



Farmers' tales:

Adaptive strategies for agricultural commercialisation and food and nutrition security in Myanmar

Monica Gabrielli
Marion Herens
Bram Peters



WAGENINGEN
UNIVERSITY & RESEARCH

Farmers' tales:

Adaptive strategies for agricultural commercialisation and food and nutrition security in Myanmar

Monica Gabrielli
Marion Herens
Bram Peters

Wageningen University and Research Centre

This research was conducted in joint collaboration between the Wageningen Global Food and Nutrition Security (KB22) and Wageningen Social Innovation for Value Creation (KB28) programmes, funded by the Netherlands Ministry of Economic Affairs

Wageningen Centre for Development Innovation
December 2017

Report WCDI-17-024

Gabrielli, M., Herens M., & Peters B., 2017. *Farmers' tales: Adaptive strategies for agricultural commercialisation and food and nutrition security in Myanmar*. Wageningen Centre for Development Innovation, Wageningen University & Research. Report WCDI-17-024. Wageningen.

This study presents a rich and contextualised picture of farm household sense-making processes in relation to the rapid agricultural transition currently occurring in Myanmar, while considering the implications of these processes for household food and nutrition security (FNS). This research entailed a literature review on current views among key actors involved in agricultural development and food and nutrition security in Myanmar; a qualitative case study involving 'positive deviant' households engaged in agriculture commercialisation in the Dry Zone of Myanmar; and an exploratory analysis of social innovations among smallholder farmers. The reports concluded with a number of reflections and suggestions drawn from the analysis of farmers' narratives and reflection on the implication of agricultural commercialisation on their livelihoods and diets.

Keywords: agricultural development, agricultural commercialisation, food and nutrition security, salutogenesis, positive deviancy, social innovation, Myanmar

This report can be downloaded free of charge from www.wur.eu/cdi ("publications").



© 2017 Wageningen Centre for Development Innovation, part of the Stichting Wageningen Research. P.O. Box 88, 6700 AB Wageningen, The Netherlands. T + 31 (0)317 48 68 00, E info.cdi@wur.nl, www.wur.eu/cdi.



The Wageningen Centre for Development Innovation uses a Creative Commons Attribution 3.0 (Netherlands) licence for its reports.

The user may copy, distribute and transmit the work and create derivative works. Third-party material that has been used in the work and to which intellectual property rights apply may not be used without prior permission of the third party concerned. The user must specify the name as stated by the author or licence holder of the work, but not in such a way as to give the impression that the work of the user or the way in which the work has been used are being endorsed. The user may not use this work for commercial purposes.

The Wageningen Centre for Development Innovation accepts no liability for any damage arising from the use of the results of this research or the application of the recommendations.

Report WCDI-17-024

Photo cover: Monica Gabrielli

Contents

Acknowledgements	6
List of abbreviations and acronyms	7
List of figures and tables	8
Summary	9
1 Introduction	11
1.1 Relevance and background of this research	12
1.2 Key concepts	12
1.3 Pathways for linking agricultural commercialisation to nutritious food consumption	13
1.4 Food systems in transition: the case of Myanmar	16
1.5 Research questions and aims	16
2 Theoretical framework	18
2.1 Life-course perspective	18
2.2 Salutogenesis and positive deviants	18
2.3 Social innovation	19
2.4 Theoretical outline	20
3 Methodology	22
3.1 Research model	22
3.2 Literature review	22
3.3 In depth non-structured interviews	23
3.3.1 Study design and approach	23
3.3.2 Sampling strategy	23
3.3.3 Data collection methods	24
3.3.4 Data analysis	26
3.3.5 Ethics	26
4 Results: Agricultural commercialisation and FNS in Myanmar	27
4.1 Food system macro-level factors	28
4.1.1 Environment, geography and climate	28
4.2 Demography and health	29
4.3 Food and nutrition security	30
4.3.1 Institutions and political governance	31
4.3.2 Economics, innovation and research	36
4.4 Community dimension and socio-cultural practices	37
4.5 Household level factors	38
4.5.1 Natural capital	38
4.5.2 Physical capital	39
4.5.3 Human capital	39
4.5.4 Financial capital	39
4.5.5 Social capital	39
4.6 Stakeholders' views on agricultural commercialisation and FNS	39

5	Results: farmers' tales – community narratives on agriculture commercialisation in Myanmar	42
5.1	Setting of the research	42
5.2	Households' characteristics	44
5.3	Farmers adaptive strategies during the life course	46
5.3.1	Farmers' General Resistance Resources	47
5.3.2	Life-related events	50
5.3.3	Agriculture-related events	52
5.3.4	Diet-related life events	59
5.4	Social innovation strategies in agriculture	63
5.5	Synthesis of main findings	65
6	Conclusions	68
7	Discussion	70
7.1	Finding in the light of other research	70
7.1.1	Salutogenesis, life course and positive deviants	70
7.1.2	Social innovation	71
7.2	Pathways for linking agricultural commercialisation to nutritious food consumption	71
7.3	Strengths and limitations	72
7.4	Recommendations	73
8	References	75
	Appendix 1 Interview guideline	84
	Appendix 2 Literature review table	88
	Appendix 3 Respondents characteristics	93
	Appendix 4 List of codes	95

"I don't think of myself as unbreakable.

Perhaps I'm just rather flexible and adaptable."

-Aung San Suu Kyi-

Acknowledgements

This report, presenting the findings of a literature review and life course narratives of farm household in Myanmar, could not have been written without the generous support and willing participation of a diverse range of contributors. The authors of this report wish, on behalf of Wageningen Centre for Development Innovation (WCDI) to extend special thanks to the farm households that have actively and openly shared their histories, experiences and values with the research team. The research team specifically thanks Mr. Zaw Win Kyaw for this tireless work in assisting with the fieldwork and data collection. We are very grateful for the efforts made by our Myanmar research partners Greenovator, in particular Mr. Thein Soe Min and Ms Yin Yin Phyu, and the Myanmar Heart Development Organisation, in particular Mr. Aung Agkokohtway, in supporting and facilitating the field visits. The WCDI team gratefully acknowledges the Embassy of the Kingdom of the Netherlands in Myanmar and other Myanmar stakeholders for providing the context and ideas contributing to the research. Finally, the authors would like to thank Wageningen University and Research colleagues from the KB22, KB28 research programmes, and Health and Society Chair group, for contributing their critical inputs and reflections on the research design, set-up and review, and earlier drafts of this document. Without all these inputs, knowledge sharing, and enthusiasm this research would not have been possible.

Wageningen Centre for Development Innovation (WCDI)

Monica Gabrielli, Marion Herens and Bram Peters

List of abbreviations and acronyms

ASEAN	Association of Southeast Asian Nations
CBO	Community Based Organisation
CDI	Wageningen Centre for Development Innovation
DHS	Demographic and Health Survey
FNS	Food and Nutrition Security
HDI	Human Development Index
HH	Household
INGO	International Non-Governmental Organisation
IYCF	Infant and Young Child Feeding
WASH	Water Hygiene and Sanitation
WUR	Wageningen University & Research

List of figures and tables

Figure 1: Conceptual framework Development Pathways from Agricultural Commercialisation to Nutrition

Figure 2: Research model

Figure 3: Theoretical orientation – Opportunities to link agricultural commercialisation and FNS

Figure 4: A participant of this study, leader in his community

Figure 5: The data collection process

Figure 6: The time-line: blue= life events; red=diet-related events; green= agriculture related events

Figure 7: Myanmar States

Figure 8: Myanmar's climate classification

Figure 9: Main stakeholders' goals related to agricultural commercialisation and FNS in Myanmar

Figure 10: Pakkoku Township in the Dry Zone

Figure 11: Map of the Villages included in this study

Figure 12: Children wellbeing (on the left the picture of a graduation) and Buddhist practices (the house shrine on the right) are example of internal resources on which individuals build meaningfulness

Figure 13: An NGO's poster in a respondent's household

Figure 14: Life events

Figure 15: A female headed household

Figure 16: Agriculture – related events

Figure 17: Goats breeding

Figure 18: Most of the farmers relied on animal traction

Figure 19: The bed of a river at the end of the monsoon season

Figure 20: Diet – related events

Figure 21: Water spinach from household production

Figure 22: A traditional meal

Figure 23: The process of groundnut transformation

Figure 24: Main results – opportunities for linking agriculture commercialisation and FNS in Pakkoku

Table 1: Myanmar health and nutrition situation

Table 2: Main stakeholders related to agricultural development in Myanmar

Table 3: Main stakeholders related to food and nutrition security in Myanmar

Table 4: Myanmar main crops

Table 5: Villages information

Table 6: Research participants

Table 7: Household's characteristics

Table 8: Food production and consumption

Summary

With the Sustainable Development Goal (SDG) 'Zero Hunger' (UNDP, 2016) much importance has been given to the role of nutrition in reaching the end of hunger for all by 2030. Recently, in policy and research, the focus is shifting from improving food availability and access, toward the quality and diversification of diets. Despite the existence of several pathways that might potentially link agricultural commercialisation to nutrition achievements, there is no evidence that agricultural interventions lead to sustained changes in the overall diet of a population. It is recognised that farmers do have a crucial role in food systems, being both producers and consumers. Worldwide, individual farmers and their households have been increasingly involved in processes of commercialisation with substantial improvements in agricultural outputs, and are increasingly present market-driven agribusiness.

Food systems in Asia are undergoing a rapid transition, in which existing supply chains are adapting to economic, environmental, market and dietary change. In this study, commercialisation is defined as the agricultural transformation process in which individual farmers shift from a highly subsistence-oriented production towards more specialised production targeting markets both for their input procurement and output supply (Jaleta, Gebremedhin, & Hoekstra, 2009). Myanmar is a particularly appropriate context to study the connection between agricultural development and food and nutrition security. The recent democratisation process, ending of diplomatic isolation, and the opening up of the country to foreign investment has driven rapid change in the country. Even though the interest in nutrition security is on the rise at policy level, there is still a limited interconnection with commercialisation of agriculture. Consequently, there is an urgent need to put farmers at the centre of this field of research and explore coping strategies and forms of social innovations in which they are engaged.

The research approach was aligned to WUR research project 'Development pathways for agricultural commercialisation to nutrition', and was focused on deepening and contextualising the understanding of farm household sense-making processes in relation to the rapid agricultural transition currently occurring in Myanmar, while considering the implications of these processes for household food and nutrition security.

The main research question was:

What emergent opportunities can be identified linking agricultural commercialisation processes to food and nutrition security among smallholder farming households?

The research is comprised of two components: 1) a review of the state of play according to public, private, academic and development stakeholders on the current agricultural transition taking place in Myanmar; and 2) in-depth qualitative semi-structured interviews and exercises with selected farming households in the Dry Zone of Myanmar for analysis of agricultural life stories. The second research component brought to light resilient and emergent strategies, incentives and forms of social innovation. This study draws from three main theoretical lenses to explore the sense-making and adaptive strategies of farming households: salutogenic theory of individuals' strategies and coping mechanisms (focusing on understanding well-being); a focus on positive deviants to understand in which way successful farmers are able to guarantee sustainable livelihoods through (commercialisation) strategies in an environment where others fail; and social innovation theory to explore collective dynamics and the interactions among nutritional and agricultural oriented actors, policies and interventions. In total research was conducted among 14 households in the area of Pakkoku Township in the Myanmar Dry Zone.

The research yielded a rich and contextualised picture of farm household sense-making processes in relation to the rapid agricultural transition currently occurring in Myanmar, and their considerations of these processes in relation to household food and nutrition security (FNS). The state of play literature review identified that in Myanmar a 'silo mentality' exists separating investment in agriculture and food and nutrition security. This is reflected in the differentiation of target groups for

agricultural and FNS security interventions. The review showed a knowledge gap particularly when it comes to research on decision-making patterns, intra-household food allocation and cultural determinants of malnutrition in Myanmar.

The salutogenic approach and in-depth interviews revealed a diverse set of personal and unique ways of mobilising resources and building resilience. Although personal, most of these stories shared common characteristics, providing useful insights on the way farmers deal with the rapid process of commercialisation in Myanmar and at the same time guaranteeing their household food and nutrition security. The study shows how individuals developed a wide set of adaptive strategies to provide a stable income to their family, increase their yields, face unexpected events and guarantee a healthy diet to their family members. An important finding is that successful farmers involved in processes of commercialisation in the research area intentionally diversified their livelihood strategies in order to multiply their opportunities to deal with stressors and become more resilient. Farmers diversified their agricultural production and were flexible to change crop in response to market fluctuation. Another characteristic shared by respondents was the possibility to build their personal capital by relying on the emotional and material support of their family. Regarding land tenancy, a strong importance was assigned to the leveraging role of the family in the pathway toward land ownership. During youth, most of the respondents could live under the parental roof, working for others and saving money until they cumulated enough capital to purchase a new piece of land. This trajectory led these successful farmers to escape the condition of being landless.

Meanings attributed to sustainable diets and sustainable agriculture were deeply interwoven with local factors. Farmers' sense-making and decision-making processes differed substantially when considering agriculture engagement and their family food and nutrition security. This is suggested by the fact that a common strategy among successful farmers in the research area was to produce (or buy) organic food for personal household production and use chemical inputs in their agri-business. Even though some farmers showed a preference for organic and more sustainable way of agriculture, the majority had to rely on non-organic inputs in order to safeguard their economic goals. Nutrition did not emerge as leading respondents' choices of production and daily choices of food selection. The concept of nutrition was introduced through NGO's trainings, but effect of nutritional knowledge seemed more related with food selection for children. Food and nutrition security goals at household level mainly regarded affordability of certain kinds of food (meat, fish) and access to organic food, understood as access to food free from contaminants.

Several elements for social innovation are in place among smallholder farmers in Myanmar. Specifically, new forms of inclusive community-led organisations are taking root often in connection with the process of democratisation and increasing freedom of association. However, these initiatives face the risk to remain isolated and miss the opportunity to successfully scale up.

These findings lead to a number of **suggestions for policy and development interventions and further research**. Agricultural commercialisation and food and nutrition security are connected through an interrelated and complex set of pathways which are embedded in local sense-making and decision-making patterns. First of all, including smallholder-farmer households' interests and perspectives in agricultural production and food and nutrition security is key. Secondly, the salutogenic approach holds potential to explore adaptive strategies oriented toward well-being, and could, in combination with a quantitative research strategy, highlight trends and insights in a wider research area across Myanmar or over a longer period of time. Thirdly, regarding nutrition interventions, it appeared that declarative knowledge transmitted through educational trainings did not seem having significant implications in personal selection of food. The inclusion of procedural knowledge and local understandings of diets in food and nutrition security programmes and the impact of procedural knowledge transmission rather than declarative could represent an interesting field to explore further. Fourthly, there is an urgent need to establish a nationwide systematic, transparent and reliable system of data collection. Policy makers, development actors and the private sector are all in need of quality data to address their programmes. Above all, farmers are in need to access more reliable sources of information. Finally, the research underlines that diversification of livelihoods, social and emotional components, and support during youth play a major role in guaranteeing successful outcomes. This is quite different from specialisation and intensification strategies often promoted by agri-businesses. This is also different from the NGO project-based approaches that present farmers with standardised, mono-directional livelihood solutions.

1 Introduction

With the Sustainable Development Goal (SDG 2) 'Zero Hunger' (UNDP, 2016) much importance has been given to the role of nutrition in reaching the end of hunger for all by 2030. In the past, increasing food production has been the emphasis of agricultural strategies all over the world. By intensifying production, increasing availability and decreasing food prices, the current world food system is able to guarantee larger yields of staple grains. Since much calorie intake comes from maize, rice and wheat, in combination with oils, sugars and fats a larger part of the world population had the possibility to better cover their food intake (Carletto, Ruel, Winters, & Zezza, 2015). However, the presence of a triple burden of nutrition in low- and middle-income countries and the growing prevalence of obesity all over the world, prove an urgent need to further investigate how to simultaneously stimulate individuals' healthy food production and consumption (Miller & Welch, 2013). Recently, the focus shifted from improving food availability and access towards the quality and diversification of diets.

In the past decade, international attention has increasingly moved toward 'nutrition-sensitive agricultural programmes and policies' and 'make agriculture work for nutrition' (Webb, 2013). Agricultural development and nutrition interventions have achieved several goals in their respective fields but they have rarely worked in a coordinated way (Du, Pinga, Klein, & Danton, 2015). Despite the existence of several pathways that might potentially link agricultural commercialisation to nutrition achievements, there is no evidence that agricultural interventions lead to sustained changes in the overall diet of a population (Ruel & Alderman, 2013). Furthermore, Meeker and Haddad (2013) argue that, so far, review studies on the effectiveness of agricultural interventions aimed at improving nutritional status showed mixed results (Arimond et al., 2011; Berti, Krusevec, & FitzGerald, 2004; Hawkes & Ruel, 2007; Kawarazuka, 2010; Masset, Haddad, Cornelius, & Isaza-Castro, 2011; Ruel, 2001; Webb & Kennedy, 2014). This might be related to the fact that most agricultural programs aiming to increase agricultural production are not originally designed with clear nutritional goals (Meeker & Haddad, 2013). In addition, agricultural programmes often differ from nutritional interventions in several features, for instance in the kind of target groups of beneficiaries and intervention approaches (USAID, 2016).

Farmers have a crucial role in a food system being both producer and consumer (Hawkes & Ruel, 2011). Worldwide, individual farmers have been increasingly involved in processes of specialisation and commercialisation with substantial improvements in agricultural outputs (Carletto et al., 2015). In addition, by accessing markets, farmers improved their purchasing power to buy food, goods and services (McDermott, Ait-Aïssa, Morel, & Rapando, 2013). Unfortunately, this did not automatically lead to sufficient dietary intake of nutrients and vitamins, with malnutrition still affecting a large part of vulnerable groups in rural areas (Hunter & Fanzo, 2013). Although their central role in connecting food production to sustainable diets, farmers' voices are often missing in the debate.

1.1 Relevance and background of this research

The conceptual background from which this study originates is part of the research project 'Development pathways for agricultural commercialisation to nutrition' (Herens et al., 2017). In 2016, researchers from Wageningen Economic Research, Wageningen Plant Research, and Wageningen Centre for Development and Innovation collaborated on a literature and review on conceptual pathways from agriculture to FNS. From this process a conceptual framework (Figure 1) for the analysis of sustainable agriculture pathways from macro, to community, to household level was articulated. This research project aims to identify development pathways in agriculture that stimulate both viable and inclusive commercialisation and improve the production and the consumption of nutritious foods. More particularly, the aim is to identify nutritious-sensitive agriculture pathways in which social innovation process enable:

- A more efficient use of resources in an environmentally sustainable way;
- An increase in production/yields of nutritious commodities like fruits and vegetables;
- Increased stability and availability of nutritious foods to vulnerable population groups.

1.2 Key concepts

In this study food system is defined as "a system that embraces all the elements (environment, people, inputs, processes, infrastructure, institutions, markets and trade) and activities that relate to the production, processing, distribution and marketing, preparation and consumption of food and the outputs of these activities, including socio-economic and environmental outcomes" (HLPE, p.12, 2014). In a food system, the agricultural value chain plays a central role in determining actors' choices related to food. Therefore, there is a need to better understand in which way changes along the value chain can affect food system socio-economic and environmental outcomes. Starting from food production, an important phenomenon experienced by an increasing number of farmers worldwide is the participation in processes of agricultural commercialisation.

Commercialisation is defined as the agricultural transformation process in which individual farmers shift from a highly subsistence-oriented production towards more specialized production targeting markets both for their input procurement and output supply (Jaleta, Gebremedhin, & Hoeskstra, 2009). Specialisation and commercialisation could represent a more efficient strategy than subsistence for small farmers (Gebremedhin & Jaleta, 2010). However, commercialisation of agriculture can have several adverse effects, especially in terms of equity and environmental consequences. With the increase of mechanisation, a consistent part of the rural labour force needs to be relocated in the industrial and service sector, with consequent loss of human and social capital (Pingali, 1995). Commercial systems face environmental consequences due to the increased use of agricultural chemicals (Pingali, 2001). Where property rights are unclear phenomenon such as land grabbing can take place. Also, commercialisation may lead to a decline in crop diversity for households (Rerkasem et al., 2009). In some cases, farmer that invested in cash crop resulted worse off in terms of nutritional status than subsistence farmers (Anderman & Remands, 2014). Therefore, it is not only sufficient to achieve economically efficient food systems but also orient these complex interrelations towards sustainability and food and nutrition security (FNS) for all. A sustainable food system (SFS) is defined by the High-Level Panel of Experts on FNS (2014) as "a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised" (p.12). Therefore, agricultural commercialisation can be considered sustainable when it contributes to the sustainability of the whole food system.

Food and nutrition security (FNS) as defined by the United Nation System Standing Committee on Nutrition (UNSCN, 2013) is not only dependent by the availability and accessibility of sufficient quality and quantity of food. These aspects need to be supported by adequate sanitation, health services and care, allowing a healthy and active life. In the recent years, several nutritional interventions have been implemented in low-income countries, often targeting children and women. Public nutritional campaigns have often proved to be a failure in terms of long term behavioural change all over the world. This is reflected in the increasing figures of obesity and unbalanced diets (Swan et al., 2015).

Hence, mechanism that promote sustainable diets are in need of further investigation. In this study, sustainable diets are defined as “those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources” (FAO, 2012).

1.3 Pathways for linking agricultural commercialisation to nutritious food consumption

Since it is clear that just the presence of food is not enough for nutrition, there is a need to better understand in which way agricultural commercialisation can bring sustained changes in the overall diet (Webb, 2013). A set of possible pathways, potentially linking agriculture to positive nutritional outcomes are recognized in the literature (Berti et al., 2003; Hawkes & Ruel, 2007; Arimond et al., 2011; Masset et al. 2011; Meeker & Haddad, 2013; Gillespie et al, 2012; Ruel et al., 2013; Kanter et al., 2015). Meeker and Haddad (2013) defined four key lines of action. First, a possible pathway can be identified in favourable food prices. Agricultural policies influence food and non-food crops prices and consequently they affect the income of sellers, the purchasing power of buyers and the budget choices of both. Second, another pathway towards improved nutritional outcomes sees the income derived from agriculture being spent in nutrition related good. Third, another option is the increase of household availability and access to food from self-production. Forth, other directions are related with women’s condition. Women’s control over resources and assets can increase their decision-making power on intra-household food and care allocation. Women time expenditure in agriculture can also affect household management and care giving. In addition, the participation of women in agriculture can affect their health and nutritional status with possible negative consequences on their farms business status (Meeker & Haddad, 2013). Since these pathways seems to be largely indirect, they require support through policy, investment and awareness (McDermott et al., 2013). Miller and Welch (2013) identified five strategies for preventing micronutrient deficiencies in a food system perspective. Some strategies involve nutrient inputs improvement (i.e. bio-fortification or food fortification). Others have more social implications such as diversifying diets and reducing food losses and food waste. In this case issues such as gender, intra-household resources dynamics and food safety need to be taken in consideration. (Webb, 2013). In order to guide this effort there is a need to further consider the role of farmers as being both producer and consumers and their choices and sense-making processes relating to (food) production strategies and consumption choices.

The conceptual background used to develop this study (Figure 1) illustrates the factors and outcomes within a food system which link FNS and agricultural development (Herens et al., 2017). This conceptual framework originated from several other frameworks previously designed (Von Braun, 1995; FAO, 1996; DFID, 1998; Black et al., 2013; Webb, 2013; Hertforth & Harris, 2014; Kanter et al., 2015). These framework makes three main contributions to the previous ones:

- It embraces a multi-level approach taking in account several factors that affect farm household livelihood outcomes. This emphasises the interactions between macro dynamics and the household considerations;
- The rural agricultural household interactions with the external environment are the focus of this framework. In this space farmers negotiate their assets with the external environment through their decision- and sense-making behaviours. These dynamics generate pathways which cut across different levels and can take various shapes and forms, potentially leading to changes for famers’ livelihood;
- It considers time thanks to the inclusion of a life course perspective (Black et al., 2013). From this point of view the relations between inputs and outcome are non-linear, providing new processes and decisions that impact new household goals.

In order to identify potential pathways bounding agriculture development to nutrition, different aggregation levels need to be considered. At macro level, demographic, environmental, social, political, institutional and economics factors impact the agricultural value chain. These factors are

interrelated with each other and occasionally they may directly affect household level processes (i.e. natural disaster). At community level, the socioeconomic and environmental factors are contextually adapted to small scale elements relevant for famers' households such as the presence or absence of nutritious food, services, technologies, social networks, regulations and laws, health, education and care services.

The rural agricultural household is identified as the unit of analysis, as the space where production and consumption strategies are negotiated with the external context. The interaction between farmers' decision-making behaviours, assets allocation strategies, change and innovation, influenced by the external environment can contribute to generate different pathways (Von Braun, 1995). It is crucial to understand the role of farmers in linking agricultural commercialisation processes and nutritional outcomes. Several factors influence farmers' decision- and sense-making. Household capitals (natural, physical, human, social, financial) can be allocated in different ways. Farmers negotiate on time allocation. The quantity of time dedicated to social and productive activities generate a different set of activities outputs, such as surplus food, income, social safety nets, and education and training. Some of these resources will be allocated to guarantee food, health and care for the family members. Finally, all these complex interrelations between external influences and household decision making will end in different outcomes in terms of household members' nutritional and economic security (Frankenberger & McCaston, 1998).

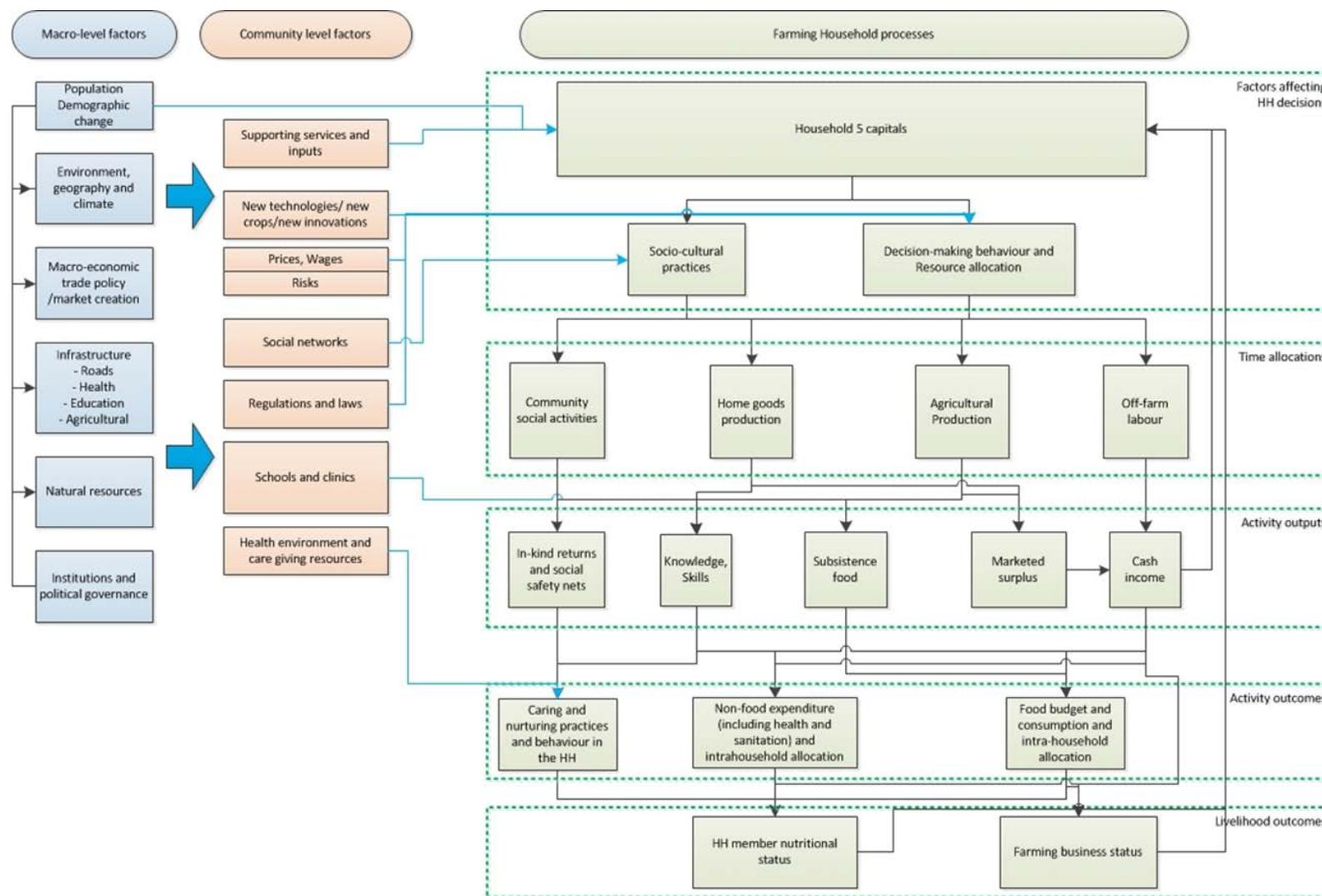


Figure 1 Conceptual framework development pathways from agricultural commercialisation to nutrition. Source: Herens Et Al, 2016

1.4 Food systems in transition: the case of Myanmar

Food systems in Asia are undergoing a rapid transition, in which existing supply chains are adapting to economic, environmental, market and dietary change. The shift is from food systems characterised by small scale production to a growing presence of commercialisation and longer and more complex supply chains (Westhoek, van Berkum, Özay, & Hajer, 2016). Myanmar is a particularly appropriate context to study the connection between agricultural development and FNS. The country is slowly emerging from decades of dictatorship and closure to the world. In 2012 the Government signed a ceasefire agreement with armed groups in the country followed by a significant reduction of internal conflicts. However, reports from the conflict areas over the last twenty years indicate militarisation and the presence of armed actors as the cause of human rights violation such as land grabbing, arbitrary arrest, detention and execution, relocation, sexual violence, etc. (Davis, Mullany, Schissler, Albert & Beyrer, 2015). Most of the conflicts in the country have their origin in the lack of autonomy of ethnic groups in managing land. Land governance is not transparent and land registration is a highly-politicized issue.

After 50 years of military rule the 8th of November 2015, Myanmar experienced the first national vote since a nominally civilian government was introduced in 2011 (Fisher, 2015). As a consequence, the country opened to the world allocating large concession to foreign agribusiness companies (Haggblade et al., 2014). The government expressed its intention to become a full member of the ASEAN (Associations of South East Nations) community and more relaxed regulation favoured foreign investment. Nevertheless, the paradigm of achieving food security through rice production and local and international agribusiness prioritisation remained a key strategy for the government (Rammohan & Pritchard, 2014).

A major problem faced by the government of Aung Sang Suu Kyi is to guarantee peace and stability among the diverse range of ethnic groups living within the country, while key ministries are still under military control. For instance, the Ministry of the Home Affairs, controls the access to several states. At the moment, the international community is questioning the way the government is approaching the situation in Northern Rakhine where the claim of integration of a discriminated Muslim community have been recently put forward by an armed insurgent group. The military have been accused of a too heavy-handed security response and human rights violations. Until recent, farmers' unions and networks were banned in the country (Mercy Corps, 2015).

Also, the country lives the contradictory situation of being on the one hand a net food exporter but on the other hand it is experiencing high poverty and malnutrition rates (Rammohan & Pritchard, 2014). A major constraint in this regard is a complex pattern to land access. Nearly half of the rural households are officially reported as landless (no ownership). Confiscation of land and conflicts in some areas are two major pathways to landlessness. In some cases, landless households gain access to land for agricultural production, but most of the time access appears to be through rental or on a sharecropping basis. (USAID et al., 2013).

Even though the interest in nutrition security is on the rise at policy level (see NESAC, 2016) there is still a limited interconnection with commercialisation of agriculture. Consequently, there is an urgent need to put farmers at the centre of this field of research and explore coping strategies and forms of social innovations in which they are engaged. In this way, a deeper understanding of the existing pathways leading to better nutritional and commercial outcomes can be identified.

1.5 Research questions and aims

This study contributes to the research project 'Development pathways for agricultural commercialisation to nutrition' by deepening and contextualising the understanding of farm household sense-making processes in relation to the rapid agricultural transition currently occurring in Myanmar, while considering the implications of these processes for household FNS. The objective of the research is twofold. First, it comprises an attempt to review the state of play according to public, private, academic and development stakeholders regarding the current agricultural transition taking place in

Myanmar by focusing on the possible links between smallholders' commercialisation and their FNS. The second aim is to include the narratives of local smallholders by in-depth analysis of agricultural life stories in order to extract resilient and emergent strategies, incentives and forms of social innovation leading to sustainable agricultural commercialisation while achieving household FNS. The main research question will be therefore:

What emergent opportunities can be identified linking agricultural commercialisation processes to food and nutrition security among smallholder farming households in the research area?

The main research question triggers the following sub-questions:

- 1. What are the current understandings and visions present among different stakeholders involved in agricultural commercialisation and food and nutrition security in Myanmar?
- 2. How do smallholder farmers developed and implemented adaptive strategies in response to changes and challenges with regard to agricultural livelihoods and diets during their life-course?
- 3. What are the meanings attributed by farmers to sustainable agriculture and diets?
- 4. What kind of social innovation strategies materialise in response to the developments in agricultural production?

2 Theoretical framework

Hawkes and Ruel (2011) underlined the importance to focus on what happens between production and consumption, particularly from the perspective of farmers being (commercial) producers as well as consumers. This requires the engagement of a holistic, multisector approach which place people at the centre of the analysis. In this chapter, the theoretical framework for this study will be outlined.

2.1 Life-course perspective

In order to understand the accumulation of factors influencing food production and consumption in a context undergoing important societal transitions, the life-course perspective offers a useful theoretical lens. In fact, this perspective examines the lives of people over time (Wethington, 2005). From a life course perspective livelihoods are the production of a series of events and broader socio-cultural influences. Trajectories, transitions, turning points and the wider historical and cultural context are all part of a household history (Wethington, 2005). Often used to analyse food consumption patterns, it can also be applied to explore how farmers make-sense of their biography in relation to agriculture development (Riley, 2010). Farmers engage in agriculture following *trajectories* or stable pattern of behaviours. Following a pattern means cumulating protective factors, social network and social resources in families (Wethington, 2005). Life *transitions* are related with changes in social roles and responsibilities such as marriage, birth of a child, etc. (Wethington, 2005). Collecting information on these transitions in the context of Myanmar can provide useful insight on socio-cultural practices and gender roles related with food production and consumption. Also, *turning points* can influence processes of change over the life course (Wethington, 2005). In addition, *contextual factors* such as the opening of the markets in Myanmar to foreign investors represent a major change for semi-subsistence farmers that are now starting to engage in commercialisation. In order to deal with these changes, farmers develop a set of diverse *adaptive strategies*, which are conscious decisions aiming at improving personal and household well-being in response of contextual circumstances (Wethington, 2005).

2.2 Salutogenesis and positive deviants

Often the life course perspective is used to understand how the accumulation of risk lead towards an ill health outcome (Wethington, 2005). In addition, the majority of the literature on agricultural development and FNS focuses on the constraints that hold farmers back. On the contrary, the salutogenic approach formulated by Aron Antonovsky in 1979 focuses on individuals that manage to live a healthy life despite past or current hardships (Lindström & Eriksson, 2010). For Antonovsky health was a movement between two extremes of ill health (dis-ease) and total health (ease). The ability to move towards the ease end of the axis depends of people's *Sense of Coherence* (SOC). According to Antonovsky's salutogenic framework, people able to cope with psycho-social and physical stressors have a high Sense of Coherence (SOC). These individuals are motivated to cope (meaningfulness); can understand the challenge they face (comprehensibility); and believe resources are available to overcome the stressor (manageability) (Antonovsky, 1979; Lindström & Eriksson, 2010). SOC development depends on the availability of resources that support individuals meaningful and coherent life experiences. Those are defined by Antonovsky as *General Resistance Resources* (GRRs). General Resistance Resources (GRR) are physical biochemical, artefactual-material, cognitive, emotional, valuative-attitudinal, interpersonal-relational and macro-social characteristics of an individual, primary group, subculture or society that are effective in avoiding and combating a wide variety of stressors (Antonovsky, 1979, p.103). These resources can be found internally (i.e. intelligence, coping strategies, identity) or they can be located in the external environment (Lindström & Eriksson, 2010). GRR are conditions to develop a strong SOC. At the same time, individuals with a

high SOC are better able to access these resources and use them to face stress and generate health and in this case also wealth (Lindström & Eriksson, 2010).

In line with this approach, recent attention has been paid to 'positive deviants' in agriculture (Pascale, Sternin, & Sternin, 2010). Positive deviants are here defined as actors that act against the norm bringing along social, technical, institutional, organisational and policy innovation and linking experts and local knowledge. They initiate change in difficult social, political and organisational environments where the majority fails (Ochieng, 2007; Pant & Hambly Odame, 2009). In some cases, they intentionally build upon resources and competencies to mobilize resources and power to achieve their goals. In other cases, innovators are less aware of their revolutionary way of acting within limiting conditions. Focusing on these exceptional cases, instead of on the failing norm, permits to identify which life experiences or supportive assets lead to healthy behaviours and commercially viable agriculture. These behaviours are often affordable, acceptable and sustainable since they are already practiced in a specific local context (Marsh, Schroder, Dearden, Sternin & Sternin, 2004). Analysing these cases from a life-course perspective permits to explore how coping mechanisms develop during individuals' lives (Wethington & Johnson-Askew, 2009). Learning from these stories provides insights on the pathways to sustainable livelihoods. The way positive deviants have succeeded can inspire interventions and policy processes aiming at the creation of a more conducive environment for the actors to realize their livelihood strategies (Amankwah, 2012).

2.3 Social innovation

In adverse circumstances, positive deviants develop new resilient and community-based way of harmonising policy and practices which can lead to better productive and nutritional outcomes. This is the space where much social innovation is observed, as expressed by Nicholls, Simon, Gabriel, & Whelan (2016):

"One root of much social innovation is the experience or observation of pain and suffering, and the experience and observation of how people respond with love, care, learning, empathy or cure. Out of that observation grew attempts to replicate these things – the love, care or learning – in institutional form or with technologies." (p. xiv).

Innovation can be defined as anything new, from technical to institutional and organisational, successfully implemented and integrated into a specific socio-economic environment (Spielman, Ekboir & Davis, 2009). Policy and research can originate innovation. Moreover, innovation can spontaneously be initiated at micro level. Through the interaction among farmers, households and communities, innovation can grow and spread. New combinations or configurations of social practices are defined by Tarde (2009) as social innovation (cited in Nicholls et al, 2016). Social innovation is a complex phenomenon which span from grassroots solutions to pressing societal issues, to novel services and products originating from innovative multi-stakeholders' partnerships, to more systemic innovation involving organisational and institutional frameworks (van der Have & Rubalcaba, 2016). In this study, social innovation will be defined as *"the generation and implementation of new ideas about how people organise interpersonal activities, or social interactions, to meet one or more common goals"* (adapted from Mumford, 2002, p. 253)¹. In addition, social innovation entails 'complex processes *"introducing new products, processes or programs that profoundly change the basic routines, resource and decision-making processes, or beliefs of the social system in which the innovation occurs"* (adapted from Westley and Antadze, 2010, p. 2).

Examples of social innovation agriculture-oriented initiative which lead to positive food security and nutritional outcomes are present in the literature (Pant & Hambly Odame, 2009; Dubé et al., 2014). The recent process of democratisation in Myanmar combined with a growing commercialisation in agriculture represents an interesting setting to explore emergent forms of social innovation. (Pant & Hambly Odame, 2009)

All these elements can merge in 'food stories', which describe how families related to their food production and consumption through their life history (Clark, 2004). Story-telling is a valuable tool to

¹ There are more definitions on Social Innovation (e.g. van der Have & Rubalcaba, 2016; Nicholls et al., 2016)

understand the sense making attempts of farmers and how they identify their own theory of change by reflecting back in order to explain their current situation. These narratives are embedded in the local socio-cultural environment. Therefore, in the Chapter 4 an overview of the current situation of agricultural development and FNS will be outlined. In Chapter 5 an analysis of farmer's tales will be provided.

2.4 Theoretical outline

This study uses a combination of theories with the aim to disentangle the complex dynamics determining farmers' livelihood. It illustrates elements of a food system that have an impact on FNS and agricultural development. Starting from the framework elaborated by Herens et al. (2017), the following conceptual graphic representation wants to provide a multi-level perspective placing farmers sense- and decision-making processes over the life-course at the centre of the analysis.

In a food system, different macro factors can influence agricultural production and food consumption:

- Environmental conditions;
- Innovation in technology, infrastructures and social practices;
- Country economy;
- Political situation;
- Demographic drivers (Swinburn, Dominick & Vandevijvere, 2014).

All these elements play an important role in shaping local food environments, health and education conditions, contextual socio-cultural practices and food value chains. Food environments consist of different aspects necessary to guarantee people's FNS. These elements are food availability, food access, food acceptability, food affordability and food safety (Caspi, Sorensen, Subramanian & Kawachi, 2012; Swinburn et al., 2014). From the definition, FNS also depends on health and educational conditions such as the availability of nutrition educational programme, WASH standards and school and clinics access (UNSCN, 2013). At community level, contextual specific socio-cultural practices as well have an influence of the final livelihood outcomes.

The food value chain is defined as the set of activities and actors, from food production to consumption and to food waste disposal (Hawkes & Ruel, 2012). This study particularly focuses on transformation in food value chains due to the progressive intensification of agricultural commercialisation. In order to understand the complex sense-making and decision-making processes happening in response of commercialisation, this study draws from three main theoretical sources. A salutogenic approach can support the analysis of individuals' strategies by focusing on coping mechanisms that promote nutritious food consumption and production during the life-course (Lindström & Eriksson, 2010). Studying positive deviants helps to understand in which way successful farmers are able to guarantee sustainable livelihoods through commercialisation strategies in an environment where others fail. (Pascale, Sternin, & Sternin, 2010). In addition, social innovation theory supports the analysis by stressing on the importance of explore societal dynamics made of alternative strategies and the spaces of interaction between nutritional and agricultural oriented actors, policies and interventions (Nicholls et al., 2016). The final goal is to identify innovative practices able to combine sustainable diets with positive economic impacts for small holders engaging in commercialisation.

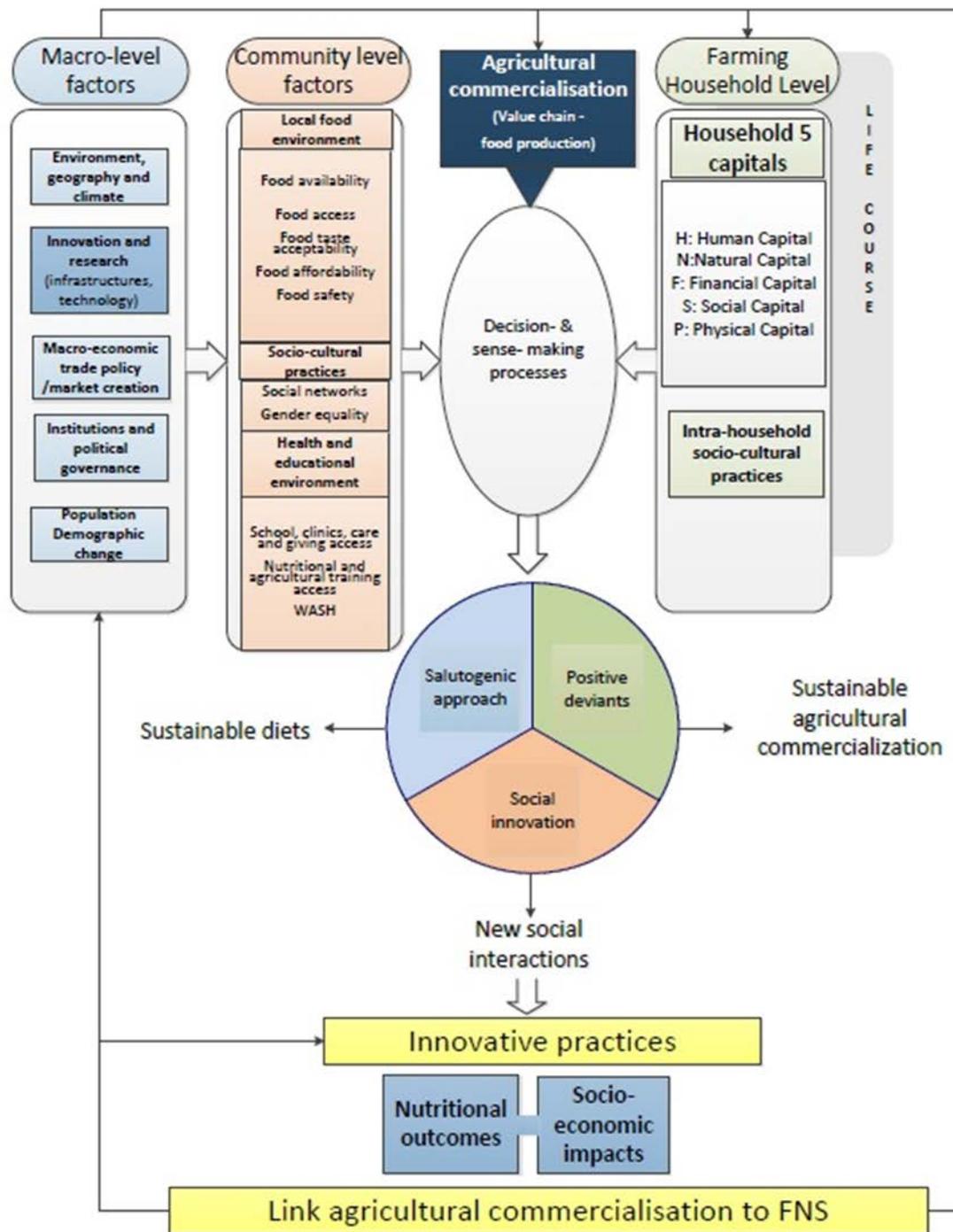


Figure 2 theoretical orientation – opportunities to link agricultural commercialisation and FNS

3 Methodology

3.1 Research model

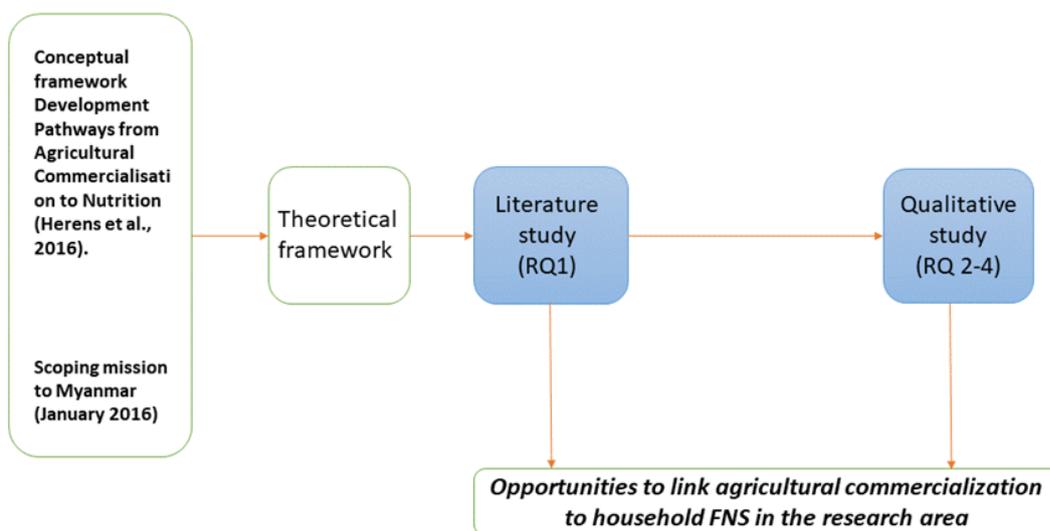


Figure 3 Research model

The research goal was reached through the methodological steps outlined in Figure 3. The case study in Myanmar is built upon the conceptual framework elaborated by Herens et al. (2017) and on the information emerged from a CDI scoping mission in January 2017. The theoretical framework is the entry point to disentangle the complex reality of agricultural development and FNS in Myanmar (Chapter 2). In this chapter, the methodology guiding this study is described in detail. The literature review provided an overview on the nutrition and agricultural policy and intervention context (Chapter 4). The qualitative case study was conducted with the aim of providing a rich picture of the smallholder farmers' situation in the selected research area (Chapter 5).

3.2 Literature review

The literature review was carried out with the aim of providing an overview of the current understandings and views present among different stakeholders involved in agricultural development and FNS in Myanmar on the thematic of food production and consumption. Specifically, the literature review seeks to identify existing points of encounter between agricultural commercialisation and nutrition promotion. The review of grey literature (reports, policy documents, etc.) provided insights on the recent development in these fields at policy and intervention level.

For the literature review the following inclusion criteria were used:

- Scientific papers, policy documents, statistics, projects and programme evaluation published in English (2010- 2017);
- Studies concerning agriculture development in Myanmar published in English (2010-2017);

- Studies concerning FNS developments in Myanmar published in English (2010-2017);
- Studies concerning smallholders in Myanmar published in English (2010 – 2017).

Scopus, Web of Science, Google Scholar, PubMed and WUR Library online catalogue were reviewed. The following key words have been used in different combinations: 'food security', 'food and nutrition security', 'agriculture' 'agriculture commercialisation' 'nutrition'. All these terms were combined with AND Myanmar. Snowball sampling has been used to identify further relevant literature. In addition, an exploratory mission in Myanmar was conducted in January 2017 as part of the project 'Development pathways for agricultural commercialisation to nutrition'. The report resulted from this mission has been of value in preparation of this report. In this mission part of the research team visited a total of 23 organisations and institutions from Myanmar government institutions, multilateral agencies, international NGOs, national NGOs, universities and research institutes and (social) enterprises.

3.3 In depth non-structured interviews

3.3.1 Study design and approach

A cross-sectional study design better suits this study aim of identifying specific meaning constructions in a defined population. A multiple case study design will be conducted in order to capture the in-depth interrelations of sense-making processes and the surrounding environment (Bowling & Ebrahim, 2005).

This study is informed by a salutogenic approach, meanings that instead of focusing on obstacles the analysis focused on what are resilient strategies, incentives and forms of social innovation leading to sustainable agricultural commercialisation while achieving household FNS. Giving voice to individuals' stories of positive deviants can offer an occasion to do so. Qualitative research can contribute to identify what are the resources that support farmers to deal with their daily risks and stressors (Bisogni, Jastran, Seligson & Thompson, 2012).



Figure 4 *A participant of this study, leader in his community*

3.3.2 Sampling strategy

A non-probability based purposive sampling strategy was applied in this study. 15 farmers were selected among a list provided by Myanmar Heart Development organisation (MHDO), a local NGO, following specific selection criteria based on the above mentioned salutogenic approach. Applied to farming, this means selecting the positive deviants who reached optimum results in an environment where the majority fails. We acknowledge that 'positive', 'healthy' and 'successful' are socially constructed concepts. In order to identify positive deviants, we based our criteria on existing development indicators and local consultation with key stakeholders involved in agricultural development and food security in Myanmar. We did so believing these parameters are sufficient for the aim of learning from the positive (Biggs, 2008).

The main criterion for selection was being a positive deviant farmer household. The eligibility criteria for this study were:

- Started agriculture as landless or smallholder (less than 5 acres of productive land as defined by Lowder, Skoet & Raney, 2016);
- Engage or engaged in the past for at least 10 years in any form of market-oriented farming in the research area;
- Relate directly to current concerns of 'scaling up' of technology, methods, social innovation, good and best practices.

Strategic selection was done on site based on the list of households provided by MHDO based on the study criteria and the availability of farmers in consultation with a local MHDO project manager. Female headed household were given priority in the selection process in order to maintain a balance between male and female respondents. For this study 5 villages have been selected among the interventions areas of MHDO due to their distance to the river and consequent diversity of crops produced. Access to villages and households was ensured by the familiarity of the participants with MHDO employees.

3.3.3 Data collection methods

Data were collected by means of qualitative in-depth interviews using narrative inquiry as method. The interviews were conducted in Burmese, recorded and then transcribed verbatim in English by the translator.

Narrative inquiry relates to the collection of narratives from individuals. This method has been chosen for the following aspects:

- It allows to catch more in-depth thoughts and emotions of individuals than the traditional interview (Savin-Baden & Nierkerk, 2007);
- It captures the meanings individuals attribute to their lives through the selection of memories (Polkinghorne, 2007);
- The process of express the personal life-story may have a near therapeutic effect and it favour self-reflection (Sheridan & Chamberlain, 2011);
- It provides a reflection on changes in societal and cultural norms from which is it possible to extract time and geographical bound socio-cultural practices (Devine et al., 2005).



Figure 5 *The data collection process*

Narrative inquiry and other similar non-structured form of qualitative inquiry have been used to explore food stories in several studies. On the side of consumption narrative inquiry has been applied to understand food choice factors in a population (Edquist, Koch, & Contento, 2009), to explore food related meanings (Hocking, Clair, Bunrayong, 2002; James & Curtis, 2010; Newcombe, McCarthy, Cronin & McCarthy, 2012), eating disorders (Papathomas & Lavalley, 2011; McCormack et al., 2014), relationship with food (Busanich, 2013), healthy eating (Rosen, 2015).

Narratives inquiry has also been used to understand whole food systems, including production aspects (O'Kane & Pamphilon, 2016). The generation of narratives is not an automatic process and it is strictly dependent on the questioning mode adopted by the interviewer. In order to facilitate the generation of

narratives the interviewing process can be supported by creative outlets of expression. The use of objects connected with the topic of the interview can encourage a more in-depth cognitive and emotional response and allow those who have not experienced the events narrated to better connect with the story (Sheridan & Chamberlain, 2011). The selection of an item connected with healthy food may enhance socio-cultural meanings related with food and support the production of narratives related to current food patterns. Timelines co-constructed by the researcher and the interviewee can represent a tool to support further discussion (Delaney & McCarthy, 2014; Keenan, Abusabha, Sigman-Grant, Achterberg & Ruffing, 1999). Timelines supports the recall and reflection upon past experiences and serve as a graphic tool to guide the interview.

Wengraf (2001) developed the biographical interviewing method to guide story telling conversations. This method calls for opening the interview with single narrative questions (i.e. 'please, tell me about your experience of') to allow the respondent to freely generate narratives. In a second moment, the interviewer can rise questions and dig deeper in specific topic relevant for the research.

The interview procedure is mainly based on the one designed by Rosen (2015) and consisted of the following main steps:

1. The first 15 minutes were dedicated to (i) briefly introduce the study goal and interviewee selection criteria, (ii) fill the informed consent form (orally in case of illiteracy) and a household roster and (iii), the explanation of the two activities to be completed before the storytelling conversation.
2. After that 30 minutes were given to the respondents to complete the following two activities. First, select an item (photography, piece of text, foodstuff, etc.) that respondents associate to healthy food. The research team provided a practical example. Secondly, respondents were provided with posters and asked to draw the household' members story-line where participants could freely include important moments, transitions, turning points, etc. in relation with agriculture and their diets. Also in this case, the researcher provides the respondents with a timeline as example.
3. After that a narrative-probing open question started the conversation. Respondents were let free to describe their personal experience in relation with agriculture and their diets with the graphical support of the story-line. In a second moment, the interviewer dug deeper in topics relevant for the study not yet addressed. Particular attention was given to important life-course stages. In addition, going through the life history enabled the identification of socio-cultural, ethnic and gender roles and meanings (Devine et al., 1998). Furthermore, in order to understand coping strategies and social innovation cases particular attention have been paid to responses to challenges and stress. An open, unstructured conversation guided the interview with the respondents taking charge of their own narratives. The main aim of the interviewer was to explore the timeline and food item together with the participant. However, the researcher was provided with a list of topics related to the interest of the study (see appendix A).

In a second moment, respondents were asked to describe and explain the reason of the healthy food item selection. Through the object, it was possible to explore meanings of healthy food among respondents and link to the family's agricultural history.



Figure 6 The time-line: blue= life events; red=diet-related events; green= agriculture related events

3.3.4 Data analysis

Thematic analysis was applied to analyse the narratives emerged from the interviews. The analysis was conducted with the support of QDA Miner Lite software. Both top-down and bottom-up coding were applied. Both coding strategy were applied simultaneously by two researchers of the team and then converged in a single list of codes (see Appendix D). For the bottom-up strategy, a sample of interviews were selected among the 14 transcripts. From these transcripts, salient points were underlined and more elaborated sentences were added as comments on the margin. These sentences expressed a slightly higher level of interpretation and were added to the final list of codes. For the top-down strategy, transcripts of the interviews were coded according to the theoretical framework. The coding categories emerged from both top-down and bottom-up strategy have been merged in a list of codes. Secondly, all the stories have been analysed applying the new concepts. Consistency and wrong coding of relevant fragments has been checked. At the end, findings were systematically described in relation with each research question, after discussion in the research team for clustering of emerging themes. Quotes supported the results to transmit unique concepts and meanings. In the table in Appendix D, the main codes applied are listed divided per research question and per coding strategy (black for top-down and blue for bottom-up).

3.3.5 Ethics

The participation to the interview were voluntary. Informed consent was obtained before taking the interviews and pictures. Considering the possible illiteracy of respondents, consent was requested orally. Participants' anonymity is ensured. Due to the current political situation, interviewers were advised to avoid political related topic especially if connected with the military regime in order to avoid problems to the respondents and considering the risk to have the research suspended. Therefore, freedom of expression could have not been fully guaranteed during this study.

4 Results: Agricultural commercialisation and FNS in Myanmar

Myanmar lives in a controversial situation of relatively abundant production together with a widespread presence of rural poverty and under-nutrition (Rammohan & Pritchard, 2014). With the recent political and economic transition, agricultural development has intensified, with consequent pressure on the environment and on the population livelihoods (Rammohan & Pritchard, 2014). Therefore, there is a need to understand in which way the national food system can adapt and adjust in order to guarantee a sustainable production and consumption of food. The objective of this chapter is to review the current understandings and views of different stakeholders on the impact of agricultural development on smallholder farmers, and specifically on their FNS situation. First, an overview of the macro elements of Myanmar food system will be outlined following the theoretical multilevel framework structure. Particular attention is paid on the country's FNS situation. Second, an outline of the socio-cultural dimensions of the food system emerged from the literature will be provided. Third, an analysis of household assets will follow. This chapter ends with a reflection on stakeholders' goals and possible merging points between agricultural commercialisation and FNS.

This chapter is based on 16 scientific articles matching the literature review selection criteria (see 3.1). Since the topic concerns recent political and economic dynamics and considering the limited academic research published in English in peer reviewed journals, this research takes also into account 36 (I) NGOs reports, policy documents and the results of a scope mission conducted by Wageningen CDI in January 2017. A table with sources divided per topic and type of source can be find in Appendix B.

4.1 Food system macro-level factors

In this section, the macro-level factors influencing Myanmar agricultural production and household FNS will be outlined. The country recently opening of the borders, the relaxation of international sanctions and the adaptations of institutions towards democracy brought along several changes which have a significant impact on the food system.

4.1.1 Environment, geography and climate

Myanmar is a country rich in diversity. It comprises seven states and four main agri-ecological zones: the delta, coastal, dry and hilly zones. The country is rich in minerals, natural gas, water sources, timber and some of the richest soil for agriculture in South-Eastern Asia. In addition to the country strategic position between China, India and Southeast Asia, its richness in natural resources represents a major growth potential (Kattelus, Mizanur & Varis, 2014).

Myanmar climate is dominated by the south west monsoon from which depends most of the country agricultural production. From this discerns a diverse conformation in terms of climate, natural resources, cultures and traditions.



Figure 7 Myanmar's states. Source: DHS (2017)

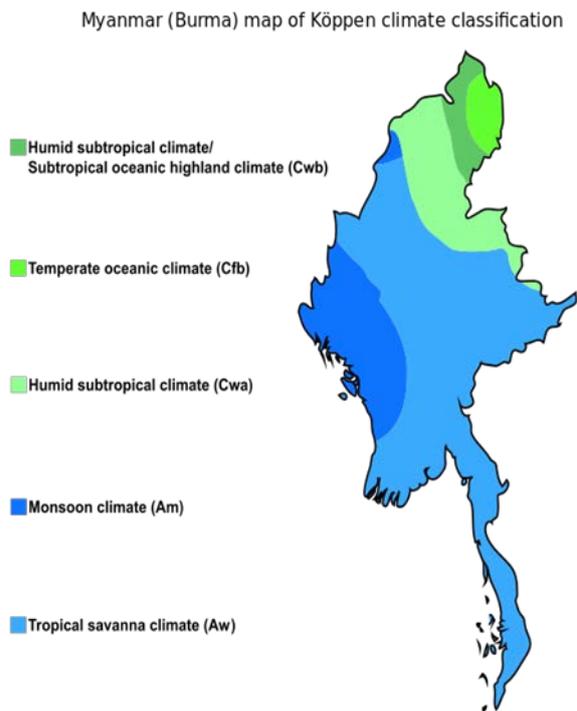


Figure 8 Myanmar's climate classification source: wikipedia (20.02.2016)

In 2008 Cyclone Nargic had dramatic consequences in terms of life toll and damage to livelihoods and properties. The heavy rains and floods of 2014-2015 induced a supply shock to agriculture, resulting in an inflation rise and therefore in declining household purchasing power (World Bank, 2016).

4.2 Demography and health

The country has a population of 53.9 million people, 70% lives in rural areas. Following the general election on 2015, dramatic economic and political changes have brought to an increase of rural to urban migration. In order to improve their livelihoods many people started to migrate internally (in 2014, 9.39 million people, which is approx. the 20% of the population) (IOM, 2016). The Government estimate that there are 4.25 million Myanmar nationals living abroad. Drivers of migration include better wages in neighbouring countries, conflict and environmental migration (IOM, 2016). Migration has important consequences on societal structures. For example, while in the past female-headed headship was associated with poverty, from 2005 this kind of household resulted more often non-poor, due to receipt of remittances from the absent male members (SIDA, UNICEF & UNDP, 2011).

Myanmar is one of the countries within the lower part of the category Medium Human Development in the HDI ranking (145 on 188 countries) (UNDP, 2016). There is a heavy burden of infectious diseases across the country with scarce availability of health services in rural areas. Two-thirds of the country's population live in areas of malaria risk (DHS, 2017). Prevalence of HIV is very low in Myanmar (estimated 0.54% in the adult population) (DHS, 2017).

Almost 50% of the household have an improved sanitation facility, of which less than 1% have a flush toilet linked to a sewer system (DHS, 2017). The infant mortality rate is 40 deaths per 1,000 live births. Most of these deaths occur in the first year of life, more than 60% within the first month (DHS, 2017). Over one-third of child deaths are due to increased severity of diseases related to undernutrition and lack of WASH access (WB, 2015). 37% of women deliver take place in a health facility (DHS, 2017). The pregnant-related mortality ratio is 227 maternal deaths per 100.000 live births (DHS, 2017).

4.3 Food and nutrition security

Food and nutrition security occurs when nutritious food availability, access, stability and proper utilization and absorption of nutrients are guaranteed, in order to conduct a healthy and active life (UNSCN, 2013). The country is a net exporter of rice and pulses, however rural households in Myanmar can access food for 10 months per year while landless households for 9.6 months (Myanmar Government, 2016).

The national nutritional situation, was until recently, difficult to assess due to the wide differences between regions and due to lack of timely and reliable data gathering by the government. Nutritional assessments of international agencies offered data representative of small areas (FAO, 2013). Of significant importance in this regard has been the first publication of the Demographic and Health Survey (DHS) in 2017 supervised by the Ministry of Health and Sports. The groups who are most exposed to food insecurity are landless and functionally landless smallholders, ethnic minorities, women and young children and individual living close to the borders or in conflict areas (Action Contre la Faim, 2012; USAID et al., 2013). A study of 2015 in Karen State shows that the hiking time to an army base or the exposure to armed groups predicts higher risk of human right violation, poor health outcomes and reported moderate or severe household hunger (Davis et al., 2015).

Table 1 Myanmar's health and nutrition

Infant mortality rate	40 per 1000
Births delivered in a health facility (%)	37
Children under 5 who are stunted (moderate or severe) (%)	29
Children under 5 who are wasted (moderate or severe) (%)	7
Children under 5 who are underweight (%)	23
Women 15-49 who are overweight or obese (%)	25
Children age 6-59 months who are anaemic (%)	58
Women age 15-49 who are anaemic (%)	47

Source: DHS (2017)

The overall nutritional status for children shows high prevalence of stunting (29%), wasting (7%), and underweight (19%). The situation is recently improving comparing with the previous measurement in 2009-2010 (stunting 35%; wasting 8%; underweight 23%). Children are more at risk of being stunted in rural (32%) than in urban areas (20%) (DHS, 2017). There is substantial difference between regions in the country. In Rakhine State, for example, rates of stunting are 38 % and wasting 14% (DHS, 2017). Regarding rates of stunting per gender, interestingly, girls show more favourable outcomes than boys. There is no clear explanation for this fact (USAID et al., 2013). Only half of infants under six months are exclusively breastfed. Breastfeeding duration are long with 88% of children are still breastfeeding at year 1 and 64% at year 2 (DHS, 2017). Feeding practices of only 16% of children age 6-23 months meet the minimum standards with respect to all three IYCF practices (i.e. breastfeeding status, number of food groups, and minimum meal frequency) (DHS, 2017). Regarding micronutrient intakes 58% of children have anaemia and vitamin A rich food is consumed by the 70% of children age 6 – 23 months (DHS, 2017). 82% of the household consume iodized salt (DHS, 2017).

Regarding the nutritional status of women, 16% of women have BMI below 18.5, while 60% have a normal BMI and 25% are overweight (DHS, 2017). The proportion of women who are overweight or obese tends to rise with the level of education and wealth (DHS, 2017). In addition, hypertension and type 2 diabetes are emerging health issues connect with malnutrition (USAID et al., 2013). Nearly half of the female population is anaemic (47%). Most mothers did not receive vitamin A or iron supplementation during pregnancy (DHS, 2017).

Despite the varied crops and rich ethnic and cultural diversity, households across the country consider rice the main component of their diet and synonymous of household food security. Plain white rice is eaten for almost every meal served with side dishes such as fish, meat and soup. Rice can be substitute by fried rice, noodle and other rice-flour made dishes (USAID et al., 2013).

The most common source of protein are fish, pulses and meat and eggs (pigs, chicken and duck especially). Daily consumption of micronutrient-rich kinds of food results low compared to the availability of this items.

When facing food shortages household commonly switch to less expensive and less preferred foods and/or they eat more wild foods (USAID et al., 2013).

From a research conducted by LIFT Fund et al. (2015), emerged that consumers look for “good quality” in buying vegetables and fruit. For quality mainly means a product that look fresh and free from chemical residues. There is a growing concern over the use of pesticide usage. Women are traditionally in charge of preparing food and they have the health of their family in mind when purchasing food.

Underlying causes of malnutrition in Myanmar are poverty, poor ICYF (Infant and Young Child Feeding) practices, lack of education and a high disease burden due to the lack of health care (USAID et al., 2013).

4.3.1 Institutions and political governance

During the British domination, the country became one of the most important rice producers worldwide. Rice cultivation remained central during the military rule, which started in the 1962, since rice supply was considered a prerequisite for political stability (Rammohan & Pritchard, 2014). However, rice is one of the less profitable crops considering the high labour and fertilizers costs (Haggblade et al., 2014). Until 2004, the Government controlled rice production requiring farmers to produce and sell to the state a minimum quantity of rice. The military regime was able to control agricultural production thanks to the constitutional law introduced in 1988 that wants all land officially property of the state with farmers having the right-on tillage only. Consequently, farmers who did not respect the national planning, could have their land expropriated. In addition, this regulation restricted the possibility to lease, sell or acquire land. Cropping choices were limited with a consequent scarce capacity of farmers to secure their food and nutritional needs. Moreover, a system of price controls, low yields, market inefficiency and corruption hindered the possibility of farmers to guarantee their FNS through the income generated from cash crops (Rammohan & Pritchard, 2014). In 2004 the procurement system was abandoned but the regime kept on prioritizing rice cultivation. In addition, in the last 10 years the Government has always favoured large agribusiness, allocating in their favour two million acres of land to local and foreign investors (from 2010). Local agribusinesses were often linked with the military forces (Rammohan & Pritchard, 2014). The large concessions were used in some cases to alternative uses such as mineral extraction or lumbering. In other cases, land was rented to smallholders (Haggblade et al., 2014). It is only in 2012 that the Government allowed a structural reform on rural land use. The ‘Farm Land Act’ and the ‘Vacant and Fallow Land Act’ allowed landholders to mortgage or lease their land (Rammohan & Pritchard, 2014). Despite some improvements these laws failed to protect vulnerable groups, especially women who often have less formal ownership of assets (Oxfam, 2013). During this delicate phase lack of transparency and a slow and complicated bureaucratic system favoured large agribusinesses with a consequent appearance of land grabbing (Rammohan & Pritchard, 2014). As a consequence, landless or near-landless are present to a large extent in the country (between 24% and 55% of rural households). Due to the scarce employment possibilities outside agriculture, landlessness is often associated with high levels of poverty and rural inequality (Rammohan & Pritchard, 2014).

The Myanmar Ministry of Agriculture, Livestock and Irrigation (MoALI) in 2014 adopted an Agricultural Development Strategy which aims to align with the ASEAN region agricultural policies and favour FDI (Foreign Direct Investment). At the moment, the government position is oriented towards supporting large-scale farmers, high yielding good quality seeds, trainings for agricultural techniques, research and mechanisation (Myanmar Government, 2014a). Even though smallholders were mentioned in the new agricultural strategy, the nutrition- sensitive elements was not strongly developed. This strategy was written in order to get funding from the Global Agriculture and Food Security Program (GAFSP). It focuses mainly on Myanmar Dry Zone and addresses three main key issues: governance, productivity and competitiveness of smallholders.

In 2016 the National Economic and Social Advisory Council (NESAC) elaborated a strategy for agricultural development called in Myanmar ‘From Rice Bowl to Food Basket’ that see market-oriented,

private sector-led investments as the main drivers of innovation and dynamism in place of the government-driven previous strategy. To do so, the council advised to move away from a 'narrow silos thinking' and promote communication among the government, the private sector and civil society for a more coordinated effort. Taking as a model the 'rest-of-Asia' this strategy aims to diversify their production and invest in on-farm productivity (NESEC, 2016).

In the NESEC document three lines of development are defined in respect of environmental and social conditions: (i) modernisation of small-farm production; (ii) modernisation of agricultural input markets; (iii) modernisation of output markets and agri-food supply chain.

Under the first pillar, for the first time, smallholder farmers are considered as part of a national agricultural development strategy. According to the document, modernisation can be reached by enabling farmers to decide which agricultural products better suit their assets and guarantee the best opportunity to increase their income. In order to modernise input markets (Pillar 2) a major point suggested is it to guarantee greater land tenure security for farmers. The liberalisation of seed, fertilizer and equipment markets together with the financial services markets are other points of the strategy. In addition, the strategy focuses on natural resource use regulation, rural non-farm employment, infrastructure investment, food safety and natural resources governance.

Table 2 *Main stakeholders related to agricultural development in Myanmar*

Level	Stakeholder	Role
Government	Ministry of Agriculture and Irrigation	It has the most important role in impacting the agricultural sector.
	Ministry of Livestock and Fisheries	It has a secondary role in impacting the agricultural sector.
	Myanmar Agricultural Development Bank (MADB)	MADB is a public institution and source of credit for small-scale farmers.
	Department of Agricultural Research	DAR develops seed technology and extension packages for farmers.
	NESAC (National Economic and Social Advisory Council)	It is an advisory body with the aim to assist the government of Myanmar with the implementation of the economic and social reforms and support the formulation of national development plans. Together with USAID and Michigan University the council elaborated the last agriculture development strategy.
Private sector	MAN (Myanmar Agriculture Nutrition Network) and Grow Asia	The Myanmar Agriculture Network (MAN) was established in 2013 under the leadership of the Ministry of Agriculture, Livestock and Irrigation under the umbrella of Grow Asia, a programme created by the World Economic Forum, in collaboration with the ASEAN Secretariat. The Network is a multi-stakeholder platform for ensure environmentally sustainable and inclusive agricultural growth together with food security in Myanmar. The main areas of investment are coffee, horticulture, rice, agri-finance/mobile services and seed sector. Examples of partner of the network are Nestlé Myanmar, Ministry of Agriculture, Livestock and Irrigation, Livelihoods and Food Security Trust Fund (LIFT), USAID, Mercy Corps, Embassy of the Netherlands, East-West seeds.
	Chambers of Commerce and Industry (UMFCCI)	Is the most influential commercial actor that influences the production and marketing of foodstuff.

Sources: Man website (2017); Lift fund, (2016); Myanmar Government (2016).

Food and Nutrition Security Policy Development

In 2013, the country joined the Scaling Up Nutrition (SUN) movement. Nutritional-Relevant Policies at the moment are the National Plan of Action for Food and Nutrition Security (2016-2025) which is not currently published; the infant and young children feeding strategy (2011-2016); Food Law (1995) including breast milk substitutes as a controlled food item; and Universal Salt Iodization Regulation (1999) (USAID & FANTA, 2014).

The Central Board for Food and Nutrition Security under the Ministry of Health is a multi-sectoral platform for nutrition coordination (European Commission, 2015). The Ministry of Health and Sports (MoHS) supports early initiation of breastfeeding and rooming-in practices to increase bonding and protect new-borns from harmful external environments by promoting the Baby Friendly Hospital Initiative (DHS, 2017). Myanmar complies with the National Strategy on IYCF (2011-2016), which encourage exclusive breastfeeding until 6 months (DHS, 2017). The National Nutrition Centre identified vitamin A, iodine, iron and vitamin B1 (thiamine) deficiencies as major public health problems. The national nutritional programme included growth monitoring, community nutrition centres for moderately malnourished children. There is no governing body on food security, however some processes and frameworks that address food and nutrition issues are in place although their voluntary base cannot ensure effective application at country level. Questions remain on the extent to which agricultural investments will benefit small scale farmers, particularly women, without governing bodies on food security (ICCO et al., 2015).

Myanmar is 41st out of 45 in the Hunger and Nutrition Commitment Index (HANCI) (UK Aid et al., 2014). In the last HANCI report (2014) underlines the low commitment of the government in actually implementing these policies. In addition, poor farmers cannot express their opinion on policy priorities. Plus, there is no separate budget line for nutrition, with consequent lack of transparency and accountability (HANCI, 2014).

Table 3 Main stakeholders related to food and nutrition security in Myanmar

Level	Stakeholder	Role
Multi-stakeholders' partnerships	SUN (Scaling Up Nutrition Alliance)	The SUN movement was officially launched in Myanmar in February 2014. It is composed by the Government network, the Donor Network, the UN network and the Civil Society Alliance.
Government	National Nutrition Centre	It is the government body responsible for nutrition and sits within the Ministry of Health
UN Network for Nutrition and Food security	WFP	In Myanmar WFP action focuses on Chin, Kachin, Magway, northern Shan and Rakhine on three key areas: i) treatment of moderate acute malnutrition; ii) prevention of acute malnutrition; and iii) prevention of stunting. In these areas, WFP provide fortified food. WFP Myanmar promotes appropriate IYCF practices and provide technical assistance to the government to strengthen the national health system and the policy framework for nutrition (WFP, 2016). Nutrition activities are implemented through local (i.e. Myanmar Heart Development Association) and international NGOs (i.e. Consortium of Dutch NGO's).
	UNICEF	Implementing nutrition interventions focusing especially on early child development.
	FAO	Working along these seven priorities: increased agricultural production to enhance food security; improved food safety and quality; sustainable management of natural resources and the environment; land use and land management improvements; human resource development and institutional capacity building; rural livelihoods

		improvement; preparedness for and mitigation of disasters and climate change.
	USAID	Working on these areas: democracy, human rights and governance; economic growth and agriculture; global health.
	WHO	Focusing on promoting health; proactive and committed leadership in public health; mobilizing, developing and optimally utilizing human and financial resources.
	UNIFPA	Working on: maternal health; census; youth; HIV & AIDS; gender Equality; and gender-based violence.
International Donors	LIFT (Livelihood and Food Security Trust Fund)	<p>It is the primary multi-donor trust funded by UKAID, EuropeAid, Australian Aid, Swiss Agency for Development and Cooperation, Denmark Ministry of Foreign Affairs, the Netherlands Ministry of Foreign Affairs, USAID, SIDA, Agence Française de Développement, Italy Ministry of Foreign Affairs & Cooperation, Luxemburg Development Cooperation, New Zealand Ministry of Foreign Affairs & Trade, Irish Aid.</p> <p>Implementing partners are among others: ActionAid Myanmar, Care International, FAO, WFP, UNESCO, World Bank, Mercy Corps, Oxfam.</p> <p>One of the biggest challenges to achieve good nutrition is mobilising political support for nutrition programmes and policies. To do so LIFT produce evidence-based reports and studies on the rural sector to improve interventions and inform policy decisions in Myanmar. LIFT's partners are implementing the following actions to achieve better nutrition, especially for children in their first 1000 days:</p> <ul style="list-style-type: none"> - Maternal and child cash transfers - Access to micronutrients via staple foods (rice fortification) - Promote positive nutrition practices
Non-profit community organisations	Food Security Working Group	The FSWG is a network of local, international NGOs, CBOs and individuals who are working and interested in food security related issues in Myanmar.

Sources: Food Security Working Group Website (2017); Lift Fund, (2016); European Commission (2015)

4.3.2 Economics, innovation and research

The economic management under military rule, the self-imposed isolation and the 'Burmese Way to Socialism' resulted in a slow economic growth and periods of recession especially during the 80s. In 1988, under the guide of a new regime 'a market oriented' approach was adopted. From the start of the 21st century the country has experienced a double-digit GDP growth. However, the quality and reliability of economic and statistical data are seriously questioned by many observers (Myint, 2010). These data strongly collide with an economy largely based on the agricultural sector, a general situation of social instability and low scores in other socio-economic indicators. In 2000 the Thirty Year Industrial Development Plan shows a clear intention of Myanmar authorities to 'catch up' with other countries in terms of development (Myint, 2010). One factor that hinders this effort is that laws and regulation are outdated and unclear. In addition, lack of transparency and accountability combined with systematic corruption provide serious obstacles for businesses (Myint, 2010).

The country is experiencing an economic transition characterised by a gradual opening of the borders, the end of international sanctions and policies favouring foreign investments. In 2012 Myanmar passed a new Foreign Investment Law which captured the attention of international investors (Oxfam, 2013). The removal of restrictions enabled local business and farmers to respond to market incentives. Concerns remain around its capacity to ensure basic rights for the most vulnerable since the law lack mechanism to counter the impact of negative social and environmental externalities. In addition, the law set the base for large tax exemption for foreign companies (Oxfam, 2013). Unregulated markets often do not serve the need and economies of the poorest with a consequent risk of further marginalization (Oxfam, 2013). In order to guarantee equal long-term economic and social gains there is an urgent need of solving the underlying causes of ethnic conflict by empowering civil society and enable people to influence policies and gain access to the markets. To do so there is a need of improving local government capacity to support small-scale farmers with effective inputs and infrastructure. The process of decentralisation has begun with the institution of Township Development Committees which may enhance the capacity of citizens in participating in local planning and budgeting (Oxfam, 2013).

The combination of a scant road system, inefficient ports and sporadic electricity is a serious limitation for industrial growth. Since costs of transportation are high important markets developed close to the borders of China and India (LIFT Fund, 2013).

Agricultural research is limited and mainly dependent on external funding. Regarding food security information system in Myanmar there is a general lack of reliability and coordination between agencies with a consequent duplication of efforts and inconsistent conclusions and recommendation. Most information collected for government use and is not published (FAO/EC, 2011).

Regarding agricultural production, from a recent study (LIFT, 2016) emerged that Myanmar's farming system, despite the governmental strategy focusing on rice, is quite diversified. The monsoon season is mostly dedicated to paddy production. During the cool and dry season, instead, farmers produce other kinds of crops, mainly beans, pulses, oilseeds, maize and other kitchen crops. From this analysis emerged that Myanmar's agriculture and labour productivity are low compared to other countries in the area, especially in rice production (LIFT, 2016). More than 80% of the seed supply comes from farm saved seeds. The rest is supplied by the public seed system, domestic and international companies (LIFT, 2016).

The agricultural sector contributes significantly to the country's GDP (42%) and shows potential for further growth (Rammohan & Pritchard, 2014). The main opportunities for agricultural development comes from rice production, oilseed, pulses and an emerging horticultural sector (Haggblade et al., 2014). The main crop of Myanmar agriculture is rice, generally cultivated in rotation with pulses. Nowadays paddy production covers almost half of the total cropped area, pulses and oilseed accounts for 20% each and the rest comes from horticulture and fruit crops (Haggblade et al., 2014). In terms of employment around 61% of the labour force depends on agriculture for its income (Myanmar Government, 2014b).

Table 4 Myanmar's main crops

Cereals	paddy, wheat, maize, sorghum
Oilseeds	groundnut, sesame, sunflower, niger, mustard, palm
Pulses	17 kinds of pulses (black gram, green gram, pigeon pea, soy bean, kidney bean, butter bean, chick pea, garden pea, sultapya, etc.)
Industrial crops	cotton, sugarcane, jute, rubber, coffee, mulberry, oil-palm
Kitchen crops	chilly, onion, garlic, ginger, turmeric, potato
Fruits & Vegetables	mango, banana, citrus, pears, durian, mangosteen, pineapple, rambutan, etc.

Source: Myanmar Government (2014 A)

Rice covers a fundamental role in the diets of people and this cultivation is the main occupation of the majority of farmers. Nowadays, there is an increasing political and economic interest to diversify agricultural production (World Bank, 2014; NESAC, 2016). The main markets for exportation are the domestic and regional markets (NESAC, 2016). Good business opportunities can be found in the growing markets of maize, pulses, oilseeds, poultry, and fresh milk. Foreign investors are attracted by opportunities in the field of improved input supply such as quality seeds and agro-chemicals (EKN, 2015).

4.4 Community dimension and socio-cultural practices

National policies, economic interventions and technological innovations developed at national or international level are absorbed by local community and translated in contextual outputs. Myanmar comprises a wide range of food environments and different socio-cultural practices due to its geographical conformation and due to the existence of a multitude of different ethnic groups. In order to elaborate effective strategies to link agricultural development with nutrition it is important to understand how interventions and investments relate with local context. However, from the review local socio-cultural differentiations did not clearly emerged.

Regarding the community dimension, until recently civil society organisations were banned including unions and farmer networks. As a consequence of years of authoritarian top-down control communities exhibited limited tendencies to organise as a group (Mercy Corps, 2015).

Nowadays a greater space exists for activism, political organisations and use of media. However, these positive changes may enhance the risk of conflicts. The legacy of failed cooperatives imposed by the government makes farmers reluctant toward this form of aggregation (Mercy Corps, 2015). In a situation characterised by weak formal institution and lack of external support farmer's social network are often important for accessing information, goods and services. For example, farmers can exchange labour with neighbours, share tools, and provide credits to each other. Trust is also a characteristic of farmers' interactions with input retailers, especially for the provision of credit.

An emerging form of network among farmers may be the producer organisations (POs) which can ensure the voice of farmers reflected at policy level and can join and benefit from economies of scale (Oxfam, 2013). An increased use of smart phones and social media is observed in the country with mobile penetration rising from 10 percent in 2014 to 93 percent in 2017 (We are Social & Hootsuite, 2017).

Women have an important role in crop production and are responsible for the family welfare and food security. Women are still discriminated in land and credit access. They often rely on casual labour, working in other fields or in small businesses. Women have also an important role in marketing their crops at the market (Oxfam, 2014).

Compared to other neighbour countries women in Myanmar own a larger number of rights. For example, women had the right to vote since 1935 and they have the same rights than men to own property and receive equal inheritance. 54% of women own a house and 48% own land alone or jointly with someone else (DHS, 2017). Half of currently married women with cash earning can decide independently on how to use their earning. On the other hand, domestic violence is in some way social accepted since 51% of women believe that husband is justified to beat his wife in some specific situations. 21% of married women have experienced spousal violence. 71% of women reported to have never experienced any marital control behaviours by their husbands (DHS, 2017). Even though women are the main food providers the role of "rice-winners" is attributed to men with a consequently lower value placed on women (USAID et al., 2013). In agriculture women are considered as workers rather than as farmers (Oxfam, 2014). Women cover household chores and take care of children while still contributing in the labour force also when pregnant and nursing. Women in reproductive age are therefore in danger of poor health and nutrition outcomes. Women are generally the first to renounce to food for the nourishment of other members of the household (Oxfam, 2014).

There is no difference by gender in primary school attendance, but more girls than boys attend secondary school (DHS, 2017). The median age at first marriage for women is 22 and for men 24.5 (DHS, 2017). The total fertility rate is 2.3 children per women and the median age of a women at her first birth is 24.7 years (DHS, 2017).

4.5 Household level factors

In Myanmar, a household can be defined as one or more families living under one roof, sharing food and assets such as income and livestock (adapted from FAO's definition, 1995). This study focuses on smallholder farmers. Smallholding is here defined as having land entitlement below 5 acres (about 2 hectares) (Lowder, Scoet & Raney, 2016). A smallholder household can adopt diverse strategies in response to food security. The capability to overcome adverse circumstances depends on the household capabilities to optimize its assets ('five capitals') to changes in the surrounding environment. Coping strategies are socio-culturally adapted taking different connotation based on the spatial and temporal context (Rammohan & Pritchard, 2014).

Following the most important household assets for smallholder farmers' household are described.

4.5.1 Natural capital

Natural capital is based on ownership or access to land, water & aquatic resources, trees and forest products, wildlife.

Land is the most important asset for rural households. It guarantees income generation to fund both current consumption and investment activities since land can be used to better access credit. In addition, land ownership gives the possibility to having control over the process of production, consumption and sales (Rammohan & Pritchard, 2014). Average landholding in Myanmar size is 6.22 acres (USAID, 2013).

In Myanmar half of the rural households are landless (Haggblade et al., 2014). There are four main determinants of landlessness: population growth, indebtedness, confiscation and conflicts (USAID et al., 2013). Another factor influencing agricultural production is access to water and irrigation. Poor water control systems make difficult to be resilient to climate change and unpredictably heavy rainfalls (Haggblade et al., 2014).

4.5.2 Physical capital

Physical capital includes, animals, mechanized power, roads, secure shelter & building, water supply, sanitation, energy, tools, seed, fertiliser, pesticides and traditional technology. Most rural household counts on livestock (cattle, pigs and chickens) for income generation and as a source of protein. They are important assets in lean times. Large stock (cattle and buffalo) are used in the fields.

Main problems that smallholder farmers face in terms of physical capital are: low productivity, high cost of transportation, food safety and quality, rising costs of labour due to outward migration, lack of impartial information access (USAID et al., 2013, Haggblade et al., 2014; Mercy Corps, 2015).

Mechanisation is promoted by the government but it can lead to adverse consequences for smallholders, such as labour displacement and depressing rural wages (Haggblade et al., 2016).

A particular problem is the high cost and inconsistent quality of fertilizer, seed and pesticide. Farmers often expressed the preference for improving traditional seed rather than depending on purchasing expensive hybrid varieties. Some well-connected domestic agricultural inputs companies keep the prices high. Input are often purchased in illegal markets at low quality (Mercy Corps, 2015). Farmers expressed preference for lower-cost inputs such as natural fertilizers. Farmers experience lack of impartial information access. There is a general feeling of mistrust towards information coming from private companies (Mercy Corps, 2015).

4.5.3 Human capital

Human capital includes health, nutrition, education, knowledge and skills, capacity to work, capacity to adapt. In the last decades, due to underinvestment in education, Myanmar historical excellence in education has deteriorated. Ethnic minorities resulted disadvantaged since the national education language is Burmese and some communities have limited access in more remote areas (USAID, 2013). More specifically on agriculture education, there are scares rural education for agribusiness and non-farm professionals (Haggblade et al., 2014). Households experience high disease burden, often connected with lack of WASH access and malnutrition (USAID et al., 2013).

4.5.4 Financial capital

Financial capital is composed by savings, credit/debt - formal, informal, remittances, pensions, wages. Informal credit does not offer sustainable interest rates with an increased risk for smallholders to become landless. Financial institutions are almost absent in rural areas. Common forms of savings among farmers are stored agricultural commodities, precious metals (especially gold jewellery) and livestock.

There is a general lack of rural financial institutions (Haggblade et al., 2014). Government loans for farmers are generally low. The main sources of funds available are government finance and international donors. Most projects financed are related with mechanisation.

4.5.5 Social capital

Social capital means networks and connection (patronage, neighbourhoods, kinship), relations of trust and mutual support, formal and informal groups, common rules and sanctions, collective representation, mechanisms for participation in decision-making, leadership. All these aspects have been compromised by years of military societal control and do not emerge clearly from the literature.

Myanmar has no national social safety nets. In some cases, UN's agency and NGO's programs cover the role of welfare agent at household level (Haggblade et al., 2014).

4.6 Stakeholders' views on agricultural commercialisation and FNS

In this chapter, an overview of the agricultural and FNS conditions in Myanmar have been described. Particular attention has been paid to the current understandings and visions of different stakeholders

on the impact of agricultural development on smallholder farmers, and specifically on their FNS situation.

The recent wave of political reforms in Myanmar created unprecedented possibilities for economic growth. However, smallholder farmers face the risk of being excluded from the benefits generated by new investments in agricultural development. This mainly because of a general lack of targeted policy and regulation enabling an equal access to the market. A complex set of factors determines a situation in which being a farmer means often facing poverty and malnutrition: unequal distribution of resources, a long period of conflict, lack of long-term investment in education, health and agriculture. From the literature, it is not clear what is smallholder farmers' attitude towards commercialisation and FNS at household level. Therefore, the topic is in need of further research.

The non-profit sector is characterised by the presence of many (I)NGOs and local CBOs. International and local NGOs bring in significant additional resources and knowledge but are often not considering local needs (Mercy Corps, 2015). CBOs and farmers' organisations are growing in number and can represent key actors in the process of introduction of a more bottom-up approach.

Development programmes implemented by the government have been characterised by a top-down approach leading to weak implementation and outcomes at community level. For the government, food security means food availability (with major attention on rice). Food access, utilization and stability are not taken in consideration. Nutrition is perceived as a health issue unlinked to economic aspect.

Private companies mostly focus on profit maximization, so there is no declared interest in investing in FNS. The level of trust between farmers and the private sector is very low. Overall, there are few meeting points between public, private and civil society such as for example the MAN (Myanmar Agriculture Nutrition) network which brings together main foreign investors and the Ministry of Agriculture and Irrigation and the SUN (Scaling Up Alliance) movement, composed by the Government network, the Donor Network, the Un network and the Civil Society Alliance.

The results of the analysis are summarised in Figure 10.

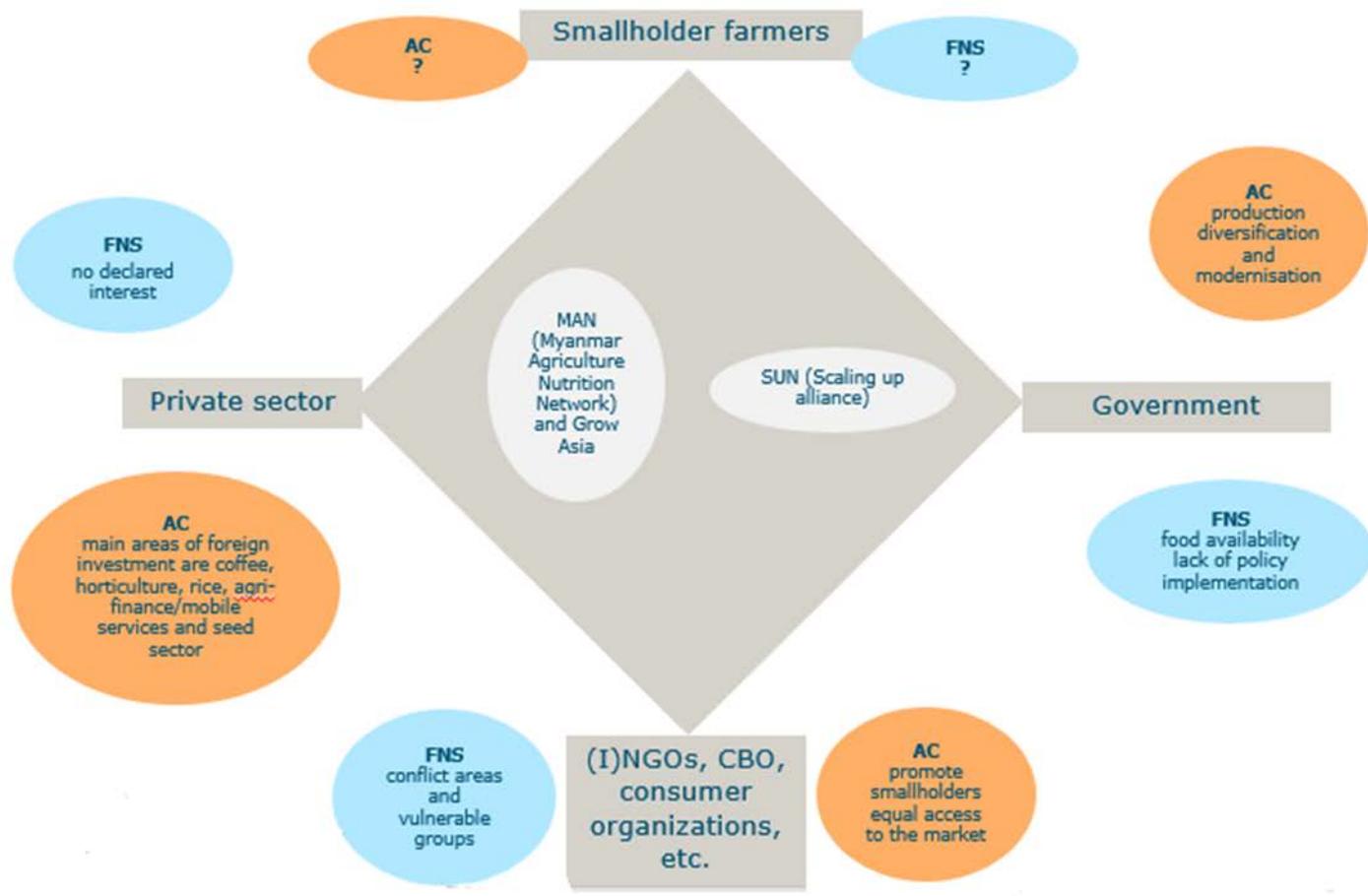


Figure 9 Main stakeholders goals related to agricultural commercialisation and FNS in Myanmar

5 Results: farmers' tales – community narratives on agriculture commercialisation in Myanmar

5.1 Setting of the research

This study was conducted in the Dry Zone of central Myanmar, specifically in 5 villages surrounding Pakkoku Township in Magway division. The Dry Zone is characterised by large crop diversity. Most of the households grows three or more different types of crops. The most common food crops grown are pulses which are the main sources of protein together with meat and eggs (USAID et al., 2013). Other common crops are sesame, maize and groundnuts (WFP & Save the Children, 2011). In the Dry Zone, most households rely on markets to access rice. Only a small minority (9%) rely on their own production for rice. The majority of households is able to directly purchase food, while some families access food through borrowing or crediting in advance. Income derives mainly from casual wage labour, followed by farming, small trade and sale of livestock. An average meal is composed by rice, fresh vegetables and oily/fatty abundant condiments.

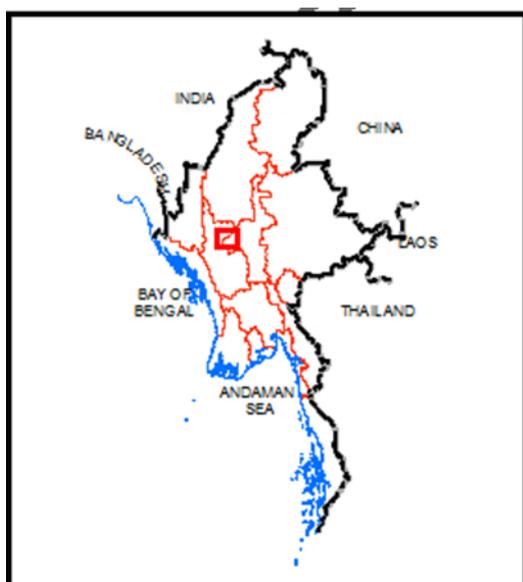


Figure 10 Pakkoku Township in the dry zone

Some families can afford meat and fish once or twice per week (WFP & Save the Children, 2011).

The Dry Zone is one of the most food insecure of the country due mainly to irregular and scarce rainfall (WFP & Save the Children, 2011). The World Food Programme classified 17% of households in the Dry Zone as severely food insecure and a further 24% as moderately food insecure (CAPSA, 2016). Food insecurity is particularly evident among young children (wasting 14% and stunting over 30% in 2013).

Food availability is strongly dependent on monsoon rains (from May to October). Clay and sandy soils characterises the Dry Zone, with high risk of land degradation and declining agricultural production (WFP & Save the Children, 2011). The majority of the households relies on rain-fed cultivation on flatland, some have access to wet paddy and very few have access to a garden or orchard. Nearly every farmer' household has ownership of their agricultural land. However, landlessness is estimated to be around 50% in the area (Oxfam, 2014). Household without access to land or with plot sizes below 2 acres are more likely to be food insecure (WFP & Save the Children, 2011).

The Dry Zone is characterised by a high presence of female-headed households, due to outwards migration of male family members. Migration is mainly directed to other cities in Myanmar (WFP & Save the Children, 2011). Farmers in the area have limited access to finance and better inputs, especially for cultivation different from paddies promoted by the government (Oxfam, 2014).

In 2013 only the 64% of households could access protected water all year round. 79% of households have a latrine while the rest does not have access to sanitation. There is a general concern regarding the seasonal scarcity of water for household consumption (WFP & Save the Children, 2014). Main health issues are inappropriate care for sick children, poor hygiene practices, poor access to latrines, use of unprotected water sources, poor drinking water treatment practices. Girls tend to have less access to education than boys (WFP & Save the Children, 2011).

Specifically, this study took place in Pakokku Township in Magway division (see Figure 11). Pakokku has a 45% migration rate (MHDO, 2017). One of the main constraint for agricultural production is the lack of irrigation systems in an area where rains are erratic and droughts are common. Soil is generally poor and due to its sandy composition, easily erodible by heavy rains during the Monsoon period.

Average family size is 5.9 persons per households. Most of the villages comprise 100 – 200 households and the landless households are about 40% of the total. Larger land owners are increasingly acquiring new land from smallholder farmers (MHDO, 2017).

Due to its proximity to the Irrawaddy Delta, Pakokku area has been affected by severe flooding throughout the years. Every year in the Monsoon season the population has to face damages due to floods and heavy rains. At the time of this study some villages were flooded and inhabitants were forced to live in tents in Pakokku town. Food availability was recently compromised by floods: for example, in 2015, there was an estimated 10-25% of crop loss (MHDO, 2017).

In Pakokku Township 51% of household are characterised by low income, high indebtedness and limited purchasing power. 42% of rural households has to borrow money for consumption purposes. Alternative livelihood strategies to agriculture are mostly casual labour in other people's farms and migration. In average, at household level, 45% of incomes are used to access food (MHDO, 2017).

This study took place in the following villages: Kan Zauk, Sar Kyin, Aung Tha, Oo Yinn, Yar Lar Lay. All these villages refer to Pakokku as main market.

Table 5 Villages information

Region	District	Township	Village Tract	Village	#HH	#Pop	Distance
Magway	Pakokku	Pakokku	Sa Bay	Sar Kyin	157	802	41km
				Kan Zauk	192	606	37km
			Bae Gyi	Aung Tha	185	1127	18km
			Yay Lar	Yay Lar Lay	153	402	21km
			Nyunt Bin	Oo Yin	42	205	18km

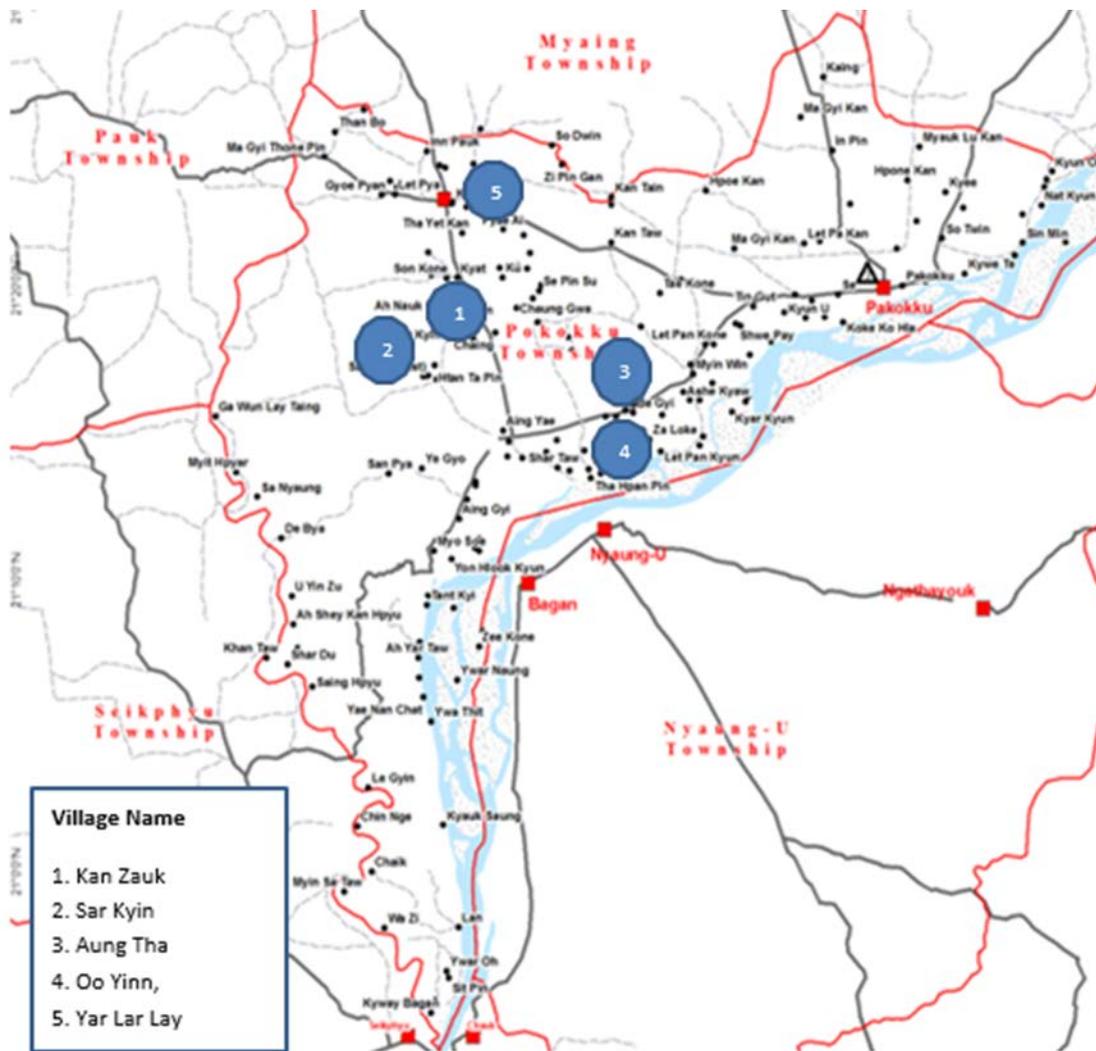


Figure 11 Map of the villages included in this study source: MHDO (2017)

5.2 Households' characteristics

In total 15 households were selected for interviews. Two cases were not fitting the selection criteria. The first case was living on his parent's land of 8 acres but because of his age (31) was still at risk of becoming landless in case of family size expansion. Therefore, it was included in this study as positive deviant. The second case inherited 30 acres and reduced his farms at 19 acres during his life-course. Even though this farmer had to face similar constraints as the other cases he started from an advantaged starting point. For example, he could afford a better education and became teacher. Consequently, this could not be considered as deviating from a norm group sharing the same characteristics. At the end of the process of selection 14 cases were considered positive deviants for the purpose of this study. The household head was asked to participate to the research. In some cases, more than one household member participated to the interview, for a total of 20 individuals interviewed. Of them 8 were women. All the participants started to be involved in agriculture during their childhood. Below a table summarizes characteristic of the household per village. In Appendix C, a more extensive table can be found.

Table 6 *Research participants*

Village	Land ownership starting point		Land ownership at the moment of the study		Type of crop commercialised
	Landless	<5	<=5	>5	
Kan Zauk	2	1	2	1	groundnut, lablab bean, mung bean, onion, pigeon pea, potato sesame, toddy-palm, tomato.
Sar Kyin	3	1	1	3	cotton, groundnut, lablab bean, maize, mung bean, pigeon pea, sesame.
Oo Yinn	1	1 (+1 <8) ¹	2	1	chick pea, chilly eggplant, lablab bean, mung bean, maize, tomato.
Yae Lar Lay	1	0	0	1	cotton, groundnut, mung bean, pigeon pea
Aung Tha	2	1	0	3	chick pea, cotton, green gram, groundnut, mung bean, maize, pigeon pea, sesame

¹: One case exceeded the selection criteria of starting with less than 5 acres. However, the economic value of the farm was considered by the researcher not dissimilar to the other cases and therefore the case was considered valid.

Respondents were asked to tell the story of their life with a particular attention to agriculture- and diet-related events. In a second moment, they were asked to reflect on their coping strategies and resources that lead them to become successful cases. In table 7 main households' characteristics are outlined. Following a table illustrates the type of crops participants of this study commercialise, produce and purchase for household consumption.

Table 7 *Households characteristics*

N of Household	14
N of respondents	20 (40% Women)
Female household heads	21%
Education of the household head	42% literate but never went to school; 50% finished primary school; 7% completed secondary school.
Households with a member who was attending or completed university	57%
Average household size	6.9 (min. 5 – max. 10)
Conjugal families ¹	64%
Average age of respondents	52
Average land size at the time of the interview	7.6 (min. 4 – max 13)
% production sold to the market (farmer subjective estimation)	73%
Household starting landless	64% (the others inherited or were still living on their parents' land)
Livelihood strategies	Mixed – livelihood (78%) were a combination of: Agriculture (100%) Husbandry (42%) Self-employment (21%) Migration (57%) 14 migrant individuals (35% female)
Household experienced lack of rice (main staple food) at least once	93%
Household experienced debt at least once	66%

Table 8 Food production and consumption

Commercial crops grown by respondents	
Cereals	maize (10 HH)
Oilseeds	sesame (10 HH), groundnut (9 HH)
Pulses	mung bean (8 HH), pigeon pea (9 HH), chickpea (5 HH), lablab bean (3 HH), green gram (1 HH)
Industrial crops	cotton (7 HH)
Kitchen crops	chilly (5 HH), onion (1 HH), potato (1 HH)
Fruits & Vegetables	toddy palm (2 HH), eggplant (4 HH)
Other farm products	jaggery (1 HH)
Food consumed from household production	
Cereals	maize
Oilseeds	groundnut, sesame
Pulses	mung bean, long beans, pigeon pea, bean leaves, yardlong bean
Industrial crops	cotton
Kitchen crops	chilli, onion, potato
Fruits & Vegetables	toddy palm, eggplant, tomato, gourd, roselle (Hibiscus), water spinach, mangos, bananas, pumpkins, radish, bitter melon, watermelon
Other products consumed at farmer level	oil, eggs, goat meat, jaggery
Food consumed from market	
Cereals	rice
Oilseeds	/
Pulses	yardlong bean, chickpea, senegalia pennata
Industrial crops	/
Kitchen crops	potato, sweet potato, garlic, ginger
Fruits & Vegetables	eggplant, cabbage, roselle (Hibiscus), water spinach, radish, lettuce, tomato, lady fingers, bamboo shoots, apples, oranges, mangos, bananas, tamarind, kale, chayote, bitter melon
Other products purchased	oil (groundnut and palm), eggs, meat, chicken fish, soya chunks, noodle, dried fish, cookies, tea

1: Referring to families composed by a couple and its children in opposition with multigenerational types of families (Skinner, 1997).

5.3 Farmers adaptive strategies during the life course

In this chapter factors operating along the life course playing a major role in developing successful farms while achieving household FNS will be described. Specifically, respondents described agricultural- and diet- related life events, the adaptive strategies they developed and the resources they mobilize to face stressors. Participants of this study managed to cope with a different set of constraints and succeed where others failed. Understanding the underlying dynamics that led smallholders' farmer in the research area to pursue (w)healthy lives is one of the aims of this study.

"I had learned many things from these bitter experiences. Those memories made me a stronger person." [01 KZ1, F]

"We (me and my wife) were strong enough to work, so far. Our family has good health that is why we could improve step by step and reach our current situation. We have never visited any hospital or clinic." [06 SK3, M]

5.3.1 Farmers' General Resistance Resources

In this chapter, General Resistance Resources at the disposal to positive deviants in the research area are analysed per level as in Mittelmark et al. (2017): individual-level resources (internal such as intelligence, religion and philosophy, genetic and constitutional); family-level resources (material and emotional support), community- and society- level (material, knowledge, cultural stability, social support).

Individual level

At individual level respondents looked inside themselves to identify the following resources: faith in Buddhism, values, intelligence, internal strength and health.

Buddhist practices and beliefs were mentioned by some respondents as a way to guarantee fortune and health in this and in the afterlife. Religion offered support to deal with events beyond control.

"We have a Buddhist altar inside our house and we offer food and flowers to Buddha. I pray every early morning before going to work. We donate as much as we can, we offer food to monks and we are involved in religious activities." [01 KZ1, F]

According to Buddhist practice, sons before the age of 20 need to live in a monastery at least for a short period of time. Guaranteeing a proper ceremony of novitiation was considered the most important duty parents owed to their sons. Some respondents expressed the wish to be able to provide an adequate ceremony and to be able to offer enough to the monasteries during their lives.

Other values giving meaningfulness to respondents' lives, were related to their children wellbeing. Parents expressed the wish their children could complete University studies and find a job outside the agricultural sector. This with the intention to spare them from the difficulties and struggles they experienced.

"I desired to attend school but I couldn't. Because of this, I tried to support them [my children] to become educated persons even though I was not able to send the first three children to school. I know education is very important in our life because our environment is changing so fast, I observed. I don't want them to be poor like us. For example, we went out for work under extremely weather condition with rain and high temperature." [01 KZ1, F]

In terms of human capital, some respondents explained they could count on their intelligence explained as an ability to apply knowledge to certain situations. In addition, all the household head were literate and in 9 cases out of 14 one of the household member attended university.

"If you can grow at right time then you can have a better harvest [...]. It is also depending on your decision-making." [02 KZ2, F]

"My eldest daughter was always involved in agriculture related activities and shared with us what she learned. If her father was weeding, she explained that we could reuse them as organic fertilizer for soil." [06 SK3, F]



Figure 12 Children wellbeing (on the left the picture of a graduation) and buddist practices (the house shrine on the right) are example of internal resources on which individuals build meaningfulness

Family level

Family represented the main security net for respondents, providing with material support and sense of belonging.

Parents' support was particularly relevant during youth, when most of the respondents lived under the parental roof with the intention of saving money for their future investments.

"When I was 25 years old, I got married and stayed with parents for a year. Similarly, my wife also stayed with her parents. After my daughter was born, we separated from our parents and moved to the land we are living now." [08 OY1, M]

"Once I got married, I lived with my parents-in-law. They helped us in many ways for example they took care of our children while we were working in the field." [06 SK3, F]

Inheritance of family land was also an important source of natural capital. Example of physical capital owned at family level were cattle, carts, bicycles, motorcycles and agricultural tools.

Children remittances and physical help in agriculture were crucial for the sustainment of the household. Relatives were mentioned as source of financial capital in form of credit.

"In agriculture activities, all of our family's members are working together and trying to reduce the need to hire extra workers." [12 YL2, F]

In addition to material support, forms of immaterial support were mentioned by respondents especially when facing stressors.

"The hardest thing was to pay back money to creditor but we were able to face those hard times. We encouraged and helped each other within our family and we decided not to give up until we succeeded. Currently, all of family members are in good health. In the past, when we were weaving cotton, often we had to work until midnight and keep on working to sell to the market. There were other competitors but we worked harder." [12 YL2, F]

"We passed through these challenges by family unity" [01 KZ1, F]

Community level

The village is the point of reference for the respondents when they refer to community or social support. Villages are organised around a group of leaders. Three respondents were village leaders. Being a leader meant organise and participate to community activities (i.e. ceremonies) and development intervention. These activities were described as both a privilege and a burden (in terms of time). Monasteries were also a point of reference in the community. A number of the respondents was literate thanks to monasteries education.

One village leader explained that the unity and solidarity of the village helped farmers to develop their business. For example, farmers of that village organised to rent a truck to sell directly to the market to avoid brokers' intermediation.

"Our villagers are motivated and work hard. We won the first prize of a competition as best village in the area because we did very well in having unity and been smart." [03 KZ3, M]

Another respondent described how during a flood all the villagers mobilized to secure the river bank and to made handcraft to get an extra income to face the emergency. Inhabitants of the same village supported each other by borrowing money at low interest rate.

While in the past meeting of more than 5 people were forbidden by law, from the interview emerged that nowadays associations were common at village level. Some respondents expressed the wish to be able to organise more structured farmers' organisations. The advantage they identified were the possibility to gain better information, prices and advocate for farmers' rights.

"Now, I am a leader of youths, a member of a funding raising group, a credit and loan working group, the teacher and parents' association, and an educational working group. I also participated in 3 groups focusing on agriculture." [07 SK4, M]

A main resource identified at community level was agricultural knowledge. The majority of the respondents affirmed that the main source of information on market prices and new agricultural techniques and inputs were other farmers. First, farmers gained knowledge from different sources

(traditional knowledge, observation of other farmers, private companies, NGO's trainings, radio, TV, social media, books, University) for then eventually share it with colleagues. Often farmers used to observe and copy successful methods from their neighbours.

"For the use of fertilizer and insecticide, I learned from other farmers." [08 OY1, M]

"We also learned among farmers. For example, if a kind of seed is productive, I recommend it to other farmers and we are sharing information in this way." [07 SK4, M]

"We saw and observed that those who use organic fertilizer on their lands has more fertile and more productive soil. There were some agriculture trainings available on how to make soil fertilizer with your own raw materials but I didn't attend such trainings. I have just learned and copied from my neighbour farmers." [05 SK2, M]

One farmer was aware that information was available through smartphones but he could have access only with his son's help.

"Yes, I know that there are applications related to agriculture and the phone can be used to study. As for me, I am not able to use it but my son is using such applications on his phone. Young people are more interest to find new technology." [07, SK4]

In the same way, nutritional knowledge coming from trainings was shared in the community.

"I learned from other neighbour family what was happening after they were eating those kinds of vegetables. There was a training on food and nutrition and they learned when your children reach 5 months what kind of food you should feed them and when they reach 4 years old how much rice you should give them." [06 SK3, F]

Society level

At societal level, external actors were identified by farmers as source of opportunities. NGOs were active in the area. Interventions consisted mainly in trainings on nutrition and health (nutritious food and IYCF practices) agriculture (organic input, soil management), vocational (baker), individuals' material support (donations of agricultural tools, rice and water supply, nutritional packages, water-pipes for household consumption), community's material support and capacity building (construction of wells, dams, roads, organisation of a common mill) and microfinance organisations. The presence of microfinance organisations allowed farmers to access lower interest rates compared to informal moneylenders.

"In the past, there were no options and interest rate was high so, we were in debt burden. Now we are able to borrow money from microfinance organisations in our village with very low interest rate." [08 OY1, M]

On one hand, some respondents thought the support of NGOs was fundamental. Many affirmed to have applied the knowledge acquired during the trainings in their farm or on their diets and found it beneficial. On the other hand, others expressed concerns related to dependency and the real effectiveness of the help received.



Figure 13 An NGO's poster in a respondents household

“We expected to receive new technology and education on agriculture activities and economics skills. The support role should be based on real needs of local people but it depends on donors' requirement so we can't expect too much. For technology, we want to cooperate with technicians to have better agriculture.” [03 KZ3, M]

“There are advantages and disadvantages. Because of their support, our village improved in infrastructure and its health sector (roads, water tank, food and nutrition). As disadvantage, villagers may become highly dependent on humanitarian assistance which may create lack of personal development and self-reliance. In some cases, they supported with capital (money or livestock) individual households for livelihood activity and villagers used in an unproductive way.” [04 SK1, M]

Private companies of pesticides and fertilizers were reported to visit the villages and train farmers on how to use their products. Some businesses provided farmers with inputs in advance with the possibility to pay after harvesting. In addition, wholesalers at the market were also considered a source of information by farmers.

“Sometime agricultural technician from a pesticide company came to show their products and taught us how to use it. I was trying to record as much as I could and then follow their recommendations.” [08 OY1, M]

Yezin University² provided agricultural trainings and distributed seeds in the area. Government extensions were rarely mentioned. In one village government workers sold new varieties of cotton seeds.

“Last year, when I went to sell my crops in Pakokku I got information that we can grow sesame with water irrigation. The seed were distributed by Yezin University. If we have such kind of things, I believe that we will have success in agriculture.” [14 AT2, M]

5.3.2 Life-related events

In the following chapters, the adaptive strategies applied over the life-course by positive deviants farmers in Myanmar will be described in order to gain insights on the pathways towards sustainable agriculture and sustainable diets. To render the analysis more structured biographies of people were analysed under three lines: life-related events, agriculture-related events and diet-related events. In this this chapter, life related-events common among participants will be described illustrating socio-cultural practices, gender roles and coping strategies applied to face stressors. The same line of analysis will be applied in the following chapters for agriculture- and diet-related events.

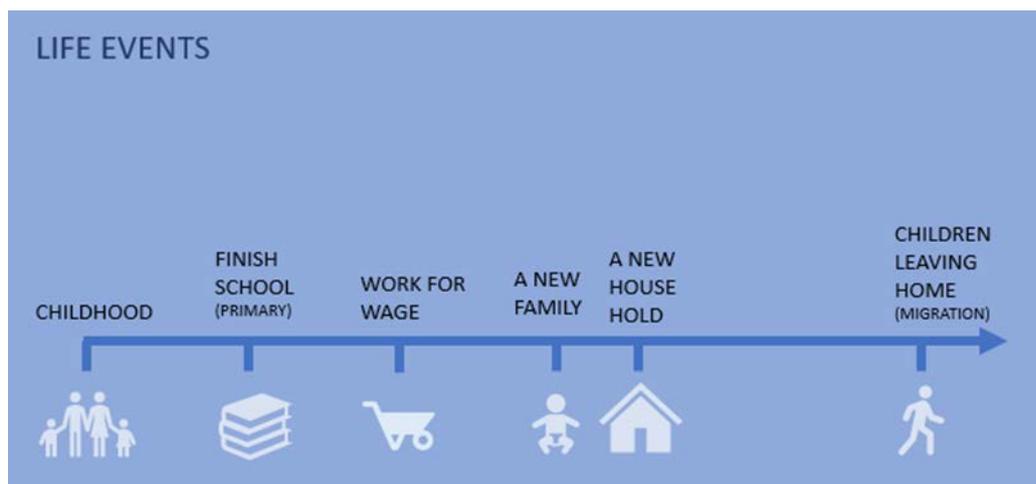


Figure 14 Life events

² The main agricultural university of the country based in Naypyidaw

Childhood

All participants settled in the village where they were born. Since most of the respondents were between 40 and 55 years old, the majority of them grew up in the 60-70s'. During their lives, these farmers experienced the birth and establishment of the military dictatorship, the fight for democracy, the Saffron revolution³ and the first democratic election in their country. However, none of these topics was explored by respondents. Only some political events were mentioned. The demonetisation⁴ that led to the explosion of the political movement for freedom in 1988 were associated by farmers with scarce availability of rice. Only one respondent mentioned a case of oppression related with the military regime (forced labour for national infrastructure).

The majority of the respondent started their involvement in agriculture at early age in their parents' farm, usually after living school. Most of the household's heads finished their education with the fourth grade (end of primary in Myanmar)⁵. Some others were literate even though they did not attend official schooling since they received their education in monastery schools. Wives of the male household heads were in general less educated (3 out of 11 were illiterate). Childhood was generally described as a period of poverty where in some occasions food was scarce and it was difficult to purchase other goods (i.e. clothes).

During their childhood fathers took up the role of 'rice-winner' for the whole family. The impossibility to work for this household member could destabilise the family. One response strategy was that other family members compensated the income loss.

"Because of my father was unhealthy, I went out to work in Pakokku after I left school. I worked for many years there and I married after I returned home. [...] We stopped to do agriculture and then we weaved fabrics for a few years. We sold the products in the city." [12 YL2, F]

A new family

Most of respondents started their involvement in agriculture as landless (9) and worked for others in order to save money with the aim of buying a piece of land. In 5 cases, the head of the household inherited a piece of land from the parents. Even in the case they inherited a small piece of land, most of the respondents worked in other people farms or in other kind of temporary jobs during their youth.

Marriage was not necessarily associated with the creation of a new household. The main push factor to leave the parental house was family growth and the consequent pressure on the parental household resources. The birth of a child was often associated with the purchase of land.



Figure 15 A female headed household with one research team member

³ In 2007 an imposed increase in fuel prices caused protests, which were joined later by thousands of Buddhist monks. The first monks' protest that initiated the movement took place in Pakkoku (<http://www.oxfordburmaalliance.org/saffron-revolution.html>)

⁴ On September 5, 1987, the government demonetised the 25-, 35-, and 75-kyat notes, rendering 75 per cent of the country's currency worthless. The results were serious riots and eventually a coup d'état in 1988 by General Saw Maung. (http://factsanddetails.com/southeast-asia/Myanmar/sub5_5g/entry-3126.html)

⁵ The education system in Myanmar is divided as follow: Primary starts at 6 years old (4 grades); Middle School starts at 11 (4 grades); High School starts at 14 (2 grades); University starts at 16-20. (<https://www.classbase.com/Countries/Myanmar/Education-System>)

"I had difficult moments when I was living my parents' family in the same house. As my family was increasing we were in need of more resources to feed everybody. Consequently, sometimes I had some disagreement with my parents but still we felt connected by family bounds. Once my father told me, "You don't want to separate because you are scared of starving and suffering, right?" Since then I decided to move out with my family in a small house. It made me strong and willing to try." [07 SK4, M]

Women played a major role in the management of the farm. They were not only involved as labour force in the fields but they were actively participating or leading the decision-making processes. This emerged clearly from the interviews with women. They showed they had a full picture on their business situation. In two cases, a woman was holding the headship of the household in presence of a working age male member (husband and brother). In the first case, the female head of the household, during her youth, migrated to another village and with the money she gained she purchased a piece of land where she settled with her family. In the second case, the woman was not married and was managing the land of her parents together with the brother and the sister-in-law. She defined herself head of the household. In the remaining case, the family was composed by four sisters living on inherited land.

Children

After marriage, the main life events described were related to children births and their developments. In 9 households, at least one child was attending or could complete university. The majority of children supported the parents in agriculture activities or find an off-farm job.

Migration was common among young family members, especially to attain highest levels of education or to pursue better job opportunities. Some migrated to other cities in Myanmar (i.e. Mandalay and Yangon) and other to neighbouring countries (i.e. Thailand and China). Girls migrated as well, but less often than boys (5 out of 14).

"Currently, my son is working in China. His supporting is very helpful to our family. We used his remittance in house building and were able to buy 2 cattle." [08 OY1, M]

5.3.3 Agriculture-related events

After listing on the time-line all the most relevant events of their life related with agriculture, respondents were asked to reflect on the way they faced stressors and difficult periods in relation with their involvement in agriculture. The adaptive strategies emerged from the narratives of the farmers are described in this section.

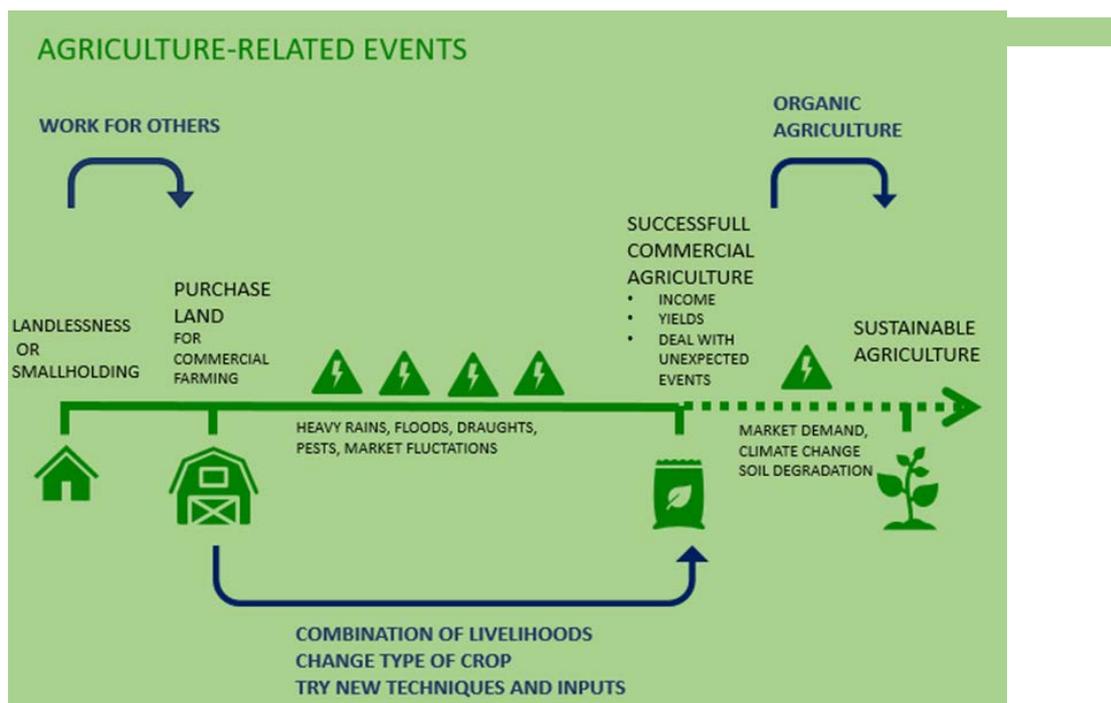


Figure 16 Agriculture – related events

Starting the family farm

All the respondents came from farmers' families and started their involvement in agriculture working in their family fields. A common coping strategy among respondents was to work for others in order to save money with the final aim to buy land. A few emigrated to neighbouring villages to find their fortune. Thanks to these savings all the respondents acquired a piece of land where to settle with their family. When young most of the respondents worked in other people farms. A common source of income in the area was climbing toddy-palm tree⁶ to collect the sap. This job was perceived as exhausting and dangerous by some respondents. The women interviewed reported to have done this job as well in the past.

"It was very hard to us because we were scared to climb toddy-palm trees to collect sap and palm forests are also very far away from each other." [02 KZ2, F]

When young, women were also involved in raising animals, selling of sweets and vegetables and cotton fabric production to gain an extra income. Young men worked as pond diggers, shepherds, gold diggers, workers in others farm, wood cutters, brokers, teachers, cooperative workers. Some of them during their youth temporarily migrated to other neighbour villages.

"I tried to work hard and save money. In the past, I worked in agriculture along with raising goats and cows. After I married, then I could separate from my parents". [04 SK1, M]

Land access was the precondition to leave the parental house. Some respondents started their own farm by borrowing land while the majority directly purchased the land. Some farmers expanded or acquired land for the first time through inheritance. The decision to extend was often associated with a new-born in the family.

Compared to their parents, this generation of farmers moved from a semi-subsistence form of farming to a more market oriented kind of agriculture.

"When I was a child, my parents were selling half of the total harvest and we were eating the rest. But now, I store my crops in my house and I wait until market prices are going up. We can also send our crops to warehouses. They will keep it for you and you can sell to them at any time. In the past, we didn't have this option. Today, I grow crops with a market-oriented view." [04 SK1, M]

Make the farm successful

Over the life course the household selected were able to increase yields, expand their land and have a stable income for their household sustainment. In order to achieve the current state of wealth most of the respondents had to face several stressors. This session provides an overview of the main adaptive strategies farmers applied to become successful.

The main goal of farmers was to gain a stable income to provide their family with good living conditions. In order to gain income from agriculture, farmers were in a constant effort to improve their yields and profit. Another challenge for respondents was to overcome exceptional events that could totally compromised their crops.

Gain a stable income

In order to be resilient and gain an income to meet the whole family needs, farmers were often engaged in different kind of livelihood strategies.

All the respondents defined themselves as farmers as most of their time was spent in commercially oriented agriculture. However, other side activities were often contributing to the household income. In just 3 cases the family farm represented the only source of income for the household. In 8 cases, respondents were raising livestock for commercial purpose (4 goats, 2 cows, 1 sheep, 1 both goats and cows). In 3 cases respondents had another occupation beside being a farmer. One was selling construction materials and furniture, and the other two were carpenters. In 8 cases, remittances coming from migration contributed to the household income.

⁶ The Toddy Palm's (*Borassus flabellifer L.*) chief product is the sweet sap (toddy). The toddy ferments naturally and is locally popular as a beverage. Rubbing the inside of the toddy-collecting receptacle with lime paste prevents fermentation, and thereafter the sap is referred to as sweet toddy. Toddy palm jaggery is much more nutritious than crude cane sugar. The fresh sap is a good source of vitamin B complex. (<http://www.fao.org/livestock/agap/frg/ECONF95/HTML/TODDY.HTM>)

The following combinations of livelihoods were considered as resilient by farmers:

Only agriculture but with diversified production

The three respondents who were relying only on agriculture for their livelihood had a diversified production. In the first case, the family owned a small toddy-palm plantation and a domestic production of jaggery. In the second case, the respondents had a tobacco plantation eventually transformed into a horticulture business. The third case grew a wide diversity of crops (chick pea, mung bean, green gram, maize, cotton, sesame, groundnut and pigeon pea) and used tractors and irrigations pumps.

"We were suffering a lot in the past and it made us stress as well. But the three of us (myself, brother and sister-in-law) together we worked harder. In addition, we learned enough to work in toddy-palm sap production which we combined with agriculture production." [02 KZ2, F]

Agriculture and husbandry

"I started to rise 3 cows, now I have 6. I sell the calves. With that money, I reinvest in agriculture and something we use for household expenses." [10 OY3, M]

Agriculture, husbandry and migration

[I migrated]" Because there was no job available in our region. My family couldn't stand with agriculture activities alone since there were some educational expenses for my children too so I decided to migrate. Now, my son reached University as a second-year student and my daughter is also in her first year. [...] Livestock rising helped our agriculture investments so I could grow. [...] It is a combination of three activities: agriculture, livestock and migration" [07 SK4, M]



Figure 17 Goats breeding

Agriculture, husbandry and self-employment

"For household food security, we can't mainly depend on agriculture. I tried to do other livelihood activities like raising animals (goat) and working as a carpenter." [05 SK2, M]

Agriculture and migration of a family member

"Since my children went out to work, they send back some money to us. In case we have less return from agriculture, it is very helpful for my family welfare. According to my experience, you can't stand in your life if you rely on your agriculture alone. Annually, rainfall pattern changed. We either don't know what happen next year or how to control climate." [01 KZ1, M]

Agriculture and self-employment

"I work in a business of reselling machines and materials beside agriculture activities. [...] I started with 5 acres of land that were only sufficient for household consumption. Later I started to work in other off-farm activities, so my household's economic conditions have been improved. In the past, we

used to live together as one family. After that I bought more land (including horticulture land) and built a new house for my children." [03 KZ3; M]

Improve yields and profit

In order to improve yields and profit, farmers were in a constant struggle of improving their farming practices.

Changing type of crops in response to climatic conditions, market fluctuations and availability of better varieties of seeds was a common strategy among respondents during their life-course.

"For example, in the past we didn't grow groundnuts. Later we got to know that it can get good market price and that is adapt for this climate so all farmers started to grow around here." [01 KZ1, M]

"Pigeon pea and cotton are resistant to these climatic conditions than other crops. I select climate resistant crop to grow. Now, we can't grow one type of sesame because of less rainfall." [15 AT3, M]

It was not possible to identify a clear transition from certain kind of crops to others. Decision-making was mainly based on anticipating market fluctuation going back to previous cultivations when appropriate.

The only clear transition identified was from tobacco that was abandoned to other kinds of cash crops in some villages. Five farmers switched from tobacco monoculture to a more diversified and less labour expansive farming strategy.

"In the past, we mostly grew Virginia tobacco. Now, most of the famers do not grow tobacco because it needs more effort so we changed to lablab bean, maize and various kinds of beans. [...] We selected to grow crops that we were able to sell for a good price." [09 OY2, F]

In the quote below an ex-tobacco producer explains why he switched to horticulture:

"With horticulture, we adjust to grow more this year and less next year depending on market demand. [...]. For example, this year, we planted tomato seeds and may be next year we will observe there might be uncertainty of market demand, so we will plant less tomatoes." [08 OY1; M]

For food production, groundnuts, sesame and pulses were the most common crops cultivated in the area. Maize was usually sold for animal consumption, groundnuts were requested for oil production and cotton for industrial purposes.

Horticulture was considered a risky investment by two farmers. In one farmer's opinion, other villages had more favourable soil conditions and therefore more competitive selling prices for vegetables. Another explained that fruit and vegetables prices were much more unstable than other crops. On the other hand, some considered horticulture a profitable investment and a source of FNS security.

"In the past, we did only agriculture as our livelihood activities but it was not able to cover our household food security. Then, we observed that other villager started to do horticulture activities was quite successful. Thus, we also tried to grow and learned from them." [08 OY1, M]

Another adaptive strategy applied by respondent was to actively seek for better inputs and cultivation techniques. Overall, respondents described cultivation techniques as improved compared to their parents' time. Respondents described a transition from a traditional way of farming with no use of external inputs (only animal manure) to an increased use of chemical pesticides and fertilizers. At the moment of the interview farmers were using both organic and chemicals fertilisers. Some farmers showed an inclination for using organic fertilisers (cow dung, in one case mixed with peat) because considered cheap and good for humans' health, the environment and for soil productivity.

"Nowadays, there are significant changes in cultivation method and technology. For example, in the past, we were using traditional way for soil preparation and planting. Now, we are using cow dung mixed with peat as organic fertilizer that we put in the field and then harrow the land. I learned this and asked to other farmers who owned a lot of land acres and are successful." [05 SK2, M]



Figure 18 *most of the respondents relied on animal traction*

To respond to poor yields farmers were eager to improve their agricultural techniques. Farmers were open to try new varieties of seed, different kinds of fertilizers and pesticides. In order to improve profits farmers sought to plant before others to get more competitive prices at the market.

"We applied soil management practices such as better tillage methods, effective use of fertilizer, use of organic fertilizer (cow dung) and adjusting timing to grow crops." [02 KZ2, F]

"If there are new seeds offered in Pakokku City, I immediately go to buy them and I grow the new variety in my land." [03 KZ3; M]

"For horticulture, we use a rotation methods. If you don't use this method, your crop will be not good and unfruitful. We learned this from agriculture technician." [10 OY3; M]

Other farmers were more favourable to chemical fertilisers due to the short-term yield increase. Moreover, organic was considered a non-profitable choice due to the high risks and the lack of a local market. Farmers reported the use of pesticides.

"Nobody grows organic in this area because the price is higher and there are no buyers. The villager and customer will only select cheaper vegetables and fruits for their daily food". [10, OY, M]

Farmers perceived to not have access to good varieties of seeds (long germination time, climate adaptation). However, they noticed the availability of new varieties in the local market had recently increased. For example, government extensions distributed new varieties of cotton in the area.

None of the farmers interviewed owned mechanized means for fields preparation or harvesting. Ploughing was mostly conducted by animal traction. All the household owned at least two buffalos to harrow the fields. Some farmers expressed the wish to use tractors in order to have better yields, but the majority of them could not afford the rental costs. One respondent was sceptical about the advantages of modernised way of agricultural production.

"This is our traditional knowledge. If we use machines or tractors, it is no good for soil conservation because it increases soil degradation and it can destroy microorganism in the soil. The traditional technique of soil cultivation is the best." [13 AT1, M]

Only two cases could access tractors available at village level. However, renting was not free from constraints:

"I got a chance to use tractor for ploughing but we had only two tractors to hire. Therefore, we did in the night time." [14 AT2, M]

It was common to hire extra workers at the moment of harvesting, weeding, ploughing the fields. This choice was considered a risky investment since in some cases the volatility of the market and weather conditions could compromise the production and therefore create debts for the landowner. Workers were paid from 2500 to 5000 MMK per day (1,25 to 3 euro). Labour force was perceived as expensive and difficult to find. This factor was also influencing the kind of crops to grow. For example, in uncertain years farmers decided to plant less labour-demanding crops.

Overall from the interviews emerged that farmers felt more exposed to new knowledge and new techniques compared to the past. This was mainly explained by better road conditions guaranteeing a

better access to markets. However, the main source of information reported remained knowledge sharing among farmers.

Crops price fluctuation emerged as a main concern by many farmers. For example, at the moment of the study, price of pulses decrease was affecting the respondents' income. On the contrary, cotton was considered a good investment. These fluctuations influenced the decision on which kinds of crop to invest in the next season. A few farmers responded to market fluctuations by storing products for a period for then selling when the prices were more favourable.

"For example, this year crop price may be higher but it can be very low next year. Last year, pigeon pea price was 50,000 MMK [31 euro] per Tin (basket) but this year price decreased to 20,000 MMK per Tin [13 euro]." [02 KZ, M]

The lack of information about market prices caused often losses for farmers. The main sources of information were other farmers, brokers and private companies.

"We are always worried about market prices. Working with agriculture is like playing lottery. We cannot foresee if we will win or lose." [09 OY2, F]

Traditionally farmers were used to sell their products to brokers. The distance to the main market (up to 35 km), the conditions of the road and the high costs for transportation were the main constraints identified by the farmers. Some farmers were of the opinion that road conditions had improved recently. Some of them owned a motorbike. In one village farmers organised to avoid broker intermediation by renting collectively a truck.

Dealing with the unexpected

Exceptional events such as heavy rains, floods, draughts and pests could potentially destroy one year of agricultural production leaving the household facing debt-burden and lack of income.

"Around 1999-2000, due to intensive rainfalls, toddy-palm tree didn't produce sap. There was famine, particularly scarcity of rice and also our crop (mung bean) in the field was damaged by fungus and we couldn't sell it. So, I borrowed money with high interest rate. I faced debt-burden and it was very difficult time for me to handle. I tried to raise pigs to have an income. In that period, my husband was bitten by a snake and got sick. This created more difficulties to our family. At the same time, weather conditions were getting worse." [01 KZ1, F]

The main problem of farmers in the Dry Zone of the country was access to water. All the farmers, except two, were depending on rain for agriculture. In the study area, this meant relying only on the short and intense Monsoon season. Climate conditions were described as extreme and erratic.



Figure 19 *The bed of a river at the end of the Monsoon season*

"When I was a child, farmers were growing groundnut in their fields and the field received adequate rainfall annually. It was disappearing in this region due to drought and water scarcity. Now, it is reappearing again with short-germination varieties." [06 SK3, M]

"As our land was flooded, the sand deposit was very thick so that it was impossible to grow any crops." [08 OY1, M]

Heavy rains, droughts and floods from the Irrawaddy rivers were events that could potentially affect the same farm over the years. Farmers noticed increasingly erratic rains. The vicinity of the river could represent an opportunity for irrigation but at the moment the area was lacking an irrigation system. Access to electricity was limited in most of the villages in the area. Therefore, farmers could not use pumps to get water. Just two farmers had a pump on their property.

Another issue compromising farming harvests were pests.

"Last year, ground nut was destroyed by pest. It was like plants dried and then died. 3 years ago, we had the same kind of problem but it wasn't destroyed too much. We even used pesticide to kill them but it failed." [02 KZ2, F]

In response to stressors such as harvest loss due to water-related problem or pest the majority of the respondents engaged in short term adaptive strategies. Often a response was engaging in temporary income generation activities (raising pigs, make handcrafts, off-farm work, etc). Farmers were often referring to extra effort and hard work in order to overcome difficult moments.

"It was very difficult time to us. At the time of drought, I was climbing toddy-palm tree and sleeping next to the well to collect water at night time." [04 SK1, M]

Some temporary adaptive strategies were collective:

"After the flood, most of the women produced cotton fabrics. They were spinning and weaving until night time. They used the light of oil lamps and after 4 days we went to sell to the market in the city nearby. [...] During the flood, we almost had to move our village but we built blocks to stop the water upstream so we were didn't need to relocate our village." [08 OY1, M]

Drastic measures in case of stressors were contracting debts, use jewellery as collateral, and selling livestock and carts. 9 out of 15 farmers experienced debt-burden during their life course.

"According to Buddha teaching, we must return all our debts in this life. If you fail, you will be suffering until next life. If this year I can't return all my debt to creditor, I have to try harder. At the same time, I must learn and discuss with more people to understand to find the way to gain more profit." [10 OY3, M]

Towards sustainable agriculture

For the future farmers had the vision to continue their involvement in agriculture even though they saw a different future for their children. In relation to their farms, they expressed the wish to be able to have access to tractors, machines, irrigation, better seeds varieties, better fertilizers and to extend their land. Having access to irrigation was seen as the possibility to grow other kinds of crops such as paddy, fruit and vegetables that need more water. One farmer expressed the wish for a collaboration with the University to develop better quality seeds.

Concerns were expressed regarding the sustainability of the current way of doing agriculture. Main problems identified were soil degradation and environment-related health problems.

"In the past, climate conditions were stable and land was fertile. Now, we need to use fertilizer for productivity because of soil degradation and bad climate condition." [15 AT3, M]

In response to these concerns some farmers were interested in growing organic. These practices were considered as going back to more traditional methods but at the same time new knowledge introduced through trainings.

"As soil fertilizer, we use cow and goat dung. Unfortunately, I don't have enough livestock to get such amount of dung so I buy it 30,000 MMK per truck. We started to use this kind of method recently." [05 SK2, M]

"We use a rotation method. For example, if this year we grow bean in this land, next year we will grow chili in that land and then we will grow bean to another land. It is good for soil conservation and recovering. Recently, we received such knowledge from agricultural technicians. Nobody grew organic vegetables and fruits in this area. If you individually want to do organic farming, all pests will come to your farm because everybody is using pesticides in their farm. I know that using pesticides is not good. But we should do like before selling to the market [before commercialisation N/A], we need to set a space of time for releasing the chemical that we used." [08 OY1, M]

"I'm trying to raise livestock and collect dung so that I can be reduced chemical fertilizer use." [15 AT3, M]

Some farmers were growing organic for household consumption while they were using chemical fertilizers for the crops designated to the market.

"I use cow and goat dung as organic fertilizer. It is good for plant and makes the soil resistant to climate condition at least for 2 years. Today, I am eating long bean, roselle, eggplant and tomato that I am growing in my farm for family consumption and not for selling. I didn't use any chemical fertilizer for these vegetables." [04 SK1, M]

5.3.4 Diet-related life events

Respondents were asked to described diet-related events starting from their childhood. In this way changes over the life-course in availability, access, utilisation and stability of food could emerge. After that, farmers were asked to select healthy food item and explain why that item was connected in their understanding to health. To formulate this question the words 'healthy', 'nutritious' and 'good' were used. Respondents were not connecting specific kinds of food to the concept, however different dimensions of their understanding of their diets emerged from the narratives.

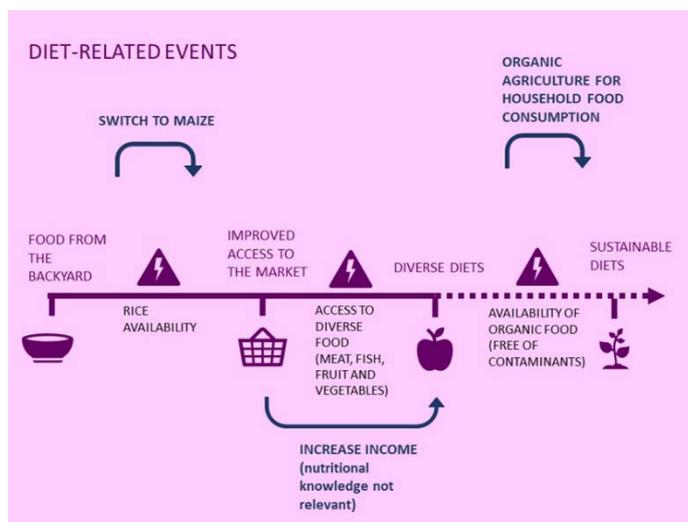


Figure 20 Diet related events

Food from the backyard

During childhood, almost all the respondents described less availability of diverse food since families mainly relied on their land to access food. Markets were difficult to access due to road conditions. People could reach the market only by cart or on foot. Therefore, food availability in the past was much more dependent on seasons and natural events. Rice was rarely cultivated in the area so most of the respondents (13 on 14) were used to consume rice mixed or substituted with maize or other grains (i.e. millet). This mixed staple food was usually associated with poverty and disliked by respondents. Collecting plants and food from the forest such as bamboo shoots and mushrooms was common. Traditional crops during their childhood were beans, roselle, gourd, eggplant, potato, water spinach, groundnut (oil), sesame, tomato, chilly, pumpkin, bitter melon, watermelon and other plants growing naturally.

"When I was a child, I had to eat corn because my parents were unable to buy rice. I was crying because I didn't like corn. [...] After my fourth son was born, we got sufficient food. Currently, we can buy food whatever we want to consume." [01 KZ1, F]



Figure 21 Water spinach from household production

"At my parent's time, this area was very poor and vulnerable and we used to eat food in a traditional way. There were available only local vegetables and fruits like beans, roselle and bean leaves that we grow ourselves." [03 KZ3, M]

"In the past, we didn't have good transportation. We were only eating vegetables and fruit from our farm. We used a bullock cart to go to the market. It took a lot of time. There were no bicycles and motorcycles. Our household income was low. We went to the city to sell firewood and we were getting just a little amount of money. With that we bought some food and materials like rice, oil and gasoline for lamps. Sometimes it was not enough to buy what we need." [05 SK2; M]

Three farmers mentioned that the demonetisation that led to 1988 political events influenced availability of rice forcing them to mix rice to other grains.

"There was a significant event related to political movement in 1988. We had to eat maize alone. Even though we had enough money to buy rice, there was no seller. But it took only 3 months. I faced similar event at least 3 times in my life." [06 SK3, M]

"There was a national financial crisis as well (demonetisation N/A). We lost money in there too. But we had enough food at that time because we were selling vegetables and fruits besides agriculture activity and I also went out to find job in the city." [12 YL2, F]

The road to the market

Comparing their current diets with the past respondents noticed that thanks to income increase and accessibility to markets they could eat fish, meat, eggs, milk and fruits more often. At the moment of the interview respondents often owned a motorcycle and roads were in good conditions even though not paved. Overall, it is possible to observe a transition over the years from a more secure household food availability and access.

Meat and (dried) fish were the most common items associated with income increase. As in the past, farmers were dependent from the market for the most important component of the local cuisine: rice. Buying food to the market did not emerge as a problem from most of the narratives. Some wished to have some food more often (meat and fish).

Traditionally people consumed three meals per day. A main dish was usually made of rice (or rice noodles) coming with 2 or more kinds of curries served in small portion and placed in the middle of the table. Curries were made of vegetables, pulses, grains, fish, mushrooms, bamboo shoots, meat. They were often oily and salty. Women were in charge of food selection and preparation.



Figure 22 A traditional meal

"In the past, we couldn't have sufficient food items for daily consumption. I cooked what I got because of poor household income but now I can buy whatever I want. Every day, I take responsibility to select and prepare difference food items for my family." [02 KZ2, F]

Farmers were asked to estimate the percentage of production sold to the market compared to the one kept for household consumption. The estimation was subjective and could not be supported by objective measurement. In average, farmers interviewed sold 74% of their production to the market.

Some farmers were mostly dependent from the market for their access to food while others made an intentional choice to their dependency from the market for economic- and health-related reasons.

"Now, we don't grow vegetables and fruits for food in our farm land so that we are able to grow more crop. We just buy food from the market." [05 SK2, M]

Nutritional knowledge

The meaning 'nutritious' attached to food was introduced through trainings and other NGOs' interventions. This association emerged from the respondents' narratives. However, at the moment this knowledge did not appear to have any real effect of their diets.

"In the past, we never considered to eat healthy food and we were just eating for work and living. We had to eat what we had. Lately we got some money, we buy what we want to eat but without thinking about nutritious food consumption." [01 KZ1, F]

The trainings covered topic such as healthy food consumption, IYCF practices, food safety. Fish, meat, eggs, milk, potatoes, seasonal vegetables were considered good food for children. Some of the respondents (mainly women) participated to nutritional trainings where they got introduced to the concept of nutritious food. Those respondents were repeating what they learned during the trainings when asked what they meant with healthy food. Two respondents said they gave to their nephews fortified powders for their brain and physical development (i.e. Ovaltine).

"Now, I am able to feed healthy food to my niece and nephew comparing to when I was a child. Because I participated and learned from healthy education activities at village level. As a result, I got some knowledge regarding healthy food and I can select food items before cooking for my family." [02 KZ2, F]

"We have some knowledge of food consumption. For example, we try to avoid some food items like pork if we are in high blood pressure. We received such knowledge from village's health worker when we went to make medical check-up. They also recommend avoiding some kinds of food when we are in sick." [09 OY2, F]

"We gained knowledge from trainings and seminars on health education which were organised by external organisations. I learned to not eat vegetables with chemicals use. In our village, somebody grow and sell organic food. In the past, the monk taught and encouraged us "Don't eat what you want to eat but try to eat what your traditional foods in the field". [15 AT3, M]

Exploring local understandings, emerged that food good for health was that food is able to render people strong enough to work.

"I think, health is very important and we tried to eat food for our health so we were never had any major health problems until now. Therefore, we overcome many challenges because we could work." [02 KZ2, F]

In addition, some kinds of traditional food were believed to have special properties:

"We don't think about food selection in terms of healthy food but we try to eat nutrient food in our own way. For example, lady finger is very good for humans and it can reduce high blood pressure and diabetes. Till now, our family meal pattern didn't change and we are eating 3 times a day." [13 AT1, M]

The medium holder farmer excluded as a case because of his better-off starting position expressed concerned for junk food. This as a hint of concerns spread among better-off farmers and most probability the sign of an increasing availability of processed food:

"In the past, we were in good health. We ate jaggery and brown slab-sugar as a snack. [...] Today, children can eat whatever they went to eat and they are from Yangon and Mandalay." [11 YL1, M]

Towards sustainable diets

The main concern expressed by respondents connecting health and food was related to the contamination of food by pesticides, fertilizers and other products dangerous for health. Farmers reported to have learned about it from books, trainings and from other farmers.

"If you individually want to do organic farming, all pests will come to your farm because everybody is using pesticide in their farm. I know that using pesticide is no good. But we should do like before selling to the market, we need to set a space of time for releasing chemical that we used. However, we can't remove that chemical inside of plant since its contained in seeds." [08 OY1, M]

"So, we have to buy from the market even we don't want to eat such kinds of vegetable and fruit. For example, we know that they are using chemical to grow fast, big and good looking like tomato but not good taste." [06 SK3, M]

"Now, we are eating dried fish, egg and buy vegetables and fruits from neighbouring farmers who don't use pesticide." [15 AT3, M]

"Recently, I just received this information from NGOs. They provided trainings on disease prevention and healthy food consumption. For example, how to eat food in a healthy way: eat vegetables and fruit and avoid fish and meat. They said if possible, please try to consume oil from your own production of groundnut and sesame. I was thin in the past but now I am healthy. I knew that oil from the market is not real. They mixed with other unclean oils. It doesn't do well enough for your health." [02 KZ2, F]

"In the past, my parent gave me vegetables from our farm that were fresh and good for health. Nowadays, vegetables and fruits sold at the market with low price are unsafe and don't give strength." [06 SK3, M]

"As we are horticulture producer, we know that they are using chemical. So, we are eating them after cooking and boiling with hot water." [09 OY2, M]

5.4 Social innovation strategies in agriculture

The aim of this chapter is to outline social innovation strategies in which respondents were involved especially in achieving their agriculture- and diet-related goals at societal level.

Social innovation can flourish in a context where individuals are free to interact and connect. Until recently, Myanmar people were not allowed to gather freely and limitations to bottom-up forms of organisation were still present at the moment of the interview. What it could have been observed during this study is a general intention to explore the potential of new opportunities coming with more freedom. Some forms of organisation already existed and some respondents were actively involved and even leading these groups. However, most of these initiatives were not coming from people's desire of gathering around a social goal but were more introduced by external factors such as schools, NGOs or the government. Passive participation to meetings, trainings and other initiatives were seen as an occasion to obtain some short-term advantage (i.e. material support).

"We always participate in village activities. [...] I received boots and a rake. From WFP, my youngest son (a student) got a ration of rice for a year. 8 years ago, one of the organisations conducted bakery training and my daughter attended the trainings but it was not helpful to our livelihood activities. We didn't receive any significant assistance from external organisations to our livelihood. But they distributed water for household consumption in dry season." [01 KZ1, F]

Some other forms of social organisation had local roots and acted with some margin of autonomy but were exclusive (village leaders committee). However, some examples of citizens engagement were reported. For example, in one village farmers organised to rent a truck for selling their products to the market. In this way, they could avoid the intermediation of brokers and gain several other advantages:

"In the past, we had had to deal with brokers because lack of good transportation and high costs. They bought farmers products and sold other products from the city. Since we don't have to deal with brokers anymore, farmers' household conditions economically developed. We can notice that farmers received more opportunities from directly deal with wholesalers. They get higher prices and access new knowledge about agriculture techniques and new seeds variety." [03KZ3, M]

In the same village, the community gather to organise a common mill to grind groundnut and sesame for oil production.

"We selected 29 female members willing to participate in managing the mill. We divided into small groups. Each group takes care of the mill in rotation. The village committee takes the decisions." [03KZ3, M]

Exploring farmers narratives, a stated desire to create farmers' unions. Emerging informal mutual support among farmers was clearly present, especially regarding information and knowledge sharing. Giving more structure to this rooted feeling of solidarity was perceived as possible for some respondents.

"I have ambition to organise and create a farmers' union at village level so that we will able to help in farmer's rights and opportunities. For example, nowadays, I am trying to participate in meetings and training related to land issue and learning new skills." [07 SK4, M]

"I believe that if we can organise farmer groups and directly deal with international traders, we farmers we will be able to have more success in agricultural activities. We know that it is not so easy but we want to try step by step to get this." [12 YL2, F]

Suggestions with partnerships with government extensions, international traders, experts and scientists.

"For networks, we have to keep in touch with local authorities and technician. I always ask their contact numbers. For example, there were problems related with land issue, so I called to the land department. I also have land policy books." [07 SK4, M]

"If we have opportunities to directly contact international traders, we can avoid middle men, those who take advantage from farmer." [12 YL2, F]

"I will seek for new yield varieties of seed from Agriculture University and try to receive technology as well." [07 SK4, M]

"We are worried about future climate conditions and natural disasters. These events are happening more frequently than in the past. Now, we can only pray. I believe that if there is prevention, we can reduce the impacts. But we don't have the capabilities to face this. We can do it effectively through cooperation with educated persons and scientists." [03, KZ3]



Figure 23 *The process of groundnuts transformation*

5.5 Synthesis of main findings

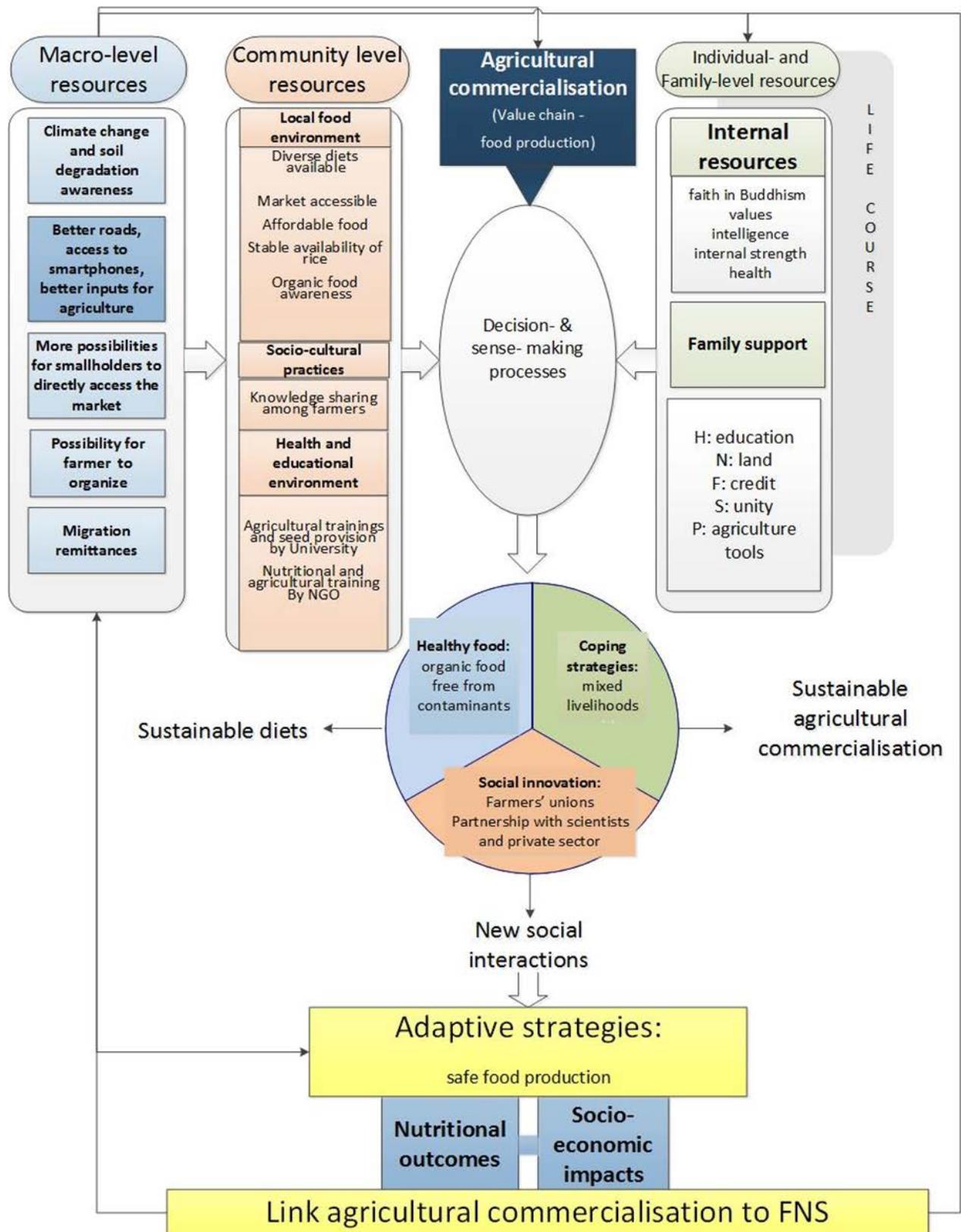


Figure 24 Main results – opportunities for linking agriculture commercialisation and FNS in Pakkoku

This study aimed at identifying opportunities to link agriculture commercialisation with household food and nutrition security in a specific research area. In order to detect local embedded best practices and resilient strategies, the mainstream problem-based approach was abandoned. Instead of analysing constraints, this study focused on successful practices and resources already in place in one of the most challenging environment for agriculture in Myanmar: the Dry Zone. 14 successful farmers living in the area surrounding Pakkoku, in Magway region have been interviewed in order to disentangle sense-making and decision-making processes leading through the life-course to their current situation of w/health. A narrative-inquiry technique helped to discern resources and adaptive strategies that farmers put in place when pursuing economic and nutritional goals.

Resistance resources enabling farmers to deal with stressors were available at different level.

Individuals could count on internal resources such as faith in Buddhism, values, intelligence, internal strength and health. Family represented the main security net. Within the family, respondents could access all sorts of capital: natural (land), physical (agricultural tools), financial (credit), human (education) and social (family unity). At community level, a sense of solidarity emerged, which concretised as knowledge and information sharing among farmers. Knowledge and information were acquired through different sources (traditional knowledge, observation of other farmers, private companies, NGO's trainings, radio, TV, social media, books, University) for then being eventually shared among farmers.

The local food environment offered a wide diversity of food that was considered stable, available and accessible by respondents. From the narratives emerged a shared awareness of the importance of organic agriculture and a general concern about the health-related consequences of eating contaminated food. At societal level, farmers could count on the presence of NGOs, private companies, a University and less often governmental extensions. These actors provided farmers with trainings, access to better inputs (fertilizers, pesticides, seeds, tools, etc.) and market information.

Macro-level resources increased over the years, although respondents could not have a real influence on these factors. At environmental level, farmers showed awareness in relation to climate change and soil degradation dynamics even though they could rarely implement effective adaptive strategies. Recent innovations in the area were: improved roads, access to smartphones and internet, and increased research for better seeds and inputs. Increased mobility of goods, people and information created better possibility for farmers to directly commercialize to the market. At institutional and governance level, the transition towards democracy left space to village level forms of organisations. New migration patterns involving the young generation, entailed new sources of financial capital for the families left-behind.

In order to gain insights on the pathways towards sustainable agriculture and sustainable diets, positive deviants farmers' adaptive strategies over the life-course were analysed.

Respondents shared some common trajectories and family-related events. Most of them shared childhood memories in which they had to leave school to help their family in the fields or with other income-generation activities. Lack of stable provision of rice and difficulties in market access caused food insecurity during their childhood. An important turning points for most of the respondents was the separation from the parental house. This moment was not necessarily corresponding with marriage but more often with the possibility to buy a new piece of land where to settle and reduce in this way pressure of the parents' resources. From the narratives emerged a family system based on the productive role of male members and the reproductive role of female members. The temporary or permanent exclusion of fathers and husbands from the job market could economically destabilised a family. However, a flexible gender role division in which women could buy and inherit land, manage the farm and conduct economic activities could guarantee a prompt response in case of the absence of a productive male member of the family. A new family dynamic encountered at the moment of the study was the migration of young family members attracted by education and job opportunities in the main cities of Myanmar or abroad.

Recalling their agricultural story farmers described a transition from semi-subsistence to a market-oriented kind of agriculture. During youth respondents worked for others in order to invest their savings in a piece of land where to start their commercial farm. This analysis shows farmers involved in a series of adaptive strategies with the goals of gaining a stable income, improving yields and profit from agriculture and overcoming exceptional events. A stable source of income could not be

guaranteed by agriculture alone. Farmers were engaged in a combination of livelihoods. Only three farmers relied on agriculture alone and these three cases had a diversified production. The rest combined agriculture with activities such as husbandry, migration, self-employment and work for a wage. Aiming at improving their yields and profit from agriculture, farmers were ready to experiment with new inputs and techniques. Most of the respondents flexibly adapted to different kind of crops during their life-course. Although successful, farmers part of these study had to face the same stressors that affected the whole population in the Dry Zone of Myanmar: droughts, floods, heavy rains, pests and famine. Thanks to their ability to promptly manage the resources available those farmers reacted to loss of crops and debt-burden by adapt their livelihoods to the new situation. Awareness was present among farmers regarding more sustainable ways of food production and consumption. Most of the respondents were aware of the possibility to produce organic. While some of them were engaged in organic farming, while others were more sceptical about real economic opportunities.

For diet-related life events, farmers described a transition towards a better access, availability and stability of diverse diets. Farmers in the area have always been dependent from the market to purchase the main ingredient of Burmese diets: rice. Over the years, better road connection to the markets and political stability caused a more stable availability of rice. Compared to the past, respondents showed to have an increased purchasing power and therefore they were able to introduce in their diets meat, fish and more varieties of fruit and vegetables. Nutritional knowledge was introduced among respondents through trainings, however it did not show to have any influence of nutritional food selection. Respondents showed a predilection for organic when selecting food, meant as food free from contaminants that could potentially causes diseases. For this reason, some of the respondents preferred to grow organic food for their household consumption or buy organic food from other farmers.

Social innovation strategies related to sustainable diets and sustainable agriculture were also object of this study. Social innovation originated around the new opportunities following the democratisation of the country. This lead to new possibility to organise around social goals. For example, in one village farmers created a common mill to produce organic groundnut oil. A preliminary intention to create farmers' unions and partnership with private sectors and research institutes emerged.

6 Conclusions

This study presents a rich and contextualised picture of farm household sense-making processes in relation to the rapid agricultural transition currently occurring in Myanmar, while considering the implications of these processes for household food and nutrition security (FNS). Farmers, being both producers and consumers in a food system, can provide useful insights on the opportunities to link commercial agriculture and food and nutrition security.

First, a literature review was conducted to provide an overview of the agricultural and FNS situation in Myanmar. Particular attention has been paid to the current understandings and views emerging from scientific and grey literature on the impact of agricultural development on smallholder farmers, and specifically on their FNS situation. This review showed the lack of a reliable and timely data collection at national level. A 'silo mentality' separating investment in agriculture and food and nutrition security emerged from the analysis. This is reflected in the differentiation of targets group for agricultural and FNS security interventions. Agricultural development focuses on smallholder farmers as main target group, while in the second case crisis-affected and vulnerable groups (women, children) are the focus of FNS interventions. Research on decision-making patterns, intra-household food allocation and cultural determinants of malnutrition in Myanmar were missing from the reviewed literature. The perspective of farmers on their nutritional and agricultural goals was also missing from reports and articles.

Second, starting from a salutogenic approach, research was conducted among 14 positive deviants' farmers in Pakkoku (Myanmar). These farmers started as landless or as smallholders, and became successful during their life-course. A narrative inquiry method allowed participants to narrate their personal story and reflect on their adaptive strategies. What emerged was a set of personal ways of mobilising resources and building resilience. Although personal, most of these stories shared common characteristics, providing useful insights on the way farmers deal with the rapid process of commercialisation in Myanmar and at the same time guaranteeing their household food and nutrition security.

In this regard, an important finding is that successful farmers involved in process of commercialisation in the research area intentionally diversified their livelihood strategies in order to multiply their opportunity to deal with stressors and become more resilient. Farmers diversified their agricultural production and were flexible to change crop in response to market fluctuation. Moreover, farmers were engaged in a mixed set of livelihoods beside agriculture. Being flexible and having a diversified livelihood status showed to be the most successful strategy applied by farmers to deal with their challenging environment.

Another characteristic shared by respondents was the possibility to build their personal capitals by relying on the emotional and material support of their family. Being landless a condition affecting half of the population of the area, this study showed the importance of the leverage role of the family in the pathway toward land ownership. During youth, most of the respondents could live under the parental roof, working for others and saving money until they cumulated enough capital to purchase a new piece of land. This trajectory led these farmers to escape the condition of being landless.

Farmers' goals regarding agricultural production and food consumption clearly emerged from the narratives. Meanings attributed to sustainable diets and sustainable agriculture resulted as deeply interwoven with local factors. The concept of nutritious food was introduced by NGO's trainings. Nutritional knowledge influenced mainly children and infants feeding practices, but had little or no impact in changing respondents' choices of production and daily choices of food selection. Healthy food was understood by respondents as those food kinds able to provide energy and strength to work. Food and nutrition security goals at household level mainly regarded affordability of certain kinds of food (meat, fish) and access to organic food, understood as access to food free from contaminants. The need to access safe food influenced respondents' strategies for household self-production but did not affect commercial oriented agriculture practices.

This study shows that several elements of social innovation are in place among smallholder farmers in Myanmar. Specifically, new forms of inclusive community-led organisations are taking root often in connection with the process of democratisation giving citizens access to more freedom. However, these initiatives face the risk to remain isolated and miss the opportunity to scale up.

Overall, the main results of the case study highlight how elements during the life-course contribute to economically sustainable agricultural commercialisation processes and to food and nutrition security at household level. In particular, this study shows how individuals developed a wide set of adaptive strategies in response to different stressors (family-, agriculture-, diet-related) in order to provide a stable income to their family, increase their yields, face unexpected events and guarantee a healthy diet to their family members. What emerged from this study is that farmers' sense-making and decision-making processes differed substantially when considering agriculture engagement and their family food and nutrition security. This is suggested by the fact that a common strategy among successful farmers in the research area was to produce (or buy) organic food for personal household production and use chemical inputs in their agri-business. Even though some farmers showed a preference for organic and more sustainable way of agriculture, the majority had to rely on non-organic inputs in order to safeguard their economic goals.

This study confirms agricultural commercialisation and food and nutrition security are connected through an interrelated and complex set of pathways which are embedded in local sense-making and decision-making patterns. Therefore, in order to be effective, interventions and policies aiming at promoting sustainable food systems have to include smallholder-farmer households' interests and perspectives on agricultural production and food and nutrition security.

7 Discussion

7.1 Finding in the light of other research

7.1.1 Salutogenesis, life course and positive deviants

In line with Devine et al. (1998) and Rosen (2015) this study showed how childhood experiences shaped respondents' connection with food. Even though respondents highlighted an increased availability of food during their life-course, consumption patterns have not diverged much from traditional diets consumed by previous generations. The positive connotation associated to traditional food was probably transmitted through the interaction around food within the family. This further supports the importance of promoting positive family interactions around food, as suggested by Rosen (2015).

At the moment of the interviews, most of the respondents were between 40 and 60 years old. From this, it can be assumed that success is a long-term process due to the accumulation of experience during the life-course. Turning points that had a positive influence on respondents' ways of producing and consuming food were: i) inheritance or purchasing of land; ii) introduction of better agricultural input; iii) improved access to the market, iv) participation to agricultural and nutritional trainings.

Transitions had a role in shaping respondents' orientations towards agriculture and food. In particular, most of the respondents had in common a smooth transition from the parental to the conjugal house. The majority reported parent's support in this transition and they associated an increase sense of wellbeing connected with this experience.

This study showed how a life-course perspective associated with a salutogenic approach can be useful not only for understanding factors, trajectories and adaptive strategies that lead to health outcomes but also for understanding how these over-life dynamics contribute to move towards wealthier lives. Health here assumes a broader connotation of wellbeing, including also material means. Even though, so far salutogenesis has mainly focused on the binomial health/Sense of Coherence there is no reason for not expanding this approach to other disciplines as suggested by Shifra Sagy and Adi Mana in Mittelman et al. (2017).

Factors influencing healthful eating have been broadly studied from a salutogenic perspective. Although SOC of respondents was not measured in this study, from the narratives it was possible to observe some elements related with the three components of the SOC (meaningfulness, comprehensibility, and manageability). For example, respondents found meaningfulness for their actions in family unity and other values. In the interviews it is possible to find extracts of self-reflection and more extended thoughts on society that show a developed orientation to comprehend their reality. Moreover, farmers were able to effectively manage the resources at hand.

From this study emerged that Myanmar farmers were able to regain stability and structure after stressful life events, and apply craftiness and fortitude during challenging moments. These skills were connected with healthy eating habits in a similar study conducted in the Netherlands (Rosen, 2015).

Other contextual factors promoting healthy eating habits emerged from this study. For instance, women interviewed were able to reproduce nutritional facts. However, this knowledge seemed not very significant in influencing people's diets as in the study of Swan (2016). Swan suggested that often declarative knowledge (knowing the facts about nutritious food) is less influential than procedural knowledge (how to acquire certain skills in relation to food) on people's diets. In line with this, among respondents of this study, women defined themselves as skilful in the art of selecting, purchasing and preparing good meals for their family.

Social-environmental factors have been proven to influence healthy eating habits. The importance of bonding and the fact respondents never lived alone favoured their health and wellbeing as in the study by Rosen (2015). Higher perceived neighbourhood collective efficacy is another predictor for healthy

eating habits (Swan, 2016). This element emerged from the narratives when respondents referred to the village as source of unity and solidarity. In addition, the physical environments influenced over-time the possibility of respondents to access healthy food as emerged in Swan (2016).

As suggested by Rosen (2015), the salutogenic approach has been used in this study to explore positive deviance. As in previous research, this approach helped to identify affordable, acceptable and sustainable strategies already in place that have high potential to be adopted and shared in the context of the research (Marsh et al., 2004). Selection criteria for positive deviants are highly dependent from the context of the research (Biggs, 2008). In previous studies involving positive deviants, farmers making most money, owning the land and not being indebted were considered inclusive criteria (de Adelhart Toorop & Gosselink, 2013). For this study, particular importance has been given to land acquisition due to the fact that most people in the area were still excluded from land ownership and land reforms had rarely favoured smallholder farmers.

7.1.2 Social innovation

Most of the social innovation strategies reported in this study did not follow a technological innovation, but could be defined as socio-political or socio-organisational innovations derived from the recent possibility of citizens to exercise their rights of free association (Wigboldus, 2016). Village level organisations promoted grassroot solutions for pressing societal issues (the common mill) and some individuals were willing to organise more systemic innovation involving organisational and institutional frameworks (van der Have & Rubalcaba, 2016). However, these last forms of social innovation were still at embryonal stage at the moment of the research showing that social innovation relates to both thinking and acting (Wigboldus, 2016).

7.2 Pathways for linking agricultural commercialisation to nutritious food consumption

As part of the research project 'Development pathways for agricultural commercialisation to nutrition' (Herens et al., 2017), this study built on a conceptual framework (Figure 1) for the analysis of pathways for linking agricultural commercialisation to nutritious food consumption.

All the farmers part of this study were involved in an agricultural transformation process, shifting from a subsistence-oriented production toward more market oriented agriculture, as in line with Jaleta, Gebremedhin and Hoekstra definition of commercialisation (2009). In discordance to the definition during this process farmers did not specialise to become more efficient, but instead diversified their agricultural production in order to be more resilient to market price fluctuations. Farmers were aware of some adverse effects of commercial agriculture and were implementing responses to limit environmental consequences especially regarding the increased use of agricultural chemicals (organic agriculture). Overall, the process of commercialisation did not bring to a decline in the crop diversity per household as instead observed by Rerkasem et al. (2009). Effects of mechanisation could not have been studied, since in the research area most of the respondents were still using animal traction. Similarly, land grabbing and other political issues related to land ownership could not be fully explored due to limitation in freedom of speech present in the country.

In this study, household level strategies to reach food and nutrition goals while engaging in commercialisation emerged. On one hand, in order to safeguard their health from contaminants, farmers grew organic vegetable for household consumption. On the other hand, farmers used chemical fertilisers and pesticides for commercial purposes. Organic household production showed to be a key entry point for diet diversification and therefore for food and nutrition security. This pathway was identified as well by Meeker and Haddad (2013) However, the fact that farmers could not apply the same strategy for their commercial production highlight the lack of sustainable options in the food system in which these farmers are embedded. The important of food prices (i.e. organic consumption and production) emerged as influential as suggested by Meeker and Haddad (2013) Another pathway identified by Meeker and Haddad (2013) and present in the research area was a connection between income increase due to agricultural commercialisation and the increase of dietary diversity. The scarce availability of processed food in the local markets lead to an increase of fruit, vegetables meat and fish

consumption. This trend can change in the future, underling the importance of food environments in guaranteeing healthy diets. In this regard, nutritional knowledge may guide food selection toward more sustainable diets. Nutritional knowledge emerged from the narratives. However, respondents did not attribute significant changes in their way of food selection related with the acquisition of this knowledge. Other pathways identified by Meeker and Haddad (2013) related with the role of women. Women could take decisions in relation to both production and consumption of food. Women were in charge of food utilisation at household level. In addition, in some cases they were in charge of the farm and they could buy land. Income coming from off-farm source played an important role for the household wellbeing and especially for accessing food since all the respondents were dependent from the market for rice.

Aim of the framework elaborated by Herens et al., (2017) is to support the analysis of pathways linking commercialisation and nutritious food consumption. This study proved the importance of a multi-level framework that takes in account macro-, community and household level factors affecting farmers' household livelihood outcomes. Specifically, this framework helps to disentangle the agricultural household interactions with the external environment. This study showed the importance of locally embedded sense-making and decision-making processes to create pathways for commercialisation and FNS.

7.3 Strengths and limitations

This study presents several strengths. First, this study contributed to the scarce literature on farmers sense- and decision-making processes in Myanmar. In fact, most of the literature available is based on standardised surveys, while using a qualitative approach had the advantage to bring out the sense-making and understandings of farmers. Findings showed the importance of including smallholder farmers perspective in the discussion for a more sustainable food system, being farmers both producers and consumers. Another advantage of a qualitative approach is the possibility to bring forward local understandings of healthy food and the contextual factors that support healthy eating habits. Above all, this study contributed to the growing literature on the possible links between agriculture commercialisation and food and nutrition security, showing the complexity of choices individuals are involved in when mediating between economic and health goals. These insights can be useful for actors operating in the area, but they can be the basis for comparison with similar studies around the world for an identification of more effective interventions for nutrition-sensitive agriculture.

Second, this analysis intentionally chose not to start from needs and constraints and instead focused on good practices already in place. Studying positive deviants can provide a different starting point for interventions design. In this way interventions can build on already existing solutions that built on locally available resources. In addition, the choice of prioritising female respondents was useful to portrait gender roles.

Third, the use of narrative inquiry and the use of objects (time-line, pictures) to support the story-telling process was effective in creating a self-reflection and learning process involving both the respondents and the researchers. Time-lines helped the respondents to structure their narratives, especially in interviews with more than one respondent. In addition, the use of household objects and the interactive drawing of the time-line facilitates people interviewed to open and share their experiences. The use of pictures helped the researchers to capture local understandings.

Despite several points of strength, this study presents some limitations.

First, regarding the sample method, it has to be underlined that the sample strategy is intentionally biased to show positive cases, the so called 'flowers in the desert'. Those are exceptional cases which does not represent the average living conditions of the population of the Dry Zone.

Second, another shortcoming related to the sample strategy regards the subjective interpretation of 'positive' or 'successful'. Purposive sampling entails a process of selection based on a list of individuals meeting a set of criteria. In order to define criteria for success a literature review and a group interview with local key informant were conducted. Ideal criteria for this study would have been improvement in indicators such as dietary diversity and yields. Unfortunately, the lack of quantitative data on FNS and agriculture development in the area challenged this procedure. The selection of cases

was mainly based on discussion with a local NGO's project manager who had the experience to conduct a before-after evaluation among the project's target population and therefore identify cases that improved their conditions in the research area.

Third, it has to be considered that narrative inquiry is a challenging method. A first issue is related with the right balance between allowing the respondent to freely express and at the same time collecting meaningful data. This process was even more challenging to implement in this case since a process of translation was involved. For this reason, the translator was trained on the method beforehand. However, active listening, the ability to initiate and lead open conversations are skills that develop with time and practice. A list of topics was provided to the translator. This led to a more structured kind of questioning compared to the ideal implementation that narrative inquiry implies.

Last, a major constraint for this research was that political-related events and considerations were rarely mentioned and probably intentionally omitted by respondents. Moreover, researchers were asked to avoid political topics that could put respondents at risk.

7.4 Recommendations

In this section, some recommendations for future research, interventions and policies are proposed building from the limitations of this study.

First, some suggestions related to the study approach are advanced:

- Positive deviant research: this study based the definition of positive deviants on local consultation with local stakeholders. A suggestion for future research is to combine this approach to quantitative assessments. For example, in this case an option would have been to add households scoring high in dietary diversity assessment and with improvements in yields;
- Transdisciplinary approach to salutogenesis: moving salutogenic research beyond the binomial health/SOC means incorporate a multidisciplinary lens to this field of research as suggested by Shifra Sagy and Adi Mana in Mittelmark et al. (2017). This study represents a tentative to explore the connection of wealth and SOC. Further research in this direction can provide new insights on the positive implications of developing a strong SOC;
- Intergenerational study: at the moment of the interview, households involved are experiencing a transition from small scale production to a growing presence of commercialisation, and longer and more complex supply chains. The influence of this transition on new generations slowly moving out from agriculture and more and more accustomed to processed food will be an interesting opportunity to study over-generational SOC development across generations;
- Researcher posture: this consideration regards the position of researchers facing the challenge of analysing realities where asymmetric power relations affect part of the population. Adopting the neutral posture typical of science involves the risk of being manipulated by the powerholders with a possible further increase of inequalities. However, being a researcher an external subject not embedded in the local context, he/she may not have the legitimacy to take a clear position. A third position to overcome this dilemma is the one elaborated by Barnaud & Van Paassen (2013) called the "critical companion" posture, which give the researcher the role to explicit power inequalities and bring to light goals and stakes of powerholders so vulnerable groups can recognise them as legitimate or not.

Second, recommendations based on this study findings are outlined:

- Impact of nutritional education programmes: as emerged from this study declarative knowledge transmitted through educational trainings did not seem having significant implications in people selection of food. The inclusion of procedural knowledge in food and nutrition security programmes and the impact of procedural knowledge transmission rather than declarative could represent an interesting field of research;
- Local understanding of diets as entry points for nutritional interventions: this study shows how diets local understandings provide insights on possible entry points for nutritional sensitive agriculture.

For example, in this case farmers intention to grow organic food for household consumption may represent the starting point for nutrition sensitive home gardening;

- Social innovation scaling up: social innovations described in this report face the risk to remain isolated examples. Bottom – up initiative should inspire policy makers profit and non- profit organizations and movements from civil society in finding better solutions in respect to the current challenges of Myanmar regarding agricultural development and food and nutrition security;
- Impact of smartphones and social media: mobile phones will play a growing role in supporting farmers' access to information. The impact of this wave of technological innovation and its social implication in farmer's life is an unexplored field for research in Myanmar. Even though this aspect did not clearly emerge from this sample, the phenomenon has its importance in the country;
- Farmers' knowledge access: this study relied on a scarce basin of empirical data, especially regarding FNS assessment in the research area. There is an urgent need to establish a nationwide systematic, transparent and reliable system of data collection. Policy makers, development actors and the private sector are all in need of quality data to address their programmes. Above all, farmers are in need to access more reliable sources of information. In fact, at the moment smallholder farmers in Myanmar stand in a very vulnerable situation regarding information access. They often have to base their decisions on something heard in a tea-shop or read on Facebook. This situation, put farmers in a condition of being easily manipulated. Due to the controversial political situation of the country is not clear whether there is a real intention at government level to provide citizens with real and transparent information. Other possibilities for further share knowledge can come from civil society. (I)NGO have the expertise and capability to build solid and participatory M&E systems which can provide reliable sources of data to farmers. More than one respondent expressed the interest in collaborating with local universities. Scientific knowledge can be shared through participatory technologies such as smartphone applications that are already available for farmers;
- Resilient livelihoods promotion: this research is a tentative to show a different perspective from which starting to build interventions. What emerged in this case is that diversification of livelihoods and social and emotional components play a major role in guaranteeing successful outcomes. This is quite different from specialisation and intensification strategies often promoted by agri-businesses. This is also different from the (I)NGOs project-based mentality which usually offers standardised solutions and restricts farmers in mono-directional livelihoods. This study shows how important holistic solutions and resilient strategies are for success. Therefore, reproducing the flexibility and resilience of successful farmers should be a key element to integrate in project strategies. Having a diversified set of livelihoods allows farmers to experiment and innovate while holding a strong fall-back position represented by other sources of income. In addition, this study showed how emotional and economic support during youth can represent a solid base for the future. In some cases, families can not cover this role and therefore other actors should invest in this important transition by, for example, provide youth with seed money for start-up their own business. Overall, this study seeks to underline the importance for policies and interventions to be informed by participatory and holistic baseline assessment where the theory of change of all the relevant stakeholders is taken in account.

8 References

- Amankwah, K., Klerkx, L., Oosting, S. J., Sakyi-Dawson, O., Van der Zijpp, A. J., & Millar, D. (2012). Diagnosing constraints to market participation of small ruminant producers in northern Ghana: An innovation systems analysis. *NJAS-Wageningen Journal of Life Sciences*, 60, 37-47.
- Anderman, T. L., Remans, R., Wood, S. A., DeRosa, K., & DeFries, R. S. (2014). Synergies and tradeoffs between cash crop production and food security: a case study in rural Ghana. *Food security*, 6(4), 541-554.
- Arimond, M., Hawkes, C., Ruel, M., Sifri, Z., Berti, P. R., Leroy, J., . . . Frongillo, E. A. (2011). Agricultural interventions and nutrition: lessons from the past and new evidence. In B. Thompson & L. Amoroso (Eds.), *Combating micronutrient deficiencies: food-based approaches* (pp. 41-75). Rome: FAO.
- Ashley, C., & Carney, D. (1999). *Sustainable livelihoods: Lessons from early experience*. Retrieved from AGRIS FAO website: https://www.librarything.com/.../Ashley_Sustainable_livelihood_lessons_learned.pdf
- Barnaud, C., & Van Paassen, A. (2013). Equity, power games, and legitimacy: dilemmas of participatory natural resource management. *Ecology and Society*, 18(2).
- Berti, P.R., Krusevec, J., & FitzGerald, S. (2004). A review of the effectiveness of agriculture interventions in improving nutrition outcomes. *Public health nutrition*, 7(05), 599-609.
- Biggs, S. (2008). Learning from the positive to reduce rural poverty and increase social justice: institutional innovations in agricultural and natural resources research and development. *Experimental Agriculture*, 44(01), 37-60.
- Bisogni, C. A., Jastran, M., Shen, L. N., & Devine, C. M. (2005). A biographical study of food choice capacity: Standards, circumstances, and food management skills. *Journal of Nutrition Education and Behavior*, 37(6), 284-291. [http://doi.org/10.1016/S1499-4046\(06\)60158-9](http://doi.org/10.1016/S1499-4046(06)60158-9)
- Black, R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., Onis, M. De, Ezzati, M., ... Rivera, J. (2008). Maternal and child undernutrition: global and regional exposures and health consequences. *The Lancet*, (1), 5–22. [http://doi.org/10.1016/S0140-6736\(07\)61690-0](http://doi.org/10.1016/S0140-6736(07)61690-0)
- Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., . . . Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427-451. doi: [http://dx.doi.org/10.1016/S0140-6736\(13\)60937-X](http://dx.doi.org/10.1016/S0140-6736(13)60937-X)
- Bowling, A., & Ebrahim, S. (2005). *Handbook of health research methods: investigation, measurement and analysis*. McGraw-Hill Education (UK).
- Busanich, R., McGannon, K. R., & Schinke, R. J. (2012). Expanding understandings of the body, food and exercise relationship in distance runners: A narrative approach. *Psychology of Sport and Exercise*, 13(5), 582-590. doi: <http://dx.doi.org/10.1016/j.psychsport.2012.03.005>
- Carletto, G., Ruel, M., Winters, P., & Zezza, A. (2015). Farm-Level Pathways to Improved Nutritional Status: Introduction to the Special Issue. *The Journal of Development Studies*, 51(8), 945-957. <http://10.1080/00220388.2015.1018908>
- Caspi, C. E., Sorensen, G., Subramanian, S. V., & Kawachi, I. (2012). The local food environment and diet: a systematic review. *Health & place*, 18(5), 1172-1187.
- Clark, J. (2004). Food Stories. *Gastronomica: The Journal of Critical Food Studies*, 4(2), 43-50. <http://dx.doi.org/10.1525/gfc.2004.4.2.43>
- de Adelhart Toorop, R., & Gosselink, K. (2013). *Analysis of Positive Deviants Among Organic Dairy Farmers in The Netherlands*. (MSc Thesis). Retrieved from WUR Library Database.

-
- Delaney, M., & McCarthy, M. B. (2014). Saints, sinners and non-believers: the moral space of food. A qualitative exploration of beliefs and perspectives on healthy eating of Irish adults aged 50-70. *Appetite*, 73, 105-113. <http://dx.doi.org/10.1016/j.appet.2013.10.017>
- Devine, C. M. (2005). A life course perspective: Understanding food choices in time, social location, and history. *Journal of Nutrition Education and Behavior*, 37(3), 121-128. [http://dx.doi.org/10.1016/S1499-4046\(06\)60266-2](http://dx.doi.org/10.1016/S1499-4046(06)60266-2)
- Devine, C. M., Connors, M., Bisogni, C. A., & Sobal, J. (1998). Life-course influences on fruit and vegetable trajectories: Qualitative analysis of food choices. *Journal of Nutrition Education*, 30(6), 361-370. [http://dx.doi.org/10.1016/S0022-3182\(98\)70358-9](http://dx.doi.org/10.1016/S0022-3182(98)70358-9)
- Du, L., Pinga, V., Klein, A., & Danton, H. (2015). Chapter One-Leveraging Agriculture for Nutrition Impact through the Feed the Future Initiative. *Advances in food and nutrition research*, 74, 1-46.
- Dubé, L., Jha, S., Faber, A., Struben, J., London, T., Mohapatra, A., ... & McDermott, J. (2014). Convergent innovation for sustainable economic growth and affordable universal health care: innovating the way we innovate. *Annals of the New York Academy of Sciences*, 1331(1), 119-141.
- Edquist, S., Koch, P., & Contento, I. R. (2009). Understanding Adolescent Food Choices Through Personal Food Stories. [SNE 2009 Annual Conference Proceedings 42nd Annual Conference Food Security: Local to Global]. *Journal of Nutrition Education and Behavior*, 41(4, Supplement), S16-S17. doi: <http://dx.doi.org/10.1016/j.jneb.2009.03.093>
- FAO. (1996). *World Food Summit*. Retrieved from FAO website: www.fao.org/forestry/13128-0e6f36f27e0091055bec28ebe830f46b3.pdf
- FAO. (2012). *Sustainable diets and biodiversity. Directions and solutions for policy, research and action*. Retrieved from FAO website: www.fao.org/docrep/016/i3004e/i3004e.pdf
- Fisher, J. (2015, December 03). Myanmar's 2015 landmark elections explained. *BBC*. Retrieved from BBC website: www.bbc.com/news/world-asia-33547036
- Frankenberger, T. R., & McCaston, M. K. (1998). The household livelihood security concept. *Food Nutrition and agriculture*, 30-35.
- Gebremedhin, B., & Jaleta, M. (2010). *Commercialization of smallholders: Does market orientation translate into market participation?* Retrieved from CGIAR website: <https://cgspace.cgiar.org/handle/10568/3015>
- Gillespie, S., Harris, J., & Kadiyala, S. (2012). *The Agriculture-nutrition disconnect in india: what do we know?* Retrieved from IFPRI website: <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/126958>
- HLPE. (2014). *Food losses and waste in the context of sustainable food systems. High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*. Retrieved from FAO website: www.fao.org/3/a-i3901e.pdf
- Hawkes, C., & Ruel, M. T. (2007). *From agriculture to nutrition: Pathways, synergies and outcomes*. Retrieved from the World Bank website: <http://documents.worldbank.org/curated/en/241231468201835433/From-agriculture-to-nutrition-pathways-synergies-and-outcomes>
- Herens, M., Peters, B., Bosch, D., van der Maden, E., Linderhof, V., Achterbosh, T. & Verhagen, J. (2017). A framework for identifying pathways for commercially viable agriculture stimulating consumption of nutritious foods. (*Desk study*), Wageningen: CDI.
- Herforth, A., & Harris, J. (2014). Understanding and applying primary pathways and principles *Improving Nutrition through Agriculture Technical Brief Series* (Vol. Brief #1). Arlington, USA: USAID: Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project.

-
- Hocking, C., Clair, V. W. S., & Bunrayong, W. (2002). The Meaning of Cooking and Recipe Work for Older Thai and New Zealand Women. *Journal of Occupational Science*, 9(3), 117-127. <http://dx.doi.org/10.1080/14427591.2002.9686499>
- Hunter, D., & Fanzo, J. (2013). Agricultural biodiversity, diverse diets and improving nutrition. *Diversifying Food and Diets: Using Agricultural Biodiversity to Improve Nutrition and Health*, 1-14.
- Jaleta, M., Gebremedhin, B., & Hoekstra, D. (2009). Smallholder commercialization: processes, determinants and impact. In *Improving Productivity and Market Success of Ethiopian Farmers Improving Market Opportunities* (Vol. Discussion Paper). Addis Ababa: International livestock research institute (ILRI).
- James, A., & Curtis, P. (2010). Family Displays and Personal Lives. *Sociology*, 44(6), 1163-1180. doi: 10.1177/0038038510381612
- Kanter, R., Walls, H., Tak, M., Roberts, F., & Waage, J. (2015). A conceptual framework for understanding the impacts of agriculture and food system policies on nutrition and health. *The Science, Sociology and Economics of Food Production and Access to Food*, 7(4), 767-777. <http://dx.doi.org/10.1007/s12571-015-0473-6>
- Kawarazuka, N. (2010). The contribution of fish intake, aquaculture, and small-scale fisheries to improving food and nutrition security: a literature review. *WorldFish Center Working Paper* (2106).
- Keenan, D. P., Abusabha, R., Sigman-Grant, M., Achterberg, C., & Ruffing, J. (1999). Factors Perceived to Influence Dietary Fat Reduction Behaviors. *Journal of Nutrition Education*, 31(3), 134-144. [http://dx.doi.org/10.1016/s0022-3182\(99\)70420-6](http://dx.doi.org/10.1016/s0022-3182(99)70420-6)
- Lindström, B., & Eriksson, M. (2010). *The hitchhiker's guide to salutogenesis: Salutogenic pathways to health promotion*. Folkhälsan research center, Health promotion research.
- Lowder, S. K., Scoet, J., & Raney, T. (2016). *The number, size, and distribution of farms, smallholder farms, and family farms worldwide*. *World Development*, 87, 16-29.
- Marsh, D. R., Schroeder, D. G., Dearden, K. A., Sternin, J., & Sternin, M. (2004). The power of positive deviance. *BMJ: British Medical Journal*, 329(7475), 1177.
- Masset, E., Haddad, L., Cornelius, A., & Isaza-Castro, J. (2011). A systematic review of agricultural interventions that aim to improve nutritional status of children. London: : EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.
- McCormack, L., Lewis, V., & Wells, J. R. (2014). Early Life Loss and Trauma: Eating Disorder Onset in a Middle-Aged Male—A Case Study. *American Journal of Men's Health*, 8(2), 121-136. <http://dx.doi.org/10.1177/1557988313496838>
- McDermott, J., Ait-Aïssa, M., Morel, J., & Rapando, N. (2013). Agriculture and household nutrition security—development practice and research needs. *Food Security*, 5(5), 667-678. <http://dx.doi.org/10.1007/s12571-013-0292-6>
- Meeker, J., & Haddad, L. (2013). A state of the art review of agriculture-nutrition linkages *An AgriDiet Position Paper*. Cork, Ir.: Department of Food Business and Development, University College Cork
- MHDO. (2017). *Dry Zone Food for Asset Creation Project-WFP, Pakokku & Ngape Townships, Magwe Region*.
- Miller, D. D., & Welch, R. M. (2013). Food system strategies for preventing micronutrient malnutrition. *Food Policy*, 42, 115-128.
- Mittelmark, M. B., Sagy, S., Eriksson, M., Bauer, G. F., Pelikan, J. M., Lindström, B., & Espnes, G. A. (2017). *The handbook of salutogenesis*. Springer.
- Mumford, M. D. (2002). Social innovation: ten cases from Benjamin Franklin. *Creativity research journal*, 14(2), 253-266.

-
- Newcombe, M. A., McCarthy, M. B., Cronin, J. M., & McCarthy, S. N. (2012). "Eat like a man". A social constructionist analysis of the role of food in men's lives. [The 36th annual meeting of the British Feeding and Drinking Group, March 29th and 30th 2012, Brighton, UK]. *Appetite*, 59(2), 391-398. doi: <http://dx.doi.org/10.1016/j.appet.2012.05.031>
- Nicholls, A., Simon, J., Gabriel, M., & Whelan, C. (Eds.). (2016). *New frontiers in social innovation research*. Springer
- O'Kane, G., & Pamphilon, B. (2016). The importance of stories in understanding people's relationship to food: Narrative inquiry methodology has much to offer the public health nutrition researcher and practitioner. *Public Health Nutrition*, 19(4), 585-592. <http://dx.doi.org/10.1017/S1368980015002025>
- Ochieng, C. M. O. (2007). Development through positive deviance and its implications for economic policy making and public administration in Africa: The case of Kenyan agricultural development, 1930–2005. *World Development*, 35(3), 454-479.
- Pascale, R. T., Sternin, J., & Sternin, M. (2010). *The power of positive deviance: How unlikely innovators solve the world's toughest problems* (Vol. 1). Harvard Business Press.
- Pant, L. P., & Hambly Odame, H. (2009). The promise of positive deviants: bridging divides between scientific research and local practices in smallholder agriculture. *Knowledge management for development journal*, 5(2), 160-172.
- Papathomas, A., & Lavallee, D. (2011). Narrative Constructions of Anorexia and Abuse: An Athlete's Search for Meaning in Trauma. *Journal of Loss and Trauma*, 17(4), 293-318. <http://dx.doi.org/10.1080/15325024.2011.616740>
- Peters, E., McCaul, K., Stefanek, M., & Nelson, W. (2006). A heuristics approach to understanding cancer risk perception: Contributions from judgment and decision-making research. *Annals of Behavioral Medicine*, 31(1), 45-52. http://dx.doi.org/10.1207/s15324796abm3101_8
- Pieters, H., Guariso, A., & Vandeplass, A. (2013). *Conceptual framework for the analysis of the determinants of food and nutrition security*. Retrieved from Food secure website: <http://www.foodsecure.eu/publicationDetail.aspx?id=41>
- Pingali, P. L., & Rosegrant, M. W. (1995). Agricultural commercialization and diversification: processes and policies. *Food policy*, 20(3), 171-185.
- Pingali, P. L. (2001). Environmental consequences of agricultural commercialization in Asia. *Environment and Development Economics*, 6(4), 483-502.
- Pinstrup-Andersen, P. (2007). Agricultural research and policy for better health and nutrition in developing countries: a food systems approach. *Agricultural Economics*, 37(s1), 187-198.
- Polkinghorne, D. E. (2007). Validity Issues in Narrative Research. *Qualitative Inquiry*, 13(4), 471-486. <http://dx.doi.org/10.1177/1077800406297670>
- Reardon, T., Chen, K. Z., Minten, B., Adriano, L., Dao, T. A., Wang, J., & Gupta, S. D. (2014). The quiet revolution in Asia's rice value chains. *Annals of the New York Academy of Sciences*, 1331(1), 106-118.
- Riley, M. (2010). Emplacing the research encounter: exploring farm life histories. *Qualitative Inquiry*, 16(8), 651-662.
- Rerkasem, K., Lawrence, D., Padoch, C., Schmidt-Vogt, D., Ziegler, A. D., & Bruun, T. B. (2009). Consequences of swidden transitions for crop and fallow biodiversity in Southeast Asia. *Human Ecology*, 37(3), 347-360.
- Rosen, L. (2015). *Salutogenic lives: stories of healthy eaters* (Master thesis). Retrieved from WUR Library Database.
- Ruel, M. T. (2001). Can food-based strategies help reduce vitamin A and iron deficiencies?: a review of recent evidence (Vol. 5). Washington D.C., USA: IFPRI.
- Von Braun, J. (1995). Agricultural commercialization: impacts on income and nutrition and implications for policy. *Food Policy*, 20(3), 187–202.
- Ruel, M. T., & Alderman, H. (2013). Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition? *The Lancet*, 382(9891), 536-551. doi: [http://dx.doi.org/10.1016/S0140-6736\(13\)60843-0](http://dx.doi.org/10.1016/S0140-6736(13)60843-0)

-
- Savin-Baden, M., & Niekerk, L. V. (2007). Narrative Inquiry: Theory and Practice. *Journal of Geography in Higher Education*, 31(3), 459-472. <http://dx.doi.org/10.1080/03098260601071324>
- Sheridan, J., & Chamberlain, K. (2011). The Power of Things. *Qualitative Research in Psychology*, 8(4), 315-332. <http://dx.doi.org/10.1080/14780880903490821>
- Skinner, G. W. (1997). Family systems and demographic processes. *Anthropological demography: Toward a new synthesis*, 53-95.
- Spielman, D. J., Ekboir, J., & Davis, K. (2009). The art and science of innovation systems inquiry: Applications to Sub-Saharan African agriculture. *Technology in Society*, 31(4), 399-405.
- Swan, E., Bouwman, L., Hiddink, G. J., Aarts, N., & Koelen, M. (2015). Profiling healthy eaters. Determining factors that predict healthy eating practices among Dutch adults. *Appetite*, 89, 122-130.
- Thompson, B., & Amoroso, L. (2014). *Improving diets and nutrition: food-based approaches*. CABI.
- Swinburn, B., Dominick, C., & Vandevijvere, S. (2014). *Benchmarking Food Environments: Experts' Assessments of Policy Gaps and Priorities for the New Zealand Government*. University of Auckland, Faculty of Medical and Health Sciences, School of Population Health.
- UNDP. (2016, 05 May 2017). Sustainable Development Goals (SDGs). Retrieved from UNDP website: <http://www.undp.org/content/undp/en/home/sdgooverview/post-2015-development-agenda.html>
- UNSCN. (2013). *Nutrition impact of food systems*. Retrieved from UNSCN website: http://unscn.org/files/Annual_Sessions/UNSCN_Meetings_2013/Meeting_of_the_Minds_summary_report_09July.pdf.
- USAID. (2016). *Convergence and tension in nutrition-sensitive agricultural market development activities*. Retrieved from USAID website: <https://www.usaid.gov/what-we-do/global-health/nutrition/technical-areas/convergence-and-tension-nutrition-sensitive>
- Von Braun, J. (1995). Agricultural commercialization: impacts on income and nutrition and implications for policy. *Food Policy*, 20(3), 187-202.
- Van der Have, R. P., & Rubalcaba, L. (2016). Social innovation research: An emerging area of innovation studies? *Research Policy*, 45(9), 1923-1935. doi: <http://dx.doi.org/10.1016/j.respol.2016.06.010>
- We are Social & Hootsuite, (2017). Digital in 2017. Global Overview. Retrieved from We Are Social website: <https://wearesocial.com/special-reports/digital-in-2017-global-overview>
- Webb, P. (2013). Impact Pathways from Agricultural Research to Improved Nutrition and Health: Literature Analysis and Research Priorities. *Background Paper prepared for the ICN2*. Rome: FAO. Retrieved from: http://www.fao.org/fileadmin/user_upload/agn/pdf/Webb_FAO_paper__Webb_June_26_2013_.pdf
- Westhoek, H., van Berkum, S., Özyay, L., & Hajer, M. (2016). *Food systems and natural resources*. Retrieved from Resource Panel website: <http://www.resourcepanel.org/file/395/download?token=JqcqyisH>.
- Webb, P., & Kennedy, E. (2014). Impacts of Agriculture on Nutrition: Nature of the Evidence and Research Gaps Food and Nutrition Bulletin, 35(1), 126 -132 *Background Paper Prepared for the ICN2 Second International Conference on Nutrition*. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/24791585>
- Wengraf, T. (2001). *Qualitative research interviewing: Biographic narrative and semi-structured methods*: Sage.
- Westley, F., & Antadze, N. (2010). Making a difference: Strategies for scaling social innovation for greater impact. *Innovation Journal*, 15(2).
- Wethington, E., & Johnson-Askew, W. (2009). Contributions of the Life Course Perspective to Research on Food Decision Making. *Annals of Behavioral Medicine*, 38(1), 74-80. <http://dx.doi.org/10.1007/s12160-009-9123-6>
- Wigboldus, S. (2016). *Ten types of social innovation – a brief discussion paper*. CDI working paper.

Sources literature review

Articles

- Aung, M. S., Masuda, H., Kobayashi, T., Nakanishi, H., Yamakawa, T., & Nishizawa, N. K. (2013). Iron Biofortification of Myanmar Rice. *Frontiers in Plant Science*, 4(May), 1–14. <https://doi.org/10.3389/fpls.2013.00158>
- Bloem, M. W., de Pee, S., Hop, L. T., Khan, N. C., Lailou, A., Minarto, ... Wasantwisut, E. (2013). Key strategies to further reduce stunting in Southeast Asia: lessons from the ASEAN countries workshop. *Food and Nutrition Bulletin*, 34(2 Suppl), 8–16. <https://doi.org/10.1177/15648265130342S103>
- Davis, W. W., Mullany, L. C., Schissler, M., Albert, S., & Beyrer, C. (2015). Militarization, human rights violations and community responses as determinants of health in southeastern Myanmar: results of a cluster survey. *Conflict and Health*, 9(1), 32. <https://doi.org/10.1186/s13031-015-0059-0>
- Haggblade, S., Boughton, D., Cho, K. M., & Denning, G. (2014). Strategic Choices Shaping Agricultural Performance and Food Security in Myanmar. *Journal of International Affairs*, 67(2), 54–71.
- Htet, M. K., Dillon, D., Akib, A., Utomo, B., Fahmida, U., & Thurnham, D. I. (2012). Microcytic anaemia predominates in adolescent school girls in the delta region of Myanmar. *Asia Pacific Journal of Clinical Nutrition*, 21(3), 411–415.
- Kattelus, M., Rahaman, M. M., & Varis, O. (2014). Myanmar under reform: Emerging pressures on water, energy and food security. *Natural Resources Forum*, 38(2), 85–98. <https://doi.org/10.1111/1477-8947.12032>
- Lin, W. Y., & Yamao, M. (2012). An Assessment of Food Control System and Development Perspective: The case of Myanmar. *World Academy of Science, Engineering and Technology*, 69(9), 751–757
- McCarthy, S. (2016). Land tenure security and policy tensions in Myanmar (Burma). *Asia Pacific Issues*, 2016(127), 1–8.
- Odaka, K. (Ed.). (2015). *The Myanmar Economy: Its Past, Present and Prospects*. Springer.
- Parmar, P. K., Barina, C. C., Low, S., Tun, K. T., Otterness, C., Mhote, P. P., ... Richards, A. K. (2015). Health and human rights in eastern Myanmar after the political transition a population-based assessment using multistaged household cluster sampling. *PLoS ONE*, 10(5), 1–19. <https://doi.org/10.1371/journal.pone.0121212>
- Rammohan, A., & Pritchard, B. (2014). The role of landholding as a determinant of food and nutrition insecurity in rural Myanmar. *World Development*, 64, 597–608.
- Rutsaert, A. P., Akter, S., Luis, J. S., Htwe, N. M., San, S. S., Raharjo, B., & Arlyna, B. (2017). Women's empowerment and gender equity in agriculture: A different perspective from Southeast Asia. *Food Policy*, 69, 1–31. <https://doi.org/10.1016/j.foodpol.2017.05.003>
- Thet, M. M., Richards, L.-M., Sudhinaraset, M., Paw, N. E. T., & Diamond-Smith, N. (2016). Assessing Rates of Inadequate Feeding Practices Among Children 12–24 months: Results from a Cross-Sectional Survey in Myanmar. *Maternal and Child Health Journal*, 20(8), 1688–1695. <https://doi.org/10.1007/s10995-016-1968-2>
- Weinberger, K. (2013). Home and community gardens in Southeast Asia: Potential and opportunities for contributing to nutrition-sensitive food systems. *Food Security*, 5(6), 847–856. <https://doi.org/10.1007/s12571-013-0299-z>

Win, A. Z. (2016). Micronutrient deficiencies in early childhood can lower a country's GDP: The Myanmar example. *Nutrition*, 32(1), 138–140. <https://doi.org/10.1016/j.nut.2015.06.011>

YuYu, T., & Hye-Jung, K. (2015). An Analysis on the Factors Affecting Rice Production Efficiency in Myanmar. *Journal of East Asian Economic Integration*, 19(2), 167–188. <https://doi.org/10.11644/KIEP.JEAI.2015.19.2.295>

Reports

Action contre la Faim. (2012). Myanmar. Sustain a 'nutrition-sensitive' food security intervention.

Retrieved from Action contre la Faim website:

http://www.actioncontrelafaim.org/sites/default/files/publications/fichiers/acf_myanmar_aligning_case_study_en_aug_2012_id.pdf.

CAPSA. Assessment of Stakeholder Interventions for Sustainable Agriculture in Myanmar's Dry Zone.

Retrieved from UNCAPSA website: <http://uncapsa.org/?q=publications/assessment-stakeholder-interventions-sustainable-agriculture-myanmar%E2%80%99s-dry-zone>.

CDI. (2017). Explorative Global Food and Nutrition Security mission to Myanmar 2017. Mission Report.

DHS Program. (2017). Myanmar Demographic and Health Survey 2015-16. Retrieved from DHS program website: <http://dhsprogram.com/publications/publication-fr324-dhs-final-reports.cfm>

Embassy of the Kingdom of the Netherlands (EKN). (2015). Agriculture in Myanmar. Retrieved from Netherlands Enterprise Agency:

<https://www.rvo.nl/sites/default/files/2016/03/Agriculture%20Factsheet.pdf>

European Commission. (2015). Myanmar Nutrition Country Fiche. Retrieved from European Commission website: https://ec.europa.eu/europeaid/sites/devco/files/nutrition-fiche-myanmar-2016_en.pdf.

FAO & EC. (2011). Scoping study on food security and nutrition information in Myanmar. Retrieved from FAO website: <http://www.fao.org/economic/esa/publications/details/en/c/122479/>

FAO. (2013). Integrated Food Security Phase Classification. Myanmar report on Food Security & Nutrition Data Cataloging. Retrieved from FAO website: www.fao.org/3/a-at647e.pdf

Hunger and Nutrition Commitment Index. (HANCI). (2014). Key data for Myanmar. Retrieved from HANCI website: <http://www.hancindex.org/countries/myanmar/>

ICCO et al. (2015) Multi-stakeholder Roundtable on Gender and Food Security. Retrieved from Myanmar Food Security Working Group: <http://www.myanmarfswg.org/en/publication/multi-stakeholder-roundtable-gender-and-food-security-february-2015>

Institute for Security & Development Policy. (2010). Myanmar economy: a comparative view.

Retrieved from ISDP website: http://isdp.eu/content/uploads/publications/2009_myint_myanmar-economy.pdf

International Crisis Group. (2016). Myanmar: A New Muslim Insurgency in Rakhine State (Report 283 / Asia). Retrieved from Crisis Group website: <https://www.crisisgroup.org/asia/south-east-asia/myanmar/283-myanmar-new-muslim-insurgency-rakhine-state#>

International Food Policy Research Institute (IFPRI). (2015). 2015 Nutrition country profile: Myanmar. Retrieved from IFPRI website: <http://www.ifpri.org/publication/nutrition-country-profile-myanmar>

International Organization for Migration (IOM). (2016). Migrants from Myanmar and Risks Faced Abroad: A desk study. Retrieved from IOM website: <http://publications.iom.int/books/migrants-myanmar-and-risks-faced-abroad-desk-study>

-
- LEAP201. (2014). Bridges to impact: A new paradigm for agri-social enterprises in Cambodia and Myanmar. Retrieved from LEAP201 website: http://leap201.org/wp-content/uploads/2014/11/LEAP_agri-SE-report_Final_WEB.pdf.
- LEARN project. (2014). Technical Brief on Improving Nutrition Outcomes through Food Security & Livelihoods Programmes. Retrieved from Myanmar Save the Children website: [https://myanmar.savethechildren.net/sites/myanmar.savethechildren.net/files/library/2\)%20LEARN%20Technical%20Brief%20LIFT_%20Jan%202014.pdf](https://myanmar.savethechildren.net/sites/myanmar.savethechildren.net/files/library/2)%20LEARN%20Technical%20Brief%20LIFT_%20Jan%202014.pdf).
- LIFT Fund et al. (2015). Vegetable Consumption, Preferences and Supply Chain Myanmar. Retrieved from LIFT website: <http://www.lift-fund.org/vegetable-consumption-preferences-and-supply-chain-final-report-en>.
- LIFT Fund. (2013). Livelihoods and Food Security Trust Fund Household Survey 2013. Retrieved from ICF website: <https://www.icf.com/perspectives/reports/2014/livelihoods-and-food-security-trust-fund-lift-household-survey-2013>
- LIFT Fund. (2016). Analysis of farm production economics. Retrieved from LIFT website: <http://www.lift-fund.org/myanmar-analysis-farm-production-economics>
- Mercy Corps. (2015). What Holds Vegetables Farmers Back? Conflict, Governance and Markets Assessment. Making Vegetable Markets Work for Smallholders Program. Retrieved from LIFT Fund website: <http://www.lift-fund.org/what-holds-vegetables-farmers-back>
- Michigan State University et al. (2013). A strategic Agricultural Sector and Food Security Diagnostic for Myanmar. Retrieved from Michigan University website: http://fsg.afre.msu.edu/Myanmar/myanmar_agricultural_sector_diagnostic_july_2013.pdf.
- Myanmar Government. (2014a). Myanmar Agriculture in Brief (Part 1 and 2). Retrieved from LIFT fund website: <http://www.liftfund.org/sites/files/publication/Myan%20Agriculture%20in%20brief%202%20%282014%29.pdf>.
- Myanmar Government. (2014b). Country Statement of Myanmar Ministry of Agriculture and Irrigation. Retrieved from FAO website: http://www.fao.org/fileadmin/user_upload/faoweb/docs/MM3/Statements/Myanmar.pdf.
- Myanmar Government. (2016). Overview of agriculture policy in Myanmar. Retrieved from FFTC website: http://ap.ffc.agnet.org/ap_db.php?id=622
- NESAC. (2016). From Rice Bowl to Food Basket: Three Pillars for Modernizing Myanmar's Agricultural and Food Sector. Retrieved from LIFT website: <http://www.lift-fund.org/sites/lift-fund.org/files/publication/Myanmar%20Agricultural%20Reform%20White%20Paper.pdf>.
- Oxfam. (2013). A new dawn for equitable growth in Myanmar? Making the private sector work for small-scale agriculture. Retrieved from Oxfam website: <https://www.oxfam.org/sites/www.oxfam.org/files/ib-equitable-growth-myanmar-040613-en.pdf>.
- Oxfam. (2014). Delivering Prosperity in Myanmar's Dry zone. Lessons from Mandalay and Magwe on realizing the economic potential of small-scale farmers. Retrieved from Oxfam website: https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bp-myanmar-dryzone-smallscale-farmers-280814-en.pdf.
- Yezin University. (2017). The integrated crops management on climate friendly agriculture in Myanmar's food security. Retrieved from Cabdirect website: <https://www.cabdirect.org/cabdirect/abstract/20173134934>

-
- SIDA, UNICEF & UNDP. (2011). Integrated Household Living Conditions Survey in Myanmar (2009-2010). Retrieved from UNDP website:
www.mm.undp.org/content/dam/myanmar/docs/Publications/PovRedu/MMR_FA1_IA2_Technical%20Report-Eng.pdf.
- Transnational Institute. (2015). The meaning of land in Myanmar, a primer. Retrieved from the Transnational Institute website: <https://www.tni.org/en/publication/the-meaning-of-land-in-myanmar>
- UKaid et al. (2014). The Hunger and Nutrition Commitment Index (HANCI 2014). Retrieved from HANCI website: <http://www.hancindex.org/the-index/hanci-report/>
- UNDP. (2016). Human development report. Retrieved from UNDP website:
<http://hdr.undp.org/en/2016-report>.
- USAID & FANTA. (2014). Burma Nutrition Profile. Retrieved from FANTA project website:
<https://www.fantaproject.org/node/806>.
- USAID et al. (2013). Background Paper on Food and Nutrition Security in Myanmar. Retrieved from USAID website: http://pdf.usaid.gov/pdf_docs/PBAAB956.pdf.
- USAID et al. (2016). The Essential Role of Agriculture in Myanmar's Economic Transition. Retrieved from Feed the Future website:
http://foodsecuritypolicy.msu.edu/resources/the_essential_role_of_agriculture_in_myanmars_economic_transition.
- WFP & Save the Children. (2011). Food security Assessment in the Dry Zone Myanmar. Retrieved from WFP website:
<http://documents.wfp.org/stellent/groups/public/documents/ena/wfp234780.pdf?iframe>.
- WFP & Save the Children. (2014). Food security Assessment in the Dry Zone Myanmar, June 24th – July 18th, 2013. Retrieved from WFP website:
<https://www.wfp.org/sites/default/files/Dry%20zone%20survey%20-%20Nutrition%20presentation.pdf>.
- WFP. (2016). Nutrition WFP Myanmar. Retrieved from WFP website:
https://www.wfp.org/sites/default/files/WFPMYA_Nutrition_Apr16.pdf.
- World Bank. (2014). Myanmar Agricultural Development Bank: Initial Assessment and Restructuring Opinions. Retrieved from WB website:
<http://documents.worldbank.org/curated/en/241951468060547171/Myanmar-agricultural-development-bank-initial-assessment-and-restructuring-options>.
- World Bank. (2015). Nutrition at a glance: Myanmar. Retrieved from WB website:
<https://olc.worldbank.org/content/nutrition-country-profile-myanmar>.
- World Bank. (2016). Myanmar Economic Monitor: Growing Economic Vulnerabilities. Retrieved from WB website: <http://documents.worldbank.org/curated/en/232051468186846783/Myanmar-economic-monitor-growing-economic-vulnerabilities>.

Appendix 1 Interview guideline

Interview information

Village:

Interview date:

Interview number:

Introduction

Introduction of us.

What and why: We are Monica and Zaw Win, we are university students conducting a research for Wageningen University in the Netherlands to better understand how people experience food production and consumption in different stages of their lives. This research is conducted with the support of Myanmar Health Development Organisation (MHDO) and Greenovator but there is no direct link with any of their project or activities. Your answers will be collected in a report which can be useful for you and other parties (organisations, government, university, etc.) in working together with the aim of improving your and your family wellbeing. We are particularly interested in collecting your views and opinions, so there is no right or wrong answer. The reason you were contacted for this interview is because your story may represent a positive example for others and we are interested to discover how your life experience enable you to cope with different situations and how this lead to your current situation. We think we can learn a lot from you and we are interested to hear your stories.

Duration interview: The interview will last approx. an hour and a half

Recording: we would like to record the conversation with this recorder, are you ok with that? Start recording!

Consent: Taking part is voluntary and you are free to stop the interview at any moment if you don't wish to continue. Your name and your identity will remain confidential in any reports, publications or discussions.

If you have any question you can always ask. Do you have any question now?

By agreeing, you give consent to take part of this study and you confirm you understand all the details of the study which have been explained to you, all your questions have been fully answered and you agree to all the conditions of the study. Do you agree?

Part 1: Household roster and general information

Part 2: Food item selection and storyline drawing

Part 3: Narrative inquiry

Part 1 Household roster

Member Code	List all members of the household (mark the HH head)	Age	Gender	Relation to HH head	Marital status	Education	Occupation
		year	Male 1 Female 2 Other 3	*	**	***	****
	Present members						
M1							
M2							
M3							
M4							
M5							
M6							
M7							
M8							
M9							
M10							
M11							
M12							
	Absent members						
M13							
M14							

- *code: relation to HH head**
1. Spouse
 2. Child
 3. Daughter-in-law
 4. Grandchild
 5. Parent
 6. Uncle/aunt
 7. Sibling
 8. Cousin
 9. Niece/nephew

- **code: marital status**
1. Single
 2. Married
 3. Widow/widower
 4. Divorced (legal)
 5. Separated (not divorced)

- ****code: occupation**
1. Not applicable (age <10)
 2. Agriculture
 3. Salary/wage
 4. Migration
 5. Self employed
 6. Extended family enterprise
 7. Job seeker
 8. Household work
 9. Student
 10. No work

- ***code: education**
1. Not applicable (age <5)
 2. Illiterate
 3. Literate (but never to school)
 4. Finished primary (grade 5)
 5. Finished intermediary (grade 9)
 6. Finished secondary (grade 12)
 7. Bachelor degree and above

Total HH size:
 Farm extension:
 Crop production:
 % production sold to market:
 Livestock:

Part 2 *Food item selection and storyline drawing*

- We would like to ask you to draw a timeline representing the story of your family in relation with your land, the crops you grew on it and how your diet change over the years. A timeline can start from your childhood to present and is a summary of what happen to you as a family in chronological order. You are free to include whatever you want in it, for example, important moments in your life, changes, significant events, etc. It does not need to be precise about dates or chronological order. The most important thing is that at the end you feel it represents your family's tale about agriculture and the food you consume. Nothing is mandatory, you can also be creative, just feel free to do whatever you want.

Here you can see the example of a timeline.

- We would like to select an item, object, piece of text, picture which can represent for you 'healthy food'. We will use this during the interview. Here you can see a picture of my 'healthy food' item.

We would like to take some picture of you and your family with the timeline and the 'healthy food' item. Are you ok with this? Your refusal does not compromise the continuation of the interview.

Part 3 *Narrative inquiry*

First, look at the timeline together and discuss key past events, memories, life transitions.

- I would like to hear this family life story. Could you please tell me about your involvement in agriculture and your way of eating over the years, referring to key turning points, life events.

Potential supporting questions:

Change in trajectories:

- Can you notice any difference between what your parents were producing in the fields during their youth compare to you and your children? When did you stop/start to product this product – why?
- When do you start to sell your products? Why did you start?
- How did you adapt to the new situation?
- When facing challenges what element do you believe helped/helps you to overcome them? Was/is something inside you (physical, mental or spiritual) or something outside yourself (social and physical context)?

Transitions: land inheritance, leaving home (migration, marriage), children, expropriation of land.

- What are significant events for your family that had some connection with your involvement in agriculture?
- How did you adapt to the new situation?
- When facing challenges what element do you believe helped/helps you to overcome them? Was/is something inside you (physical, mental or spiritual) or something outside yourself (social and physical context)?

Food culture: family meal patterns / food selection-preparation-distribution (gender roles) /children feeding

- How many times a day do you it? Did this change over time? Why?
- Can you notice any difference between what your parents were eating in their youth compare to you and your children? When did you stop-start to eat this product - why?
- Who does select-prepare-distribute food inside the household? Did this change over time? Why?
- Who does take care of children? Did this change over time? Why?

Present: time allocation among agriculture and other activities (income generation/education/household chores, care)

- You can be considered an example to follow, what events in your life bring you at this point?
- When facing challenges what element do you believe helped/helps you to overcome them? Was/is something inside you (physical, mental or spiritual) or something outside yourself (social and physical context)?
- In which community activities, farmers' networks are you involved?

Future: how would you like to imagine the future of your family's involvement in agriculture?

Please present your object that you associate with 'healthy food'. If possible, relate this object with the timeline and contextualize any important information in terms of adaptation/change.

Is there anything else you would like to add to this interview that I haven't asked about? Or that you would like to comment on?

Thank you for your time and contribution!

Appendix 2 Literature review table

Type of source	Source	Study	Topic
Peer reviewed article	Aung et al., (2013)	Iron Biofortification of Myanmar Rice	FNS
Peer reviewed article	1. Bloem et al., (2013)	2. Key strategies to further reduce stunting in Southeast Asia: lessons from the ASEAN countries workshop.	FNS
Peer reviewed article	Davis et al., (2015)	Militarization, human rights violations and community responses as determinants of health in southeastern Myanmar: results of a cluster survey.	Governance
Peer reviewed article	3. Haggblade et al., (2014)	4. Strategic Choices Shaping Agricultural Performance and Food Security in Myanmar.	Agriculture
Peer reviewed article	Htet et al., (2012)	Microcytic anaemia predominates in adolescent school girls in the delta region of Myanmar.	FNS
Peer reviewed article	Kattelus et al., (2014)	Myanmar under reform: Emerging pressures on water, energy and food security.	FNS
Peer reviewed article	5. Lin, & Yamao, (2012).	6. An Assessment of Food Control System and Development Perspective: The case of Myanmar.	FNS
Peer reviewed article	7. McCarthy, (2016)	8. Land tenure security and policy tensions in Myanmar (Burma). 9.	Governance

Peer reviewed article	10. Odaka, (2015)	11. The Myanmar economy: Its past, present and prospects.	Commercialisation & entrepreneurship
Peer reviewed article	12. Parmar et al., (2015)	13. Health and human rights in eastern Myanmar after the political transition a population-based assessment using multistaged household cluster sampling.	Governance
Peer reviewed article	➤ Rammohan & Pritchard, (2014)	➤ The role of landholding as a determinant of food and nutrition insecurity in rural Myanmar.	Governance
Peer reviewed article	14. Rutsaert et al., (2017)	15. Women 's empowerment and gender equity in agriculture : A different perspective from Southeast Asia.	Gender
Peer reviewed article	Thet et al., (2016).	Assessing Rates of Inadequate Feeding Practices Among Children 12–24 months: Results from a Cross-Sectional Survey in Myanmar.	FNS
Peer reviewed article	16. Weinberger, (2013)	17. Home and community gardens in Southeast Asia: Potential and opportunities for contributing to nutrition-sensitive food systems.	FNS
Peer reviewed article	18. Win, (2016)	19. Micronutrient deficiencies in early childhood can lower a country's GDP: The Myanmar example.	FNS
Peer reviewed article	20. YuYu & Hye-Jung, (2015)	21. An Analysis on the Factors Affecting Rice Production Efficiency in Myanmar.	Agriculture
Report	22. Action contre la Faim. (2012)	23. Myanmar. Sustain a 'nutrition-sensitive' food security intervention.	FNS
Report	24. DHS Program. (2017)	25. Myanmar Demographic and Health Survey 2015-16 26.	Population & household

Report	Embassy of the Kingdom of the Netherlands (2015)	Agriculture in Myanmar.	Commercialisation & entrepreneurship
Report	27. European Commission. (2015)	28. Myanmar Nutrition Country Fiche.	FNS
Report	29. FAO & EC. (2011)	30. Scoping study on food security and nutrition information in Myanmar.	FNS
Report	31. FAO. (2013)	32. Integrated Food Security Phase Classification. Myanmar report on Food Security & Nutrition Data Cataloging.	FNS
Report	Hunger and Nutrition Commitment Index. (HANCI). (2014)	Key data for Myanmar.	FNS
Report	ICCO et al. (2015)	Multi-stakeholder Roundtable on Gender and Food Security.	Gender
Report	Institute for Security & Development Policy. (2010)	Myanmar economy: a comparative view.	Commercialisation & entrepreneurship
Report	International Crisis Group. (2016)	Myanmar: A New Muslim Insurgency in Rakhine State	Governance
Report	International Food Policy Research Institute (IFPRI). (2015)	2015 Nutrition country profile: Myanmar.	FNS
Report	International Organisation for Migration (IOM). (2016)	Migrants from Myanmar and Risks Faced Abroad: A desk study.	Population & household
Report	33. LEAP201. (2014)	34. Bridges to impact: A new paradigm for agri-social enterprises in Cambodia and Myanmar.	Commercialisation & entrepreneurship

Report	35. LEARN project. (2014)	36. Technical Brief on Improving Nutrition Outcomes through Food Security & Livelihoods Programmes.	FNS
Report	37. LIFT Fund et al. (2015)	38. Vegetable Consumption, Preferences and Supply Chain Myanmar.	Agriculture
Report	39. LIFT Fund. (2013)	40. Livelihoods and Food Security Trust Fund Household Survey 2013.	FNS
Report	41. LIFT Fund. (2016)	42. Analysis of farm production economics.	Agriculture
Report	Mercy Corps. (2015)	What Holds Vegetables Farmers Back? Conflict, Governance and Markets Assessment. Making Vegetable Markets Work for Smallholders Program.	Commercialisation & entrepreneurship
Report	Michigan State University et al., (2013)	A statistical Agricultural Sector and Food Security Diagnostic for Myanmar.	Agriculture
Report	Myanmar Government. (2014a)	Myanmar Agriculture in Brief (Part 1 and 2).	Agriculture
Report	Myanmar Government. (2014b)	Country Statement of Myanmar Ministry of Agriculture and Irrigation.	Agriculture
Report	NESAC. (2016)	From Rice Bowl to Food Basket: Three Pillars for Modernizing Myanmar's Agricultural and Food Sector.	Agriculture
Report	OXFAM. (2013)	A new dawn for equitable growth in Myanmar? Making the private sector work for small-scale agriculture.	Commercialisation & entrepreneurship
Report	43. Yezin University. (2017)	44. The integrated crops management on climate friendly agriculture in Myanmar's food security.	Agriculture
Report	SIDA, UNICEF & UNDP. (2011)	Integrated Household Living Conditions Survey in Myanmar (2009-2010).	Population & household

Report	Transnational Institute. (2015)	45. <i>The meaning of land in Myanmar, a primer.</i>	Governance
Report	46. UKaid et al. (2014)	47. The Hunger and Nutrition Commitment Index (HANCI 2014).	FNS
Report	48. UNDP. (2016).	49. Human development report.	Population & household
Report	50. USAID & FANTA. (2014)	51. Burma Nutrition Profile.	FNS
Report	52. USAID et al. (2013)	53. Background Paper on Food and Nutrition Security in Myanmar.	FNS
Report	54. USAID et al. (2016)	55. The Essential Role of Agriculture in Myanmar's Economic Transition.	Agriculture
Report	56. WFP & Save the Children. (2011)	57. Food security Assessment in the Dry Zone Myanmar.	FNS, Dry Zone
Report	58. WFP. (2016)	59. Nutrition WFP Myanmar.	FNS
Report	60. World Bank. (2014)	61. Myanmar Agricultural Development Bank: Initial Assessment and Restructuring Opinions.	Agriculture
Report	62. World Bank. (2015)	63. Nutrition at a glance: Myanmar.	FNS
Report	64. World Bank. (2016)	65. Myanmar Economic Monitor: Growing Economic Vulnerabilities.	Commercialisation & entrepreneurship

Appendix 3 Respondents characteristics

#	Code	Village	Sex	Age	Education	HH Livelihoods	Migrant members	Type of crop commercialized	% production sell to the market	Acres starting point	Acres owned	HH size
1	KZ1	Kan Zauk	F-M	60-51	M – Literate but never went to school (NS) F- Primary	Mixed	3	Groundnut, mung beans, toddy-palm	50%	0	5	8
2	KZ2	Kan Zauk	F	44	Primary	Agriculture	0	Ground nut, mung bean, pigeon peas sesame, toddy-palm	90%	0	7	7
3	KZ3	Kan Zauk	M	56	Primary	Mixed	1	Ground nut, mung bean, pigeon peas, sesame, lablab bean, potato, tomato, onion	50%	5	5	6
4	SK1	Sar Kyin	M	41	Primary	Mixed	1	Pigeon peas, cotton, sesame	50%	0	5.5	7
5	SK2	Sar Kyin	M	44	Literate NS	Mixed	1	Mung bean, pigeon peas, cotton, maize and sesame	80%	2	7	9
6	SK3	Sar Kyin	M-F	66-66	M – Literate NS F- Illiterate	Mixed	3	Ground nut, pigeon peas, cotton, maize and sesame	80%	0	13	8
7	SK4	Sar Kyin	M	43	Primary	Mixed	0	Pigeon peas, cotton, lablab bean, maize, sesame	80%	0	10	6

8	OY1	Oo Yinn	M-F	55-58	M-Primary F-Literate NS	Mixed	1	Maize, lablab bean, tomato and chili	90%	0	4	5
9	OY2	Oo Yinn	F-F	60-58	Primary	Agriculture	0	Chick pea, maize, bean, chili, eggplant	80%	5	5	6
10	OY3	Oo Yinn	M	31	Primary	Mixed	2	Maize, chick pea, tomato, eggplant, chilly	60%	8	9	10
11	YL1	Yae Lar Lay	M	66	Secondary	Mixed	1	Groundnut, green gram, pigeon, lablab bean, sesame	90%	30	19	5
12	YL2	Yae Lar Lay	F-F-M	57-50-58	F- Literate NS F-Intermediary M - Literate NS	Mixed	0	Groundnut, sesame, pigeon pea, mung bean, cotton	70%	0	10	5
13	AT1	Aung Tha	M	56	Literate NS	Mixed	2	Groundnut, pigeon pea, maize, sesame	70%	3	7	7
14	AT2	Aung Tha	M	41	Finished secondary	Agriculture	0	Chick pea, mung bean, green gram, maize, cotton, sesame, groundnut, pigeon pea	95%	0	9	7
15	AT3	Aung Tha	M	55	Literate NS	Mixed	2	Sesame, mung bean, pigeon pea, cotton, chick pea, groundnut and maize	70%	0	9	6

Appendix 4 List of codes

RQ2	Stressors	<i>"those experiences that anyone anywhere would agree were stressors"</i> (as defined by Antonovsky cited in Mittelmark et al., 2017).
	Heuristics	"Mental shortcuts or 'rules of thumb' that decision makers consciously or unconsciously employ to make judgments of uncertainty" (Peters, McCaul, Stefanek, & Nelson, 2006, p. 45).
	Adaptive strategies (AS)	Conscious decisions aiming at improving personal and household well-being in response of contextual circumstances (Withington, 2005). Bottom-up sub codes are: hard work, migration, mixed livelihood
	Innovative strategies	New social, technical, institutional, organisational and policy innovation and linking experts and local knowledge brought forward by positive deviants (Pascale, Sternin, & Sternin, 2010).
	General Resistance Resources	Resources that support individuals meaningful and coherent life experiences. These resources can be found internally (i.e. intelligence, coping strategies, identity) or they can be located in the external environment (Lindström & Eriksson, 2010). Bottom-up sub codes are: family unity, faith, community support, knowledge sharing, etc.
	Trajectories	Stable pattern of behaviours. Following a pattern means cumulating protective factors, social network and social resources in families (Withington, 2005)
	Life transitions	Life transitions are related with changes in social roles and responsibilities such as marriage, birth of a child, etc. (Withington, 2005).
	Turning points	Turning points can influence processes of change over the life course (Withington, 2005).
	Contextual factors	Socio-cultural norms, historical events, etc.
	Agricultural commercialisation	Agricultural transformation process in which individual farmers shift from a highly subsistence-oriented production towards more specialized production targeting markets both for their input procurement and output supply (Jaleta, Gebremedhin, & Hoeskstra, 2009). Bottom-up sub-codes are: types of crops commercialised, production techniques, markets access, etc.
	Livelihood strategies	Access to 5 capitals (Ashley & Carney, 1999). Bottom-up sub-codes: agricultural activities youth (male/female); agricultural activities adult (male/female); access to 5 capitals; off-farm activities; migration; other source of income.

	Future aspirations (bottom-up code)	Sub-codes: for children, for farm, others.
RQ3	Sustainable diets	<i>"those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources"</i> (FAO, 2012). Sub-codes: environmental friendly diet; cultural acceptable diet; affordable diet, nutritious diet, safe diet, healthy diet.
	Food and nutrition security	<i>"Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life"</i> (UNSCN, 2013). Sub-codes: food consumed by children, from the market, from house-production, availability
RQ4	Social innovation	<i>"the generation and implementation of new ideas about how people organise interpersonal activities, or social interactions, to meet one or more common goals"</i> (adapted from Mumford, 2002, p. 253)

Wageningen Centre for Development
Innovation

Wageningen University & Research
P.O. Box 88
6700 AB Wageningen
The Netherlands
T +31 (0)317 48 68 00
www.wur.eu/cdi

Report WCDI-17-024

The mission of Wageningen University and Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 5,000 employees and 10,000 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.



To explore
the potential
of nature to
improve the
quality of life



Wageningen Centre for Development Innovation,
Wageningen University & Research
P.O. Box 88
6700 AB Wageningen
The Netherlands
www.wur.eu/cdi

Report CDI-17-024

The mission of Wageningen University and Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 5,000 employees and 10,000 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.

