) Few job opportunities/low wages (45%)
- (2) Drought (33%)
- (3) Sickness/health expenses (32%)
- (4) High debt (28%)
- (5) Post-harvest losses (26%)
- (6) Low prices for agricultural products (13%)
- (7) Education expenses (11%)
- (8) Not enough food (10%)

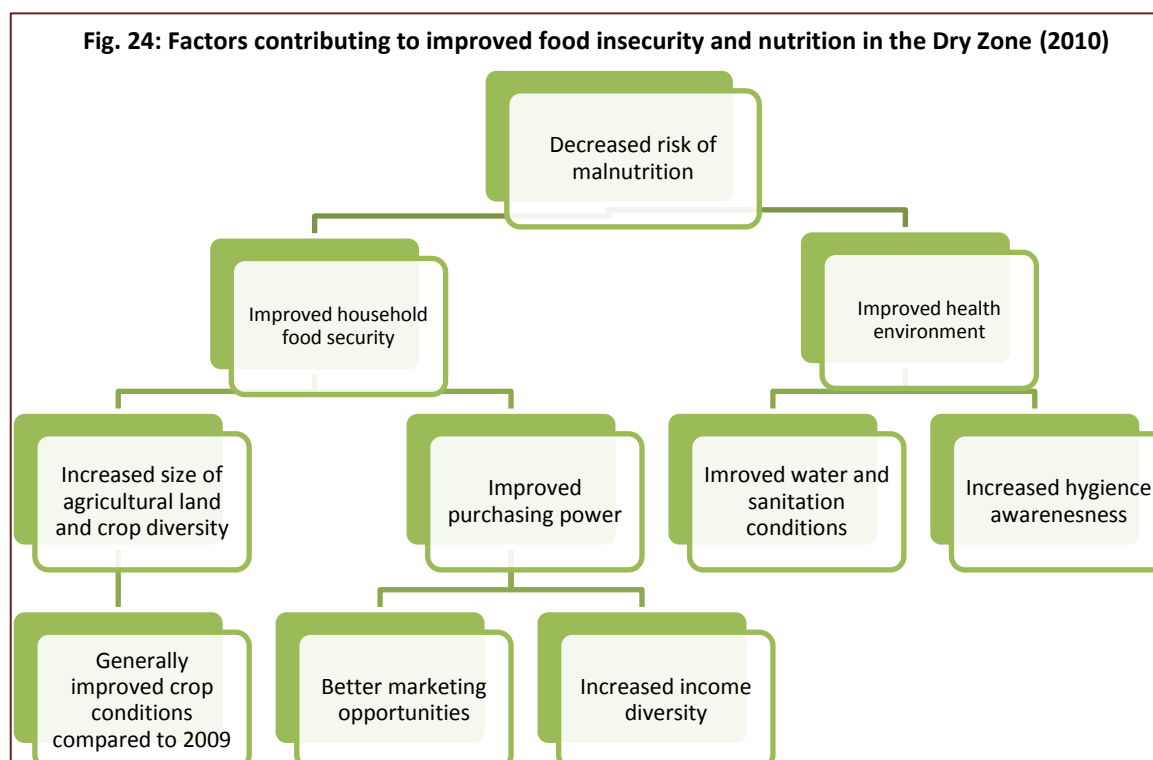


household relying on casual work were mostly affected by few income opportunities and low wages.

In terms of impact on the food security status, **households who reported few income opportunities were much more likely to be food insecure. Also households affected by drought combined with high debt are more likely to be food insecure** (see Fig. 23). Across the sample, 8% of households are affected by this combined shock with the highest proportion in Zone B (22%).

5. Towards ensuring food security

The overall food security situation has improved in the Dry Zone in 2010 compared to 2009 when most households were heavily affected by rainfall shortages – though exceptions were observed in Zone B and D. Though this study cannot provide a detailed analysis of the underlying causes, there are several factors contributing to an improved food security situation: (1) improved rainfall allowing the cultivation of larger plots and increased crop diversity; and (2) increased income diversity and improved marketing opportunities for agricultural produce increasing the purchasing power of households (see Fig. 24). The joint actions of all stakeholders present in the Dry Zone have contributed to this positive development.



Nevertheless there are a number of risks factors that should be addressed or closely monitored during the course of 2011 and beyond:

- Potential **dry spells** during the 2011 agricultural season could reverse the positive outcomes achieved in 2010
- **Highly indebted households** may have difficulties leaving the debt-cycle, farming households may face difficulties accessing the required agricultural inputs hampering their ability to make full use of their agricultural potential
- If **food price continue to increase**, food security status of vulnerable population groups (e.g. households with high dependency ratio, households without access to land and able-bodied workers) could worsen
- **Seasonal water scarcity** during the winter and dry season could increase risk for diseases and thereby contributing to a seasonal increase in acute malnutrition
- Further **land degradation** through poor agricultural practices (e.g. mono-cropping)

- **Gender inequality** as girls tend to have less access to education compared to boys despite the fact that women contribute largely to household incomes

Below, there is a list with preliminary priority actions which could to be further elaborated by the various stakeholders in the context of the multi-agency Framework for Action to define scope, timing, targeting criteria and transfer modality choices taking seasonal factors into account. Areas to be prioritized are Zones B and D as they continued to be negatively affected by rainfall shortages throughout 2010, especially Zone B shows less improvements in food security outcomes compared to other zones.

Short-term humanitarian actions:

- Closely monitor rainfall, food prices and terms of trade during the 2011 agricultural season. Monitor acute malnutrition during the peak of the dry season
- Provide food or cash-for-work/training opportunities targeted at landless households or small-holders (<2 acre) relying on casual labour, wood/bamboo-cutting or other marginal livelihood activities (productive safety-net). Priority should be given to Zone B and D
- Facilitate access to agricultural inputs such as seeds and fertilizer prioritizing smallholder farmers (<3 acres)
- Continue Food-for-education activities in Zone B to improve households access to food and continue to attract children to school

Medium- to longer term actions

- Enhance agricultural extension programmes with a focus on disaster risk reduction and sustainable land management practices (e.g. increase crop diversity, pest management, soil and water conservation, strategies to minimize post-harvest losses)
- Increase access to agricultural credits
- Expand and increase access to irrigation schemes
- Improve access to safe drinking water and sanitation in Zone B and D and design identify strategies to address seasonal water shortages
- Conduct a participatory assessment to identify specific strategies to address the gender gap in school enrolment
- Conduct a nutrition survey to measure both acute and chronic malnutrition and underlying causes to develop longer-term strategies to improve the nutrition situation

Annex 1: Food consumption, food access and food security by township and livelihood zone

	Cases	Food consumption			Food access			Food security		
		Poor	Borderline	Acceptable	Poor access	Medium access	Good access	Severely food insecure	Moderately food insecure	Food secure
Chauk	40	8%	60%	33%	43%	28%	30%	38%	28%	35%
Magway	60	5%	10%	85%	17%	30%	53%	7%	13%	80%
Minbu	60	2%	30%	68%	27%	32%	42%	15%	23%	62%
Natmauk	80	0%	25%	75%	18%	51%	31%	5%	25%	70%
Pakokku	80	13%	45%	43%	54%	16%	30%	39%	24%	38%
Pauk	50	14%	48%	38%	44%	44%	12%	32%	40%	28%
Pwintbyu	60	5%	22%	73%	5%	30%	65%	0%	20%	80%
Tharzi	60	5%	23%	72%	10%	40%	50%	5%	20%	75%
Yenangyaung	70	4%	23%	72%	20%	33%	47%	7%	27%	66%
Yesagyo	70	24%	26%	50%	33%	30%	37%	29%	27%	44%
Zone A	111	5%	27%	68%	25%	36%	39%	13%	26%	61%
Zone B	60	8%	62%	30%	38%	48%	13%	33%	37%	30%
Zone C	320	9%	26%	66%	29%	28%	43%	18%	22%	61%
Zone D	79	12%	33%	55%	24%	34%	42%	18%	27%	56%
Tharzi	60	5%	23%	72%	10%	40%	50%	5%	20%	75%
Oct 2010 (old areas)	451	10%	32%	58%	32%	33%	35%	21%	26%	53%
Oct 2010 (new areas)	179	4%	25%	71%	14%	34%	53%	7%	21%	72%
Total	630	8%	30%	62%	27%	33%	40%	17%	24%	59%

Annex 2: Food consumption, food access and food security by livelihood activity

	Food security (original)			Food access			Food consumption (28/42)		
	Severely food insecure	Moderately food insecure	Food secure	Poor access	Medium access	Good access	Poor	Borderline	Acceptable
Casual labour (n=374)	21%	29%	50%	30%	36%	33%	11%	34%	55%
Regular salary (n=65)	7%	20%	73%	21%	30%	48%	2%	14%	84%
Farming (n=246)	10%	17%	74%	15%	31%	54%	4%	24%	72%
Fishing (n=12)	17%	25%	58%	42%	42%	17%	0%	17%	83%
Wood/bamboo cutting (n=33)	24%	30%	45%	36%	24%	39%	12%	39%	48%
Trade/business (n=27)	4%	11%	85%	11%	30%	59%	0%	11%	89%
Small trade (n=98)	8%	21%	70%	18%	41%	41%	2%	30%	68%
Artisan (n=59)	2%	17%	81%	14%	47%	40%	0%	17%	83%
Remittance (n=52)	13%	21%	65%	27%	37%	37%	12%	15%	73%
Sale of livestock (n=69)	13%	22%	65%	24%	34%	43%	4%	29%	67%
Other (n=35)	26%	14%	60%	29%	29%	43%	12%	35%	53%

Annex 3: Access to land by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Total
Access to agriculture land	54%	72%	62%	65%	53%	61%	60%	61%
Average acre	5.5	3.1	5.0	5.1	7.2	5.0	5.1	5.1
Below subsistence (<2 acre)	22%	30%	25%	16%	0%	22%	20%	22%
Subsistence (2-<3 acre)	7%	19%	16%	12%	9%	13%	15%	14%
Above subsistence (3 acre+)	72%	51%	59%	73%	91%	65%	65%	65%
Small garden	5%	0%	5%	4%	3%	4%	4%	4%
Wet paddy	38%	35%	44%	6%	75%	25%	77%	39%
Rain-fed flatland	88%	93%	66%	92%	97%	88%	54%	79%
Upland/ shifting cultivated	0%	5%	1%	4%	9%	3%	2%	2%
Orchard	2%	0%	7%	4%	0%	2%	10%	4%
Access to irrigation	20%	9%	41%	6%	28%	13%	68%	28%
Owned	95%	91%	92%	90%	81%	91%	91%	91%
Rented in kind	7%	7%	7%	8%	25%	7%	11%	8%
Rented in cash	5%	2%	8%	10%	3%	6%	8%	7%
Other access	10%	5%	1%	8%	6%	5%	3%	4%

Annex 4: Types of food crops by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Gesamt
Number of crops cultivated	3.0	2.8	2.4	2.6	3.4	2.8	2.4	2.7
One crop	17%	14%	28%	14%	0%	17%	30%	20%
Two crops	22%	33%	27%	33%	25%	27%	29%	28%
Three or more crops	62%	53%	45%	53%	75%	56%	42%	52%
Rice	38%	35%	42%	4%	78%	22%	81%	38%
Maize	35%	23%	19%	24%	47%	27%	19%	25%
Sesame	70%	56%	56%	80%	75%	72%	42%	63%
Groundnuts	40%	44%	19%	39%	19%	36%	8%	28%
Sunflower	0%	2%	2%	2%	0%	1%	2%	2%
Pulses	82%	72%	63%	78%	75%	75%	58%	70%
Other crop 1	28%	40%	28%	24%	44%	33%	22%	30%
Other crop 2	3%	7%	8%	8%	6%	8%	5%	7%

Annex 5: Agricultural constraints by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Gesamt
Drought	37%	52%	36%	55%	38%	45%	30%	41%
Cannot afford agricultural inputs	34%	33%	30%	25%	25%	30%	29%	30%
Cannot afford rental fees for labour	7%	2%	8%	6%	6%	5%	11%	7%
Diseases	5%	2%	5%	2%	25%	3%	13%	6%
Flood	3%	2%	4%	0%	3%	1%	7%	3%
No land available	0%	2%	2%	2%	0%	1%	3%	1%
Animal pests	3%	0%	1%	0%	0%	1%	0%	1%
Not enough labour available	2%	0%	1%	0%	0%	1%	1%	1%
Cannot afford rental fees for land	0%	0%	1%	0%	3%	0%	2%	1%
Other constraint	8%	5%	13%	10%	0%	12%	5%	10%

Annex 6: Labour migration by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Gesamt
HH with labour migrant	28%	25%	22%	23%	13%	27%	12%	22%
One migrant	77%	73%	68%	56%	38%	68%	67%	67%
2 or more migrants	23%	27%	32%	44%	63%	33%	33%	33%
HH with male migrant	24%	22%	16%	20%	12%	22%	9%	18%
HH with female migrant	5%	7%	8%	5%	7%	8%	5%	7%
Destination: Yangon	23%	13%	23%	22%	0%	23%	11%	21%
Other, within Myanmar	50%	73%	75%	78%	100%	69%	84%	71%
Outside Myanmar	30%	13%	6%	11%	0%	13%	5%	12%
Type of migration (male): non-permanent	56%	75%	83%	81%	83%	75%	80%	76%
Permanent	44%	25%	17%	19%	17%	25%	20%	24%
Duration (male) Less than 3 month a year	8%	42%	17%	19%	17%	16%	27%	18%
Between 3 and 6 months a year	8%	8%	15%	6%	0%	11%	7%	10%
More than 6 months a year	40%	25%	52%	56%	67%	48%	47%	48%
Permanent	44%	25%	17%	19%	17%	25%	20%	24%
Type of migration (female): non-permanent	50%	50%	91%	50%	0%	74%	100%	76%
Permanent	50%	50%	9%	50%	0%	26%	0%	24%
Duration (female) Less than 3 month a year	0%	25%	17%	0%	0%	12%	33%	14%
Between 3 and 6 months a year	0%	0%	22%	0%	0%	15%	0%	14%
More than 6 months a year	50%	25%	52%	50%	0%	47%	67%	49%
Permanent	50%	50%	9%	50%	0%	26%	0%	24%

Annex 7: Access to water and sanitation by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Total
Access to improved drinking water	72%	35%	84%	49%	80%	67%	88%	73%
Piped	4%	0%	4%	10%	0%	5%	2%	4%
Borehole with pump	41%	15%	41%	13%	58%	21%	76%	37%
Protected well/protected source	27%	20%	39%	27%	22%	40%	10%	32%
Unprotected sources	27%	65%	14%	51%	13%	32%	10%	26%
Other	1%	0%	2%	0%	7%	2%	2%	2%
Water available all year round	61%	67%	88%	65%	67%	72%	88%	77%
Water available during rainy and winter season	35%	15%	10%	29%	20%	23%	7%	19%
Water available during rainy season only	4%	18%	1%	5%	13%	5%	4%	5%
No treatment of water	15%	18%	16%	19%	7%	13%	21%	16%
Boiling	17%	15%	8%	14%	5%	11%	12%	11%
Using a filter	68%	67%	75%	67%	88%	76%	67%	73%
Low risk	62%	18%	69%	37%	73%	56%	69%	59%
Medium risk	32%	80%	29%	57%	27%	42%	29%	38%
High risk	5%	2%	1%	6%	0%	3%	2%	3%
Received nutrition/hygiene training	30%	3%	44%	39%	12%	28%	50%	34%
No latrine	14%	40%	17%	34%	17%	24%	11%	21%
Surface latrine	2%	0%	1%	0%	0%	0%	1%	1%
Direct pit latrine	11%	2%	4%	3%	7%	6%	2%	5%
Fly Proof latrine	73%	58%	78%	63%	77%	69%	85%	73%
health facility in this village	54%	50%	29%	56%	55%	42%	40%	41%

Annex 8: Exposure to shocks by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Total
Few job opportunities/low wages	53%	38%	45%	35%	52%	44%	49%	45%
Drought	34%	67%	23%	47%	28%	37%	22%	33%
Sickness/health expenditures	32%	23%	36%	24%	30%	30%	37%	32%
Debt to reimburse	19%	30%	35%	27%	13%	29%	26%	28%
High post-harvest losses	23%	27%	25%	34%	23%	27%	23%	26%
Unable to obtain a good price for agricultural produce	17%	5%	12%	10%	25%	11%	18%	13%
Education expenditure	14%	5%	12%	8%	8%	10%	12%	11%
Not enough food	5%	13%	7%	23%	12%	11%	6%	10%
Unable to practice agriculture	11%	7%	8%	9%	3%	8%	7%	8%
Floods, heavy rains, landslides	3%	2%	4%	0%	3%	1%	7%	3%
Lack of access to markets	3%	0%	2%	4%	2%	2%	3%	2%
Unable to practice fishing	2%	0%	2%	0%	3%	1%	3%	2%
Other shock	8%	3%	11%	8%	10%	8%	13%	9%
No difficulty mentioned	4%	3%	8%	6%	10%	7%	5%	7%

Annex 9: Demographic factors by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Total
Female household head	23%	17%	18%	19%	12%	20%	12%	18%
Houshold with children<5	32%	35%	29%	35%	32%	33%	25%	31%
Female HH head and child<5	7%	7%	3%	4%	2%	5%	1%	4%
Household size	4.6	4.6	4.8	4.8	5.1	4.8	4.7	4.8
1-3 persons	31%	38%	27%	23%	23%	28%	27%	28%
4-6 persons	54%	47%	54%	63%	53%	53%	58%	54%
7-9 persons	14%	10%	18%	11%	23%	17%	15%	16%
10 persons+	2%	5%	2%	3%	0%	2%	1%	2%
% female	57%	52%	56%	57%	52%	55%	56%	55%
% children<5	8%	8%	7%	9%	7%	8%	6%	7%
% elderly	7%	7%	7%	5%	5%	6%	8%	6%
Dependency ration (dep per one non dep)	.7	.6	.6	.6	.6	.6	.6	.6
High (more than 2 dep per 1 non dep)	4%	2%	2%	0%	0%	2%	1%	2%
Medium (>1 to 2 dep per 1 non dep)	16%	15%	12%	16%	17%	14%	14%	14%
Low (1 dep or less per 1 non dep)	81%	83%	86%	84%	83%	83%	86%	84%

Annex 10: Livelihood activities by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Gesamt
Wages (Casual Labour)	49%	61%	66%	57%	48%	59%	62%	60%
Salary Job	15%	3%	9%	3%	10%	9%	9%	9%
Farming / agriculture	39%	31%	41%	39%	38%	38%	43%	39%
Fishing /fish pond and swamp pond	3%	0%	2%	1%	2%	2%	3%	2%
Wood / bamboo cutting	3%	5%	3%	10%	15%	4%	9%	5%
Trade / business	8%	0%	4%	0%	7%	3%	7%	4%
Small trade	18%	25%	14%	10%	18%	16%	15%	16%
Artisan	10%	0%	11%	9%	8%	10%	8%	9%
Remittance	11%	5%	8%	6%	8%	10%	5%	8%
sale of livestock	12%	7%	10%	10%	18%	9%	15%	11%
Other	4%	8%	5%	11%	3%	6%	4%	6%
No income earner	3%	2%	2%	0%	0%	2%	1%	2%
One earner	23%	23%	28%	27%	22%	28%	22%	26%
Two earners	40%	48%	36%	35%	40%	37%	40%	38%
Three or more earners	34%	27%	34%	38%	38%	33%	38%	34%

Annex 11: Share of expenditure and indebtedness by agro-ecological zone

	Zone A	Zone B	Zone C	Zone D	Tharzi	Oct 2010 (old areas)	Oct 2010 (new areas)	Gesamt
Indebted	86%	88%	83%	94%	85%	88%	81%	86%
For food food	51%	47%	47%	46%	39%	50%	37%	47%
For health expenses	9%	8%	13%	22%	8%	12%	14%	13%
For education	2%	6%	3%	1%	4%	3%	3%	3%
For agri inputs	22%	34%	30%	20%	31%	24%	36%	28%
For livestock inputs	0%	0%	1%	0%	0%	1%	0%	0%
To buy animals	0%	0%	0%	0%	0%	0%	0%	0%
To invest in trade/business	6%	0%	2%	1%	6%	3%	3%	3%
To buy or rent land	1%	0%	0%	0%	2%	1%	1%	1%
To buy or rent a flat/house	3%	6%	1%	5%	4%	3%	2%	3%
For social events	0%	0%	0%	0%	0%	0%	0%	0%
Other reason	5%	0%	3%	4%	6%	3%	3%	3%
Pay after 4 months	58%	45%	68%	78%	65%	66%	63%	65%
Pay 2-4 months	29%	26%	20%	15%	24%	20%	28%	22%
Pay less than 2 months	13%	28%	12%	7%	12%	14%	8%	13%

Annex 12: Enrolment and attendance by agro-ecological zone and township

	Number of school aged children	%boys enrolled	% girls enrolled	% kids enrolled	%boys not attending	%girls not attending	%children not attending
Zone A	88	78%	66%	72%	6%	0%	3%
Zone B	48	95%	89%	92%	26%	16%	20%
Zone C	229	87%	74%	80%	42%	33%	37%
Zone D	51	84%	85%	84%	19%	18%	19%
Tharzi	53	73%	74%	74%	18%	6%	13%
Chauk	36	76%	53%	67%	13%	13%	13%
Magway	22	100%	78%	91%	77%	43%	65%
Minbu	60	60%	43%	48%	33%	18%	24%
Natmauk	63	90%	82%	86%	4%	0%	2%
Pakokku	65	84%	91%	88%	38%	26%	32%
Pauk	42	80%	78%	79%	42%	14%	24%
Pwintbyu	34	92%	81%	85%	17%	6%	10%
Tharzi	53	73%	74%	74%	18%	6%	13%
Yenangyaung	48	100%	96%	98%	10%	19%	15%
Yesagyo	46	91%	83%	87%	57%	79%	68%
Oct 2010 (old areas)	322	88%	83%	85%	31%	25%	28%
Oct 2010 (new areas)	147	73%	61%	66%	22%	10%	15%
Total	469	84%	75%	79%	29%	21%	25%