

Study on irrigated land tenure in Cambodia and Myanmar

Final report for Myanmar

Maxime Boutry (in collaboration with Mya Darli Thant and Nyan Thiha)

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Table of content

LIST OF FIGURES	3
LIST OF ACRONYMS	3
INTRODUCTION	4
CONTEXT OF THE STUDY OBJECTIVES OF THE STUDY SCOPE AND STRUCTURE OF THIS REPORT METHODOLOGICAL APPROACH	4 4 4 6
1 CHARACTERIZATION OF IRRIGATION SYSTEMS IN MYANMAR	7
1.1 MAPPING AND IDENTIFICATION OF CLUSTERS OF IRRIGATION SYSTEMS 1.2 TYPOLOGY OF IRRIGATION SYSTEMS	7 14
2 LAND TENURE IN IRRIGATION CONTEXTS: A QUICK OVERVIEW	21
 2.1 A SHORT HISTORICAL BACKGROUND FOR UNDERSTANDING POST-COLONIAL DYNAMICS OF LAND TENURE	21 23 23 24 25 26 28
3 LEGAL AND INSTITUTIONAL FRAMEWORK GOVERNING IRRIGATED LAND TENURE IN MYANMAR	.30
 3.1 GENERAL PRESENTATION	 31 32 33 35 35 38 40 41 43
4 TRANSVERSAL RESEARCH THEMES FOR UNDERSTANDING IRRIGATED LAND TENURE	45
 4.1 DONORS' APPROACH TO IRRIGATION IN MYANMAR: AN INDICATOR OF WEAK LAND TENURE SECURITY? 4.2 IRRIGATION/WATER MANAGEMENT AND THE "VALUE" OF LAND 4.3 IRRIGATION AS AN INSTRUMENT OF STATE CONTROL/LEGITIMATION 	45 45 46
	47
6.1 DOCUMENTS CITED 6.2 GEOSPATIAL DATASETS	48 50
ANNEX 1. LIST OF INTERVIEWEES	51
ANNEX 2: QUESTION GUIDELINE FOR KEY INFORMANTS INTERVIEW	. 52

List of figures

List of acronyms

AFD	Agence Française de Développement
AMD	Agriculture Mechanization Department
DALMS	Department of Agricultural Management and Statistics
ECD	Environmental Conservation Department
ECL	Environmental Conservation Law
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EIAIDMP	Establishment of Integrated Agriculture and Irrigation Master Plan
EMP	Environmental Management Plans
ESMF	Environmental and Social Management Framework
FAO	Food and Agriculture Organization
IEE	Initial Environmental Examinations
IWMI	Integrated Water Management Institute
LAA	Land Acquisition Act
LARR	Land Acquisition, Resettlement and Rehabilitation Law
LIFT	Livelihoods and Food Security Fund
IAIDP	Agriculture Inclusive Development Project
IWUMD	Irrigation and Water Utilization Management Department
MONREC	Ministry of Natural Resources and Environmental Conservation
MSDP	Myanmar Sustainable Development Plan
NECCCCC	National Environmental Conservation and Climate Change Central Committee
NEP	National Environment Policy
NLD	National League for Democracy
NWP	National Water Policy
RERGF	Resettlement and Ethnic Group Framework
SPS	Safeguard Policy Statement
WB	World Bank
WUA	Water User Association
WUG	Water User Group

Introduction

Context of the study

Since the late 1990s, the French Development Agency (AFD) has supported the development of the irrigation sector in Cambodia (jean-philippe Venot and Fontenelle 2016) and more recently in Myanmar. In addition to significant technical assistance, AFD provides institutional support for the development of public policies related to irrigation.

To inform and capitalize on these experiences, AFD created in 2013 a Scientific and Technical Committee on Agricultural Water (COSTEA), which is coordinated by the French Association for Water, Irrigation, and Drainage (AFEID). COSTEA brings together a diverse community of experts and aims to contribute to improving the effectiveness of irrigation policies and projects. It is a place for sharing experiences and knowledge, which is opened to anyone interested in part-taking a reflection about how French actors and their partners in the South support the development and implementation of irrigation policies and projects¹.

As part of its knowledge management strategy, COSTEA has identified the issue of irrigated land tenure as an important field of research. A significant study on the subject was conducted in West Africa - in the context of the Sahel Irrigation Initiative (Hochet 2015) - and COSTEA wishes to renew the initiative in the Mekong region where AFD is active (i.e Cambodia and Myanmar). The idea is to better understand land tenure challenges² that affect irrigation projects and propose an analytical framework that could inform the design of irrigation projects that AFD supports.

Results from this study will also be discussed with the Technical Committee on "Land Tenure and Development" (CTFD) of the French Cooperation – a group of reflection and exchange on rural and urban land issues in the Global South (Africa, Asia, and Latin America).

Objectives of the study

The study aims to understand how land issues arise in a variety of irrigation situations in Cambodia and Myanmar. In particular, it aims to:

- 1. Produce a first grid of analysis to address the land issues raised by irrigation projects and the way in which the actors respond to them in practice
- 2. Formulate recommendations on the institutional framework and practices to improve the consideration of these land issues in the design of irrigation projects
- 3. Identify topics of study to inform knowledge production and exchanges on the issue of irrigated land tenure organized by COSTEA in South-East Asia

Scope and structure of this report

The present report is a preliminary contribution to the overall study presented above and specifically responds to the first objective. It deals only with the Myanmar context, while another report (following the same overall structure) has been produced for Cambodia. Due to a slow start and the unfolding of the COVID-19 sanitary crisis through the year 2020, primary data collection was impossible. Therefore, this report is entirely based on secondary data and interviews with key stakeholders. Moreover, although incomplete with regard to the initial command, it has been decided in consultation with the COSTEA to terminate the study due to the political situation in Myanmar following the military coup that happened on the 1st February 2021. Results are thus partial, and only a short analysis could be provided in conclusion.

The current report is structured as follows:

¹ <u>https://www.comite-costea.fr/le-costea/qui-sommes-nous</u>

² E.g. access to land, land reconfiguration, the recognition of land rights and land tenure security.

In the first section, we characterize the diversity of irrigation contexts in Myanmar by establishing a typology of irrigation systems. The typology is based on agro-ecological variables concerning the context in which the irrigation systems are located and technical variables concerning the mode of water control in these systems. In the second section, we turn to a discussion about land tenure dynamics in Myanmar and specific land tenure issues relating to the different types of irrigation systems identified above. In the third section, we present a more detailed analysis of the institutional framework governing irrigated land tenure. The presentation is articulated around 5 key themes and includes a review of the legal and institutional framework that prevails, its limitations and shortcomings, and how it is implemented in practice. Finally, we provide a short analysis structured around the transversal themes of relevance in order to understand irrigated land tenure and to inform further research in the country.

Methodological approach

To enable the analysis of the highly diverse realities of irrigated systems and related land tenure issues throughout the country, we chose to establish a typology based on agro-ecological contexts – taking into account river basins, flood incidence and water availability – and the main types of control over water within these areas – types and scale of irrigation systems, management practices. These variables served to identify clusters of irrigation systems in which the main land issues are explored.

Based on this cross-analysis of irrigation clusters and the main land issues at stake, we then identified interconnected themes to frame the review of legal and institutional frameworks and their implementation on the ground.

The approach guiding the identification and the use of the typology is summarized below:



1 Characterization of irrigation systems in Myanmar

1.1 Mapping and identifying clusters of irrigation systems

Myanmar comprises three main hydrographic basins that are the Ayeyarwaddy, Sittang and Salween basins. The Ayeyarwaddy basin can be divided into the Upper, Middle and Lower Ayeyarwaddy, Chindwin and Ayeyarwaddy Delta sub-basins. The most eastern area of Myanmar partly belongs to the Mekong Basin. In addition to these are the Rakhine coastal (West) and Tanintharyi coastal basins (South).



Figure 1: Main rivers and river basins of Myanmar. Data sources: FAO³, MIMU⁴. Mapping: authors

³ http://www.fao.org/geonetwork/srv/en/metadata.show?id=37039.

⁴<u>http://geonode.themimu.info/search/?title__icontains=Myanmar%20River%20Network%20250K%20scal</u> <u>e&limit=100&offset=0</u>.

With regard to the main infrastructures (i.e., recorded by Government statistics), irrigation in Myanmar is principally supplied by dams, and to a much lesser extent by pumping and groundwater. As seen in Figure 2, most pump and groundwater irrigation is concentrated in Magway, Mandalay and Sagaing Regions, that is mainly the Central Dry Zone, at the crossroad of the Chindwin, Middle Ayeyarwaddy and Lower Ayeyarwaddy sub-basins (see Figure 3).

There is however a lack of data on privately-owned ground and surface water irrigation systems. This constitutes a huge bias when dealing with irrigation-related statistics. Furthermore, it also underlines the mainstream government approach on irrigated land that long promoted irrigation development through dams and weirs.

Pump irrigation (mainly surface lift pumping) was promoted in the 1980s by programmes implemented by the Agricultural Mechanization Department (FAO 1999). Back in 2000, surface water pumping accounted for 46% of the total national irrigated area (Fujita and Okamoto 2006). Water resources for pump lift irrigation are mainly based on the flow of three major rivers, the Ayeyarwady, Chindwin, and Sittaung (FAO 2013). Groundwater irrigation schemes accounted for 100 000 ha in 2003, or 5.2% of the total irrigated area (FAO 2013).



Figure 2: Extent of irrigated areas (in thousands of ha) supplied by infrastructures completed between 1988 and 2010 per State/Region (source: Amy Soe and Thanda Kyi 2016)

The following map (Figure 3) shows data provided under FAO's General Map of Irrigated Areas (GMIA⁵) expressed in percentage of area equipped for irrigation (e.g., dams, weirs and tanks) as well as the of dams and weirs built in each river basin (ODM 2018).

Figures are reported in Table 1. There are unfortunately no spatial data available on surface water pump irrigation and groundwater/artesian schemes.

⁵ FAO 2005, <u>http://www.fao.org/land-water/land/land-governance/land-resources-planning-toolbox/category/details/en/c/1029519/</u>.



Figure 3: General map of irrigated areas (GMIA-FAO) and dams and embankments distribution among subbasins and within the Central Dry Zone. Source: FAO 2005, ODM 2018⁶

⁶ <u>http://maps.elie.ucl.ac.be/CCI/viewer/index.php</u>.

Most dams and weirs built in the Middle and Lower Ayeyarwaddy sub-basins as well as in the Chindwin sub-basin are used for irrigation of land in the Central Dry-Zone – which is at the crossroads of these three sub-basins (Figure 3).

One can also notice that the Ayeyarwaddy Delta sub-basin encompasses a large area with access to irrigation in spite of a very limited number of dams and weirs. This is explained (as discussed in the following typology) by the deltaic nature of the region where irrigation is mainly done from surface lift pumping from the numerous rivers and streams. Surface pump irrigation in the Ayeyarwaddy Delta is complemented by a system of embankments and sluice gates aimed at controlling floods and salty-water intrusion (Figure 3). To date, a total of 69 embankments (mostly government-owned) have been built in the Delta (Khin Latt 2016).

In absence of exhaustive data regarding irrigation systems and their respective catchment areas, the clusters of irrigation systems have been identified based on the land cover provided by the ESA-CCI⁷. The "irrigated and flood recession crop" category available from the land cover has been compared with the map of seasonal water occurrence⁸ to roughly distinguish non-equipped flood recession cropping areas (flood overlapping crop along rivers mainly, except from partially equipped lowlands in the Ayeyarwaddy delta) from fully or partially equipped irrigated areas (see Table 1 and **Erreur ! Source du renvoi introuvable.**).

When comparing FAO data and the data computed by the authors based on land cover and water seasonality there is a discrepancy in terms of irrigated areas. The whole irrigated area available from land cover analysis (2 508 702 ha) is larger than the FAO's "irrigation-equipped area" (2 110 000 ha). Though both data sets should be handled carefully with regard to their accuracy, the gap may be explained by the fact that FAO data is calculated based on land "equipped for irrigation". Although FAO AQUASTAT has a number of categories to qualify irrigated areas (see Venot et al. 2021) –equipped for full irrigation from surface or groundwater, cultivated wetlands, etc. – only two categories are available for Myanmar: 2 083 000 ha of fully equipped area irrigated (95.2% from surface water and 4.8% from groundwater) and 27 000 ha of equipped lowlands. Unfortunately, these two categories are not available at the subnational level. Data computed from land cover, being based on remote sensing, is more likely to consider privately equipped land (e.g., with surface water pumps, tube wells and artesian wells) and flood recession agriculture.

Overall, there are three main regions where access to irrigation is the most developed:

- The Ayeyarwaddy Delta became the "rice bowl" of Myanmar after a great deal of low-lying land reclamation projects (see sections 1.2 and 2.4) and concentrates 24% (507 054 ha) of irrigated area according to FAO data; but 43% (1 084 328 ha) according to ESI-CCA land cover. Again, although the computation from ESA-CCI land cover should be taken with care, this discrepancy is coherent with the fact that tidal-gravity and surface lift irrigation in this region are important sources of irrigation (see section 1.2) that may not appear in FAO data.
- The Middle Ayeyarwaddy and Lower Ayeyarwaddy sub-basins capture respectively 32% (665 765 ha) and 12% (245 370 ha) of the national area equipped for irrigation, according to FAO data; the ESA-CCI land cover computation provides an irrigated area of 317 963 ha (12%) for the Middle Ayeyarwaddy and 219 535 ha (9%) for the Lower Ayeyarwaddy sub-basins. The irrigated area of these two sub-basins mostly correspond to the central dry zone region. The smaller irrigated area obtained through land cover computation compared to FAO data may reflect the reality of this region: though it concentrates most of the national large irrigation schemes, they fail to provide irrigation at their full capacity, especially during the dry season, due to their poor maintenance (see infra).
- the Sittaung basin (Sittaung-Bago area) encompasses 17% (350 583 ha) according to FAO and 18% (457 837 ha) according to ESA-CCI based computation.

⁷ <u>http://maps.elie.ucl.ac.be/CCI/viewer/index.php</u>.

⁸ Global Surface Water, Joint Research Center (<u>https://global-surface-water.appspot.com/download</u>).

Table 1: Areas equipped with irrigations (FAO 2013) and irrigated crop compared to flood recession crop by hydrographic basins (ESA-CCI Land Cover 2016)

	Nb of Irrigation		ESA-CCI Land cover		
	dams/weirs	equipped area (ha)	Irrigated + Flood recession crop	Irrigated crop (ha)	Flood recession crop (ha)
Coastal	12	96 897	147 763	139 664	8 099
	13	5%	6%	6%	4%
Mekong	0	6 116	9 696	9 648	48
	0	0%	0%	0%	O %
Salween	21	70 537	58 770	56 934	1 836
	51	3%	2%	C 2%	1%
Upper	20	82 564	8 001	7 506	494
Ayeyarwaddy	20	4%	0%	0%	O %
Chindwin	22	71 264	204 810	195 284	9 526
	22	3%	8%	8%	5%
Middle	79	679 615	317 963	294 382	^{23 581} D
Ayeyarwaddy	10	32%	13%	B 13%	12%
Lower	17	245 370	219 535	206 129	13 406
Ayeyarwaddy		12%	9%	9%	7%
Ayeyarwaddy	Б	507 054	1 084 328	934 762	149 566
Delta	5	24%	43%	40%	A 77%
Sittaung	30	350 583	457 837	B 432 378	25 459
		17%	18%	19%	13%
TOTAL	254	2 110 000	2 508 702	2 313 236	195 466

Data sources: FAO 2005, Open Development Mekong 2018⁹, ESA-CCI Land cover¹⁰, Joint Research Center Global Surface Water, GIS-based computation: authors

⁹ https://data.opendevelopmentmekong.net/dataset/myanmar-dams/resource/2b98adde-b793-4423-b5a3-0003e4088368?type=dataset.

¹⁰ http://maps.elie.ucl.ac.be/CCl/viewer/index.php

Main clusters (from the largest to the smallest irrigated area)

- A. The largest cluster comprises the lowlands of the Ayeyarwaddy Delta and the Sittaung-Bago sub-basin, characterized by flood control infrastructures (through embankments) and, after 1969, land reclamation through polders or drainage systems (lvars and Venot 2019). Cluster A encompasses 1 109 787 ha (based on land cover) of partially equipped lowlands, representing 43% of the country's irrigable area. Note the large area of flood recession agriculture in the Ayeyarwaddy Delta (149 566 ha, or 77% of the national flood-recession agriculture category), highlighting an important part of low-lying areas where agriculture is possible only when flood recedes, that is about September-October. Both in the Ayeyarwaddy Delta and in the lower part of the Sittaung basin (Sittaung-Bago sub-basin), infrastructures serve both rainy season (drainage and flood control) and dry-season agriculture (irrigation). Irrigation is mainly done by pumping water from canals regulated with sluice gates.
- B. It is the second largest cluster with a total of 932 889 ha (based on land cover data) of equipped irrigated area, spread over the Sittaung, the Middle Ayeyarwaddy and Lower Ayeyarwaddy sub-basins. This cluster encompasses most of what is known as the Dry Zone in central Myanmar. To be more precise, the whole Dry Zone extending over part of the Chindwin sub-basin (Figure 3) includes 333 880 ha of irrigated land according to computation from land cover and water seasonality¹¹. However, the area irrigated in the monsoon is generally much greater than in the dry season so that the extent of irrigation within the Dry Zone is not well established. Whilst the MoALI estimates a total command area of 515 000 ha, the Integrated Water Management Institute (IWMI) mapped an area of actual irrigation of 260 000 ha, between November 2011 to April 2012 using Google Earth images (IWMI 2015). The number of pump irrigation stations in that area is more than 50 % of total number in the whole country (out of 322 stations) for an approximate area of 130 000 ha (Amy Soe and Thanda Kyi 2016). The need for water is highest in the central dry zone area, which is prone to water shortage due to low and erratic annual rainfall. Unlike in other parts of the country, monsoon usually comes very late. It starts in mid-July and ends in October.
- C. The third cluster comprises small irrigation schemes found in upland areas, totalling 474 860 ha according to the ESA-CCI land cover map.
- D. The last cluster is made of alluvial islands and flood recession cultivation along rivers, which can be found all along the Ayeyarwaddy River (lower, mid and upper basins) and the Chindwin. According to the ESA-CCI land cover, it represents 147 391 ha of cultivated areas.

¹¹ For reference, main irrigation infrastructures are concentrated in the central dry zone area with the largest benefited area (597,156.95 ha for dry zone proper), representing about 50 % of the total benefited area of the whole country, according to Amy Soe and Thanda Kyi (2016).



Figure 4: Irrigation clusters based on land cover. Sources: ESA-CCI Land cover¹², JRC Global Surface Water, GIS-based computation: authors.

¹² http://maps.elie.ucl.ac.be/CCl/viewer/index.php

1.2 Typology of irrigation systems

In each of these clusters, there is a variety of irrigation systems depending on size and management modalities notably. As a way to simplify and generalize this diversity, we provide here a general description of the main types of irrigation systems found in each cluster:

A. The Ayeyarwaddy and Sittaung-Bago deltas' irrigation systems rely on embankments and polders for flood protection in combination with a system of sluice gates enabling both drainage for rainy season's paddy cultivation and – in lower areas of the delta impacted by the tides – tidal gravity irrigation through a system of canals. In the dry season, this system is complemen ted by small (often private) pumping systems supplying surface water from the canals. The infrastructure (embankments, sluice gates, canals) is substantial and the control by the IWUMD over water management is important. Local sluice gate officers appointed by the IWUMD hold a powerful position and – at least during previous military governments – often asked bribes from farmers to deliver or retain water. Note here that the lower Sittaung River is linked to the Bago River by a 61 km long canal built in 1878 to regulate floods and is currently an important supplier for local irrigation.



Nyaung Done polder (Mezali sluice gate and drainage/irrigation canals)

B.1 Irrigation water is mostly supplied from dams and diverted to a nested hierarchy of canals allowing for gravity-fed irrigation (with pumping occasionally) used both to compensate erratic rainfall during the rainy season, and to provide water for the dry season. The infrastructure is heavy and the control over water management is important. Most systems are generally less than 4 000 ha, with very few more than 10 000 ha. Dams and weirs are never built on the main rivers (e.g. Ayeyarwaddy, Chindwin), but on smaller tributary streams to provide some storage to smooth out short term fluctuations in flow and to enable some summer cropping. During the rainy season, irrigation in these areas is principally used for flooded rice cultivation. Water shortage is a major constraint and the systems are generally only able to provide partial, supplementary irrigation during the dry-season. During the dry-season, given the smaller irrigated areas farmers will give priority to high-value cash crops such as onions. Where farmers face irrigation water shortages, they may turn to private tube wells or artesian wells (but also to other non-conventional irrigation methods such as pumping from remaining water at some points of the canal). The management and maintenance of the main infrastructures (headwork, main intakes) are supervised by the Irrigation and Water Utilization Management Department (IWUMD) while minor canals' maintenance, on-field water supply at the village level is supervised by Water Users Associations (WUAs). On the ground, WUAs have been little effective in managing irrigation schemes. This is expected to change notably thanks to the legal recognition of these associations under the new Irrigation Law (2017).



Headwork of diversion system downstream of Thapanzeik Dam, Mu River, Dry Zone



Thapanzeik irrigation scheme (nested system of canal and command area), north of Shwebo, Dry Zone

B.2 There are numerous pump-based irrigation systems from the Ayeyarwady River. These are generally small (rarely exceeding 400 ha) with exception of a few larger schemes. The majority of pump-based irrigation schemes have been built by the government and use surface water. Although the most substantial increase in irrigated area after independence was in pump irrigation, irrigated area declined, mostly because of the cost of pumping and the low-level of completion/maintenance of these schemes. Infrastructure is also important, with a nested system of canals. Such schemes are also under the supervision of IWUMD for maintenance and management of the main infrastructures (pumping station, intakes) while on-field canals, water supply and water user fees collection are under the responsibility of a WUA. In the case of the Pyawt Yaw Pump Irrigation system – recently rehabilitated with financial support from the Livelihoods and Food Security Fund (LIFT), the WUA consists of "a 'nested' arrangement, with four institutional layers [for coordinating] a scheme that has three pump stations, collectively serving almost 1,000 farmers in five villages and a command area of [1,753.5 hectares]" (de Silva et al. 2019).



Pyawt Ywa pumped irrigation system (surface water) in Dry Zone (nested system of canals and command perimeter)

B.3 This cluster comprises a third type of irrigation schemes from groundwater. There are few government-implemented groundwater irrigation schemes in the Dry-Zone mostly. Such schemes are oriented toward the production of high-value crops (onion, grapes). Apart from the pumping stations, infrastructures consist of narrow concrete canals and – in the case of the Yinmabin project only – of ponds receiving water supplied from artesian wells.



Yinmabin groundwater irrigation system with ponds and narrow concrete canals

B.4 Finally, we should add here a much more geographically spread system of privately-owned tube wells developed by farmers themselves. This cluster is likely to be under-represented – or even not at all – in available statistics. As introduced earlier, such tube-wells may be used for supplementary supply of water especially during the dry season when gravity or pumping irrigation systems do not provide enough. They can also be used for separate – and generally small, less than half an hectare – surfaces for growing high-value cash crops such as onions or chillies.



Groundwater pumped irrigation from an individual tube well in the Dry Zone

C. Small gravity irrigation schemes generally supplying water from mountain streams into pipes (plastic or bamboo) or along constructed earthen channels and mostly used for terrace agriculture during the monsoon. These systems, with only light infrastructure, are often communally managed along customary arrangements.



Terraces for paddy in North Chin

D. System of partial water control with minimal to no infrastructure (essentially temporary shallow wells) established in flooded lowland environment for dry season cultivation (recession rice) and vegetables. Water flows gradually with the recession of flood. This type of systems are individually managed and typically found in the flooded areas along the Ayeyarwaddy and Chindwin rivers and on alluvial islands.



Agriculture on alluvial islands (Pakokku)

2 Land tenure in irrigation contexts: a quick overview

We now turn to a short discussion on key land tenure dynamics in Myanmar and how they relate to agrarian change across the country. This includes an overview of the main dynamics of land use change and the legal pluralism that characterizes each land tenure regime (see Methodological approach).

Against this backdrop, we then present some key tenure issues that characterize each irrigation "type" identified in the previous section. This discussion is structured around three institutional dimensions: the issues at stake and possible related conflicts, the actors involved in these issues and the institutional context (formal and informal) that frames behaviors and decision-making.

2.1 A short historical background for understanding post-colonial dynamics of land tenure¹³

An important part of contemporary Myanmar land tenure framework derives from the British colonial period (1824 to 1948/29). But before the British, land was already central in supporting the crown's administration (Lieberman 1980). Prior to the British colonization land was divided into two categories:

- Crown land was situated within the royal sphere of influence and generally composed of the best irrigated and more fertile lands of the Dry Zone (Aung-Thwin 1984). Islands and alluvial formations on rivers, that is, land liable to periodic change due to the action of the river, were also royal land (Hwa 1965). Crown land was administered by temporary and permanent clients of the king in return for certain rights and privileges.
- Private land encompassed communal and ancestral land worked by individuals nonbonded to the king. While produce from crown land supplied royal granaries, individuals working 'private land' were taxed per capita based on their wealth (including land) (Aung-Thwin 1984). Rights on such lands were acquired by clearing and cultivating plots (*damau-gya* – 'the first clearing (of land) by knife'). These lands then became the property of the cultivator (*u-paing*), including the right to mortgage, sell or pass them to their descendants (Hwa 1965).

Various land tenure systems were introduced under British rule, all relying on the same rationale: developing land as quickly as possible "to help defray the costs of administration and, at the same time, to establish a body of peasant proprietors" (Hwa 1965). To simplify, during the decades of rapid expansion of cultivated land (second half of the 19th century), two coexisting tenure systems dominated:

- The squatter system resembled the traditional *dama-u-gya*, in which any person was able to clear and settle on any vacant land. By paying land revenue tax continuously over a 12 years period, the cultivator received a permanent, inheritable, and transferable right of use and occupancy of the land provided he continued to pay the tax regularly. Before this period, the cultivator was liable to eviction if he failed to pay the annual land revenue. This system prevailed in more-established areas (i.e. Dry Zone and upper part of the Ayeyarwaddy Delta) where cultivators were expanding their long-settled holdings by clearing adjacent land (Hwa 1965).
- The second system was the *patta* (i.e. a small piece of land) system, aimed at encouraging cultivators to cultivate virgin land. This system granted tenure before the cultivator cleared the land without collecting revenue during a period varying according to the difficulty to transform the land into productive farmland. Such land could not be mortgaged and cultivators had to show sufficient means to cultivate the land without resorting to money-lenders (Hwa 1965). This system prevailed in the lower part of the Ayeyarwaddy Delta.

¹³ This section draws principally from (Boutry et al. 2017).

In both systems, however, money-lenders became crucial stakeholders in expanding land under British rule, particularly in Lower Burma. This increasing state of tenancy among cultivators under British rule can notably be explained by the opening of Burma to the international market, especially for rice exportation purposes, which changed peasants' lifestyles in the course of the late 19th and beginning of 20th centuries through the monetization of rural economy and introduction of imported goods. However, clearing new lands, especially in the malaria-infested Delta, and turning them into productive rice fields, necessitated massive labor and investments, increasing the need for cultivators to rely on money-lenders. The British-introduced village tractbased administration – ramifying deep into the countryside – increased means of control and farmers' liability to money-lenders. Coupled with the relative closure of the rice frontier at the turn of the 20th century and the 1930s financial crisis, the colonial era achieved the transformation of a pre-colonial body of (majority) peasant-proprietors, into a body of peasant-tenants.

Given the catastrophic tenure situation bequeathed by the British – with a high percentage of land in the hands of absentee landowners, among whom were foreigners and especially Chettiars¹⁴ – the new government aimed at taking back control of its natural resources and especially agricultural lands. The constitution (1947) provided the following provisions regarding land tenure (latter implemented in the form of the Land Nationalization Act 1948):

(1) The State is the ultimate owner of all lands.

(2) Subject to the provisions of this Constitution, the State shall have the right to regulate, alter or abolish land tenure or resume possession of any land and distribute the same for collective or cooperative farming or to agricultural tenants.

(3) There can be no large landholdings on any basis whatsoever. The maximum size of private landholding shall, as soon as circumstances permit, be determined by law." (Government of the Union of Burma, 1947 quoted in Turnell 2008).

From the Land Nationalization Act of 1948 until the new Farmland Law of 2012, land use policy followed the rules and regulation as stated in the Land Nationalization Act 1953, Tenancy Act and Rules 1964, and Procedures Conferring the Rights to Cultivate Land 1964. Under these policies, all land belonged to the state but farmers were given land use or tillage rights on their holdings, which could not be – at least in theory – transferred, mortgaged, or taken in lieu of loan repayments. However, land rights were legally inheritable by family members who remained farmers and tilled the land by themselves. Tenancy and absentee ownership were illegal.

Under the socialist republic – military-led 'socialist' – government (1962-1988), government intervention and controls were introduced to cover almost all activities of food grain production, procurement, distribution, milling, storage, transportation, domestic wholesale, retail trade, etc. The 1974 Constitution maintained the state as the ultimate owner of lands, but the slogan of the agrarian reform changed from 'land to the tiller' to 'right to cultivate to the tiller' (Mya Than 1984). With the change in property rights, food grain growers became obligated to sell a fixed quota of their food grains, the 'Compulsory Delivery Quota', to the government at a fixed price.

¹⁴ A money lender class of South India.

2.2 Irrigation, paddy and land tenure dynamics

Irrigation infrastructures have been built by governments throughout the country with a single objective in mind: improving rice production to recover the "glory" of the pre-crisis of the 1930s, when Myanmar (then Burma) was the first rice exporter in the world. Whether terracing uplands in Chin State, reclaiming low lying lands of the Delta or developing irrigation in the central part of the country, all these policies aimed at increasing land available for paddy cultivation. So that "until recently farmers were required to cultivate paddy on all irrigated land and there was no need to consider design requirements for other crops" (ADB 2016). Until 2003, rice production was only partly privatized so that farmers had to sell a set quota of their production to the State. regardless of whether conditions, rodents, or even the actual condition (flooded land for instance) of land classified under "R" category (R for rice, with sub-categories according to their quality from R1 to R3). Failing to fulfil this duty after 3 consecutive years, farmers would see their land taken back by the township authorities and redistributed to farmers registered on a "waiting-list" (tan si savin) - officially small holder farmers and landless households, though in practice land has often been transferred under this scheme among local authorities or wealthy and well-connected farmers. The rice procurement policy has been a driver of landlessness for Myanmar farmers, especially in the Delta region, which is considered since its development (first under the British rule, then through the successive military governments) as the rice-bowl of the country.

After decades of declining agricultural production, the government took measures to boost rice production with the introduction of the summer paddy program initiated in 1992/93. As described by (Fujita and Okamoto 2006), it was "essentially an irrigation development program". The first irrigation scheme (reservoir and canals) that directly aimed at providing water during the dry season for cultivating summer paddy was built in Bago region (Sittaung basin). The summer paddy development program was also sustained through the construction of polders, sluice gates and draining channels in the Delta, and by encouraging farmers' private investment in water pumps. As an incentive to farmers, summer paddy was exempted from the quota system and compulsory sale to the State. Myanmar agricultural services also vigorously promoted the cultivation of summer paddy varieties. In just three years, the acreage under summer paddy countrywide increased from 0.82 million in 1992/93 to nearly 4 million in 1995/96 (Mya Thein 1997), but then followed a very sluggish phase where declining rice price was outstripped by the additional costs of diesel for the pump irrigation that was necessary for summer paddy (Fujita and Okamoto 2006).

Summer paddy cultivation, requiring both double the costs of those of monsoon cropping and access to farm machinery (power tillers, motor pump), accelerated land exclusion and land accumulation processes and increased disparities in agricultural incomes. Farmers able to invest in summer paddy met relatively greater profits while capital-poor households were often not able to meet quotas for monsoon paddy production and were subsequently dispossessed by the state (Boutry et al. 2017). However, the high costs required for summer paddy also gave space to temporary arrangements (whether free loan, rent) often provided for summer paddy by households who did not have enough resources to cultivate all the land they owned. Farmers who did not receive LUCs for their holdings is at stake. As the extension or rehabilitation of irrigated systems could make access to irrigation water cheaper and summer cropping possible, such arrangements could be jeopardized. This issue may concern clusters A and B.

2.3 The 2012 farmland law and the distribution of land use certificates

In 2012, the new Farmland Law came to sanction the pre-existing system based on individual land rights by distributing Land Use Certificates (LUCs) and legalized transfers of land use rights. This reform did not change much the on-the-ground reality of land tenure and land dynamics, since farmers did not wait for formal reform to sell, rent, or mortgage their land (despite the legal ban on such transfers prior to 2012). LUCs are supposedly bringing more security by legalizing these transfers, yet many practical barriers remain, notably when it comes to dividing a LUC over a plot of land into two or more pieces. The downside of this reform is that farmers who did not receive LUCs for their holdings are at risk of losing their land through the law.

Though the distribution of LUCs was rushed and unevenly implemented throughout the country, most lowland farmers received a LUC, even more when cultivating land under the "R" – paddy – category. Therefore, farmers who were already irrigating land by 2012 as well as those cultivating on land considered irrigable and under the paddy category even though the actual use may differ, received a LUC. Currently, the main issue regarding formal land tenure security for farmers in rehabilitated or extended irrigated perimeters relates to the accuracy and update of their LUC. Indeed, under land consolidation programs, or creation/enlargement of (new) canals, some land holdings' size or location may change without proper update on the LUC. This issue concerns potentially clusters A and B (for instance in case of land consolidation).

In lowlands, the main land tenure issues relate to the process of demographic pressure on land bringing an increasing number of households to live on very small agricultural landholdings (and have little other livelihood options other than leave). The decline of agricultural labour force, the incidence of indebtedness, combined with wealth-biased land market and the increasing intervention of external actors wanting to invest in land (for agriculture production or for mere speculative purposes) result in land concentration. With regards to irrigation (rehabilitation or extension) projects, such land concentration process may be accelerated by the prospects of an increase in value added potential of new land becoming irrigable. Another potential issue relates to land losses due to the construction of infrastructures, and how farmers are compensated (and whether compensation is deemed "fair" or not) for this loss.

2.4 The Virgin, Fallow and Vacant land framework, land reclamation and fisheries management

Together with the farmland law 2012, the Virgin, Fallow and Vacant (VFV) land management law was passed in 2012. It is virtually identical to the Duties and Rights of the Central Committee for the Management of Cultivable Land, Fallow Land and Waste Land, also known as the 'Waste Land Instructions' and the 'Procedures conferring the right to cultivate land/ right to utilize land', enacted by the military government in 1991¹⁵. The Committee was empowered to scrutinize and grant domestic and foreign companies as well as private citizens the right to use cultivation land, fallow and waste land for agricultural business (including livestock and aquaculture) for an initial period of 30 years, renewable 10 years at a time, up to a total of 50 years.

A large number of large-scale land acquisitions and widespread expropriation occurred under this legal framework (San Thein et al. 2018). The "wasteland" or VFV land category is highly problematic since most of it falls outside of the land surveys conducted by the Department of Agriculture Land Management and Statistics (DALMS). In other words, non-surveyed land – regardless of existing uses – is deemed VFV. "Virgin land" is defined in Article 2 of the VFV Law 2012 as "new land or other woodland, in which cultivation has never been done before". Vacant and fallow land is defined as "land which was cultivated by the tenant before, and then that land was abandoned by the tenant for any reason, not only the State designated land but also for agriculture or livestock breeding purposes" (Obendorf 2012). Due to the way VFV land is defined, many areas of land that are under active cultivation by farmers and community groups using these lands in a traditional or customary manner (particularly in 'ethnic areas') could be classified as "vacant and fallow". In 1991 as well, the Freshwater Fisheries law was enacted, increasing competition for access and control of *Inn* fisheries¹⁶ through auction.

Contrarily to central Myanmar (including the dry zone) where cultivation has been long practiced and land rights settled over generations, the land reclamation projects of the 1990s created a land resource out of formally flooded areas, becoming *de facto* VFV land, to be allocated to military and cronies in the first place. During the 1990s and 2000s, large tracts of land (thousands of acres) were leased to companies throughout the delta for a 30-years period, free of charge, under the condition that the land be reclaimed and put under cultivation within three

 ¹⁵ Which itself is very similar to the Rules for the Grant of Waste Land (1861) (Obendorf 2012).
 ¹⁶ Inn fisheries are productive fishing grounds (ponds, creeks, part of river) leased by the Department of Fisheries through an auction system. For more details about the fisheries system see (Campbell 2019).

years. Concession of VFV land put pressure on the fishery sector as they sometimes encroached on *Inn* fisheries areas. Besides, studies show that concessions were generally only partly exploited, sometimes for lack of investment, but more generally for companies' lack of genuine will to engage in intensive agricultural projects¹⁷ and the impossibility to turn some really low-lying areas into cultivation. Against this backdrop, building fish ponds became much more profitable, and extraction of fish resources done by renting out the ponds to village elites (lvars and Venot 2020), putting further pressure on *Inn* fisheries. Following the 2012 land reform which also called for greater scrutiny of leased concessions and for the return of unrightfully confiscated land, farmers and fishers alike started to raise – sometimes competing – claims on unused lands.

The issues at stake here typically occur in cluster A and especially in the eastern side of the delta where fish ponds are more widespread. They relate to the contradictions between natural resources governance (arable land vs. fishing grounds) and land tenure management, both of which being physically and conceptually linked by water management. With the development of fishing ponds, but also due to the many embankments built by private investors, fishing areas are shrinking so that *Inn* auctioneers try to claim larger areas and notably adjacent flooded fields. On the other side, farmers often believe that locally built and managed drainage canals are their own, and keen to fish for themselves into these during the monsoon and dry season. Such conflicts may be exacerbated by the fact that in some areas fishers had to diversify their livelihoods by undertaking agriculture though they still covet fishing grounds during monsoon.

The development of paddy cultivation through better drainage is leading local people to start farming "vacant" lands, thus raising competing interests from landless and other stakeholders on the area, and also raising some fishing-agriculture conflicts during periods where farmers clear and prepare lands for cultivation and fisher who collect more fish at this period.

Finally, the development of paddy agriculture on VFV land also poses the issue of land tenure security. Though VFV concessions may be turned into proper farmland (sanctioned by a LUC), the process is cumbersome and often expensive (due to formal and informal costs of the process).

2.5 Upland paddy terraces' development vs. customary land tenure systems

Beginning with the 1962 government of Ne Win, the central government pushed for the development of paddy cultivation throughout the whole country, with little concern for geographical or climatic features. Incentives turned into obligations, forcing the villagers to painstakingly develop terraces that would sometimes never be exploited. Cattle were introduced alongside rice, replacing manual work with the use of a plough. Owners of customarily owned plots had priority over the development of terraces on their land, but if they were not willing to build the paddy terraces, they became at risk of having to cede it to any individual willing to do so.

The development of rice terraces boomed in the '70s and '80s with the help of the central government. Farmers received financial allowances intended to cover the cost of the labour needed to dig terraces. The introduction of paddy terraces accelerated the monetization of labour, with the introduction of a hired workforce to ensure the construction of terraces and cultivation tasks. From 2002 onwards, the government launched an Upland Reclamation Project. The "Upland Farm Mechanization Project was initiated and the Department of Agricultural Mechanization (AMD) formed the task force [of which] objectives are to facilitate rural development and to transform the shifting cultivation [into] permanent farming" (San Thein 2012). International organizations such as GRET, the United Nations Development Programme (UNDP) and the World Food Programme (WFP) also helped to build terraces in Chin State through the 1990s and 2000s.

Paddy terraces are actually the primary kind – together with permanent gardens but to a much lesser extent – of formalized agricultural land use in upland areas. Indeed, land use rights of paddy terraces have mostly been formalized through LUCs since the 2012 Farmland Law. Since

¹⁷ Obtaining concessions during the 1990s and 2000s was "largely motivated by the possibility that it offered to strengthen ties with the military regime and develop other businesses elsewhere" (Ivars and Venot 2020).

many paddy terraces were developed under governmental schemes, earlier registration was also conducted to formalize cultivation rights. Therefore, the introduction of government-backed irrigated terrace cultivation has pushed for the individualization of land use within wider customary land tenure systems, which is not without causing some issues regarding land management and administration in the uplands. As an example, in northern Chin State individualization of land tenure introduced by inundated paddy agriculture led families in some villages to work their plot independently from the communal shifting cultivation rotation scheme (Boutry et al. 2018). In addition, the previous collective labour-sharing systems used for all operations relating to shifting cultivation (from the initial slashing to the final harvest) gradually disappeared and were replaced by family labour or even hired labour arrangements. As a whole, individualization of land tenure in Northern Chin villages. Being developed under governmental schemes, most land use rights on paddy terraces have been formalized through Form 7 (LUC) since the 2012 Farmland Law. Such issues can be found in cluster C.

2.6 Allocation of newly formed alluvial lands

Due to their high level of fertility, alluvial lands (cluster D) have always been a coveted resource for farmers across the country. In Myanmar's legal framework, the term "alluvial land" refers to very recent alluvial lands and river islands. On the ground, Myanmar's Ayeyarwady farmers make the distinction between:

- *mye yint* (also called *mye ma*) : stable, firm alluvial land which appeared and has been cultivated for already several years or decades and where two to three seasonal crops can generally be cultivated.
- *mye nu* : soft, lower, recently formed "unstable" alluvial land. On these lands, only one seasonal crop can be cultivated in the summer (e.g., vegetable crops, late monsoon paddy...) since the water level is too high in the monsoon to grow crops.

Due to a number of legal ambiguities and to their mobile nature, alluvial lands are fertile grounds not only for winter crops but also for conflicts (lvars 2020; lvars et al. 2021). The 2012 farmland law and rules make the distinction between stable and unstable alluvial lands but without further definition. However, this distinction would be essential since the first is considered as disposable State lands (for temporary use rights) while the latter as private land (with permanent use rights).

According to the 2012 Farmland Rules, land use rights for alluvial land should be allocated on a yearly basis, with the possibility to renew land use rights attributed the previous year. This means that beneficiaries should be aware of the temporary nature of the allocated rights. This is obviously not the case, as new allocation processes can be viewed as "robbing Peter to give to Paul" (Allaverdian 2019). According to the law, alluvial land users are registered by the Township Farmland Administrative body into a list called Form 17, which provides temporary land use rights and prohibits the sale of land. On the ground, users can often show pre-2012 tax receipts and Form 7 (full land use rights). The process of turning temporary land use rights into permanent ones (Form 7) is unclear and seems to be at the discretion of land users and the Township DALMS.

Another issue lies in the competing norms over the management of alluvial lands. In statutory law, alluvial land should be attributed every year, except for alluvial land deemed "firm and stable". According to actual on-the-ground practices and norms, a farmer who cultivates a plot may extend on the contiguous alluvial land that emerged, leading year by year to the formation of long strips of aligned plots (see picture below). But, when not allocated nor used as such, these lands are sometimes farmed by others who may be in need of land, with or without authorization from authorities.

Attributions of new alluvial lands can generate conflicts between various villages and communities as well. The 2012 Farmland Rules (chapter 12, 105 b) stipulates that available alluvial land should be allocated to the nearest village – based on the proximity to the closest

village fence – but on the ground, administrative bodies and villagers lack clarity on boundaries and on whether the alluvial land should be attributed to one village or to the whole village tract. In addition, a number of villages are still not be registered under the Ministry of Home affairs, preventing them from being officially entitled to land allocation. In one conflict case study, the Village Tract Administrator was obstructing the registration of the village closest to the newly formed alluvial lands so that lands would be attributed to his own village instead.

Mobility of settlements also adds another layer of complexity: some settlers and villages are recent and might have migrated when they lost their homes and lands due to the collapse of alluvial lands in nearby areas. Besides, land formation can sometimes be anticipated by experienced farmers, resulting in migrations led by the perspective of accessing newly formed alluvial lands.

Though, as already underlined, the issues linked to the management of alluvial land do not pertain to irrigation infrastructures per se, they relate to water management as the high potential for cultivation offered by such lands relies on flood recession. Such issues can be found in cluster D and alluvial lands of cluster A as well.

2.7 Preliminary mapping of land issues in different irrigation contexts

In an attempt to bring together the different issues described earlier, we propose a preliminary mapping of land tenure issues as they relate to the typology of irrigation system established above.

Type irrigation	Main drivers of land issues	Issues and potential conflicts	Stakeholders	Institutions
A	 Construction of irrigation infrastructures Competing access/use on land and unclear land status due to partial water control. Land use change. 	 Expropriation and the need for appropriate compensation Conflicts farmers-fisher folks (small scale or middle scale/subsistence/commercial fishing) Conflicts fish pond owners- fisher folks (small scale or middle scale/subsistence/commercial fishing) Conflicts smallholder farmers/fishers-VFV concessions lessees Market-driven land concentration, in conjunction with indebtedness, mechanization, social differentiation and land speculation 	 Smallholder farmer contextualized in network of actors Donors involved in the design and funding of irrigation scheme Cadastral administration (DALMS) Micro-Finance Institutions IWUMD at central and sub- national levels + Farmer Water User Committees VFV concessions lessees (companies) Community Fisheries Commercial fishing stakeholders including fishing lot owner/sub- leasers Fish pond owners Fisheries Administration External investors on land and agriculture, including from neighbouring countries through land lease arrangements Village Tract Administration 	 Water/Land/Fisheries laws and policies VFV land management Law and guidelines on expropriation Safeguard policy and due diligence guidelines of donors Community Fisheries management plans Irrigation project/design document Sub-national and communal development plans Power/patronage networks

В	 Construction of irrigation infrastructures Access to irrigation 	 Expropriation and the need for appropriate compensation/valuation of local contribution (in land) by farmers. Land-market driven land 	 Smallholder farmers (and landless) contextualized in network of actors Donors involved in the design and funding of irrigation scheme Cadastral administration 	 Water/Land laws and policies National (irrigation) development plans Law and guidelines on expropriation
	and increasing land value	 concentration, in conjunction of indebtedness, mechanization, social differentiation and land speculation. Redefinition of temporary land use arrangements 	 (DALMS) Micro-Finance Institutions IWUMD at central and subnational levels + Farmer Water User Committees External investors on land and agriculture Village Tract Administration 	 Safeguard policy and due diligence guidelines of donors Irrigation project/design document Power/patronage networks
C	 Plurality of land tenure systems (statutory/customary) 	 Compulsory land use transformation (terraces) Individualization of land use rights within customary (communal) land tenure systems 	 Smallholder farmers and the community External investors on land and agriculture Donors involved in the design and funding of irrigation scheme Cadastral administration (DALMS) Micro-Finance Institutions Upland Farm Mechanization Project Village Tract Administration 	 Water/Land/Fisheries laws and policies VFV land management Department of Agricultural Mechanization
D	 Increased land value and uncertainty of land use sustainability 	 Opportunistic land clearance and land tenure insecurity 	 Smallholder farmers Cadastral administration (DALMS) Village Tract Administration 	 Land laws and policies MPs Power/patronage networks

3 Legal and institutional framework governing irrigated land tenure in Myanmar

In this section, we present the main laws, decrees, and relevant policies concerning irrigated land tenure (Figure 5) and how they are implemented in practice. We examine these documents around five interconnected themes identified through the short analysis of irrigation clusters and related land issues: 1) Expropriation, compensation, and relocation 2) Land tenure security 3) Land market, concentration & consolidation 4) Environmental trade-offs 5) Multi-functionality of wetlands.

For each theme, we first present the scope of the legislation, its strengths/weakness, and the institutional roles and responsibilities of institutions that oversee the implementation. We then highlight some implications and shortcomings of this institutional setup. And based on a series of interviews conducted with donors, we present how the legal framework and policies are implemented practically, including if/how the limitations and shortcomings identified earlier are addressed in context¹⁸.

Land ownership	and land tenure security	Water, Fisheries and Agriculture	
MoALI (DoA/DAL MS) -	 National Land Use Policy (2016) Farmland Law (2012 - amended 2020) VFV Law (2012 - amended 2018) Law of Protection of Farmers' Rights and Enhancement of their benefits (2013) 	 National Water Policy (2014) Canal Act (1905, amended 1998) Myanmar Embankment Act (1909, amended 1998) The Irrigation Law (2017) 	MoALI (IWUMD)
MoNREC -	The Conservation of Biodiversity and Protected Areas Law (2018)	 The Freshwater Fisheries Law (1991) The law relating to Aquaculture (1989) 	MoALI (DoF)
		- Agricultural Development Policy (2018)	MoALI (DoA)
Expropriation a	nd land-related impacts and planning	w	
Union Gov	 Land Acquisition, Resettlement and Rehabilitation Law (2019) Presidential Notification 14/2016 (2016) 	Key themes - Expropriation – compensation – relocation - Land tonuro security (land use rights	4
MoNREC - (ECD) -	 The Environmental Conservation Law (2012) and Rules (2014) Environmental Impact Assessment Procedure (2015) National Environment Policy (2019) 	 customary tenure) Land market, concentration and consolidat Environmental trade-offs Multi-functionality of wetlands 	ion

Figure 5: Three main bodies of legal documents governing irrigated land tenure in Myanmar

¹⁸ The analysis proposed in this section is entirely based on text reviews and interviews with resource people (see annex).

3.1 General presentation

3.1.1 Land tenure regimes and security

The different land tenure regimes and the degree of land tenure security they provide is a transversal theme to analyze issues at stake when it comes to irrigation. Whether in the context of increased land transactions/land accumulation processes driven by access to irrigation and an increased value of land (clusters B and D), uncertain land use categorization and tenure regimes in wetlands (cluster A) or multiple land tenure regimes (statutory and customary) as in the uplands (cluster C), the institutional framework and legislation relating to land tenure regimes is crucial.

This body of documents includes the legal foundation for defining farmers' land use rights – the State remaining the ultimate owner of all land in Myanmar. Land tenure-related legislation is made of a body of overlapping – and sometimes contradictory – laws. The NLUP is the first attempt to harmonize the land legal framework. These documents also specify the conditions under which Land Use Certificates (LUCs) can be issued and if not, how land use can be regularized, including inside the protected area system.

Text	Relevance to irrigated land tenure
National Land Use Policy (NLUP) (2016)	 The NLUP attempts to set-up an homogenous land legal framework that could possibly become a National Land Law for the numerous – and overlapping – existing land laws. Puts the emphasis on protecting <i>legitimate</i> land tenure rights of people, "as recognized by the local community", with particular attention to vulnerable groups such as smallholder farmers, the poor, ethnic nationalities and women.
Farmland Law (2012 - amended 2020)	 Defines the different categories of farmland (paddy land, "ya" land -upland, silty land, hillside cultivation land, perennial crops land, nipa palm land, garden land or horticultural land and alluvial land), rights and duties of users. Determines procedures for adjudication, land measure and issuance of titles. The 2020 amendment introduces recognition of shifting cultivation as well as the possibility for farmers to choose the cultivated crop. Though not mentioned explicitly, paddy land most often refers to irrigated land (with exception of flood recession/alluvial land). The only explicit reference to irrigation pertains to the valuation of farmland (for compensation in case of State-led appropriation) taking into account existing irrigation infrastructures.
Vacant, Fallow and Virgin land Law (2012 - amended 2018)	 Applies mostly to unmapped land and land deemed vacant, fallow or virgin (VFV). This category notably applies to many wetlands with low/partial water control and under multiple uses (fishing/agriculture). Defines the criteria, procedures and mechanisms to grant a VFV land concession to individual farmers or companies.

	- Defines the criteria, procedures and mechanisms for taking back unproperly implemented VFV land.
The Conservation of Biodiversity and Protected Areas Law (2018)	 Defines the framework for the management, conservation and development of protected areas. Identify the possibility to establish zonation inside protected areas to differentiate between areas for protection, conservation of biodiversity, sustainable use and community-based use.
Due diligence guideline of donors	 Specifies how donors and irrigation project proponents aim to address land issues and land security in the feasibility, implementation and monitoring phases of irrigation projects. Donors' documentation reviewed and interviews point at similar approaches: land tenure clarity is a primary criterion for sites selection. Land tenure unclarity is considered as a driver of (unwanted) conflicts for the rehabilitation/ extension of irrigated perimeters. As a whole resolution of land tenure issues are not actively addressed.

3.1.2 Water, Agriculture and Fisheries

We deal here with water-related legislation as a whole given the interconnectedness of water for agriculture (Irrigation) and water for fisheries, especially in the wetlands of the Ayeyarwaddy Delta. However, this group of documents underlines the very sectorized approach to water resources management, though the National Water Policy attempts to develop a more integrated approach.

Text	Relevance to irrigated land tenure
National Water Policy (2014)	 First attempt to take an integrated approach to water resources management, take river basins/sub-basins as the fundamental physical unit for management. Suggests that water resources, irrigation and land management ought to be managed in an integrated manner at the river basin scale.
Irrigation Law (2017)	 Much similar to the former Canal Act, the major improvement is the introduction of the farmers' duty to organize themselves into Water User Groups (WUGs). Previously, the absence of a legal framework for creating WUGs hampered their recognition by the government. Given the actual weak capacity of most WUGs in managing irrigated schemes, this can be seen as a major improvement.
Groundwater Law (2020 draft)	- This law will replace the former Underground Water Act and put an emphasis on licensed and monitored use of groundwater together with quality assessments.
Canal Act (1905, amended 1928, 1998)	- This act permits water in all rivers and streams flowing in natural channels as well as lakes and other national still

	 water bodies to be used and controlled for public purposes. Determines the principles of water resources management as well as the rights and obligations of water users. Distinguishes between canal [systems] managed by the government and village canal [systems] managed at village level.
Underground Water Act (1930)	 Stipulates that any attempt to dig for obtaining underground water should seek a license to the "Water officer". Actually, the law has never been implemented, at least with regards to individual tube or artesian wells for irrigation purpose.
Irrigation Manual (1948)	 Defines key staff responsible for management of irrigation systems.
Myanmar Embankment Act (1909, amended 1998)	- Provides guidance for management of embankments.
Aquaculture law (1998)	 Defines the conditions (licensing and regulations) for performing aquacultural activities. Prohibits "obstructing [] flowing of water" though without further explanation/definition (fisheries, irrigation water).
The Freshwater Fisheries Law (1991)	 Provides a framework for commercial exploitation of freshwater fisheries (not including aquaculture). Principally focuses on legislation to operate inland fisheries (leasable, tender-licensed, implement-licensed, non-license and reserved) with only few environmental protection guidelines. Provides no mention to irrigation at all. Only stipulates that "no one shall cultivate agricultural crops within the boundary of a fishery creek".
Ayeyarwaddy (2012, amended 2018) and Rakhine (2014) Freshwater Fisheries Laws	- As stipulated under 2008 constitution, freshwater fisheries management could be decentralized. The Ayeyarwady and Rakhine laws recognize small-scale fishers' rights and introduced co-management (or community) fisheries.
Law of Protection of Farmers' Rights and Enhancement of their benefits (2013)	 Asserts farmers' right to freely chose crops "without injuring paddy cultivation, the stable food of the State". Calls for a National Plan for agricultural water development.
Agricultural Development Policy (2018)	- Promotes linkages across agricultural subsectors, notably through modernization of crop agriculture, livestock, and irrigation, but also fisheries and forestry/agro-forestry. It also aims at supporting the aquaculture sub-sector.

3.1.3 Land expropriation and land-related impacts

These documents lay down the legal foundation that regulates the expropriation and assessment of the environmental (and social) aspects of irrigation development. This set includes environmental legislation as it contains the legal basis for Environmental and Social Impact Assessments (ESIA) that must be conducted prior to irrigation projects. The National Environmental Policy and related environmental laws are also relevant in the case of multiple uses of wetlands, notably agricultural development against environmental conservation.

Text	Relevance to irrigated land tenure
Land Acquisition, Resettlement and Rehabilitation Law (2019)	 Defines principles, mechanisms, and procedures of expropriation, and defining fair and just compensation for any construction, rehabilitation, and public physical infrastructure expansion project for the public and national interests (irrigation projects fall in this category) Such principles include the identification of affected persons and their livelihood; the location, size, type and classification of land and the local market price of land on the date when the Notification Declaring the Intent of Land Acquisition is issued; the age and conditions of buildings concerned and their local market price; three times the value of perennial plants grown on the land that is calculated at the local market price based on the current value of such plants; three times the value of seasonal crops that is calculated at the market price based on the crop yield per acre; and the loss of livelihoods and job opportunity due to land acquisition; Compensation follows the above criteria and also include potential relocation expenses.
Presidential Notification 14/2016 (2016)	- Mandates the creation of Land Reinvestigation Committees whose duty is to examine land claims of unrightful land appropriation, whether by the government or private companies/individuals.
The Environmental Conservation Law (2012) and rules (2014)	 Provides a legal basis for conducting Environmental (and Social) Impact Assessments.
Environmental Impact Assessment Procedure (2015)	- Defines procedure to conduct Environmental (and Social) Impact Assessments.
National Environment Policy (2019) – pending approval	The NEP (2019) builds on the previous policy NEP (1994). It sets core values for mainstreaming environmental protection in the country's development:
	 The wealth of the nation is its people, its cultural heritage, its environment, and its natural resources. It is the responsibility of the state and every citizen to preserve its natural resources in the interests of present and future generations. Environmental protection should always be the primary objective in seeking development.
Due Diligence guideline of donors	 Specify how donors and irrigation project proponents aim to address land issues and land security in the feasibility, implementation and monitoring phases of irrigation projects.

3.2 Key themes

3.2.1 Expropriation, compensation and relocation

Legislation and institutional set-up

When an irrigation project results in expropriation, the question of defining fair and just compensation is central. The legal framework mobilized for expropriation is bound by international law. Under international human rights law, coerced and involuntary resettlement is seen as a deliberate retrogression in the enjoyment of human rights (*No one shall be arbitrarily deprived of his property*, article 17 of the 1948 Universal Declaration of Human Rights). Though Myanmar is a party to the Universal Declaration of Human Rights, the country has a long history of unrightful confiscation of land from both State-led projects and private companies/individuals.

At the national level, the main law dealing with expropriation has been the 1894 Land Acquisition Act (LAA), only recently revised into the Land Acquisition, Resettlement and Rehabilitation Law (LARR), 2019. Both laws set out the process for payment of compensation when the state reclaims land for a 'public purpose'. The reality is that few, if any, cases where land was taken by the State in its various forms since 1962, have followed the LAA procedure¹⁹.

The LARR 2019 brings several improvements:

- Defines the scope of the "public purpose" categories for which expropriation can be used, for instance "socioeconomic development projects" in which fall irrigation projects.
- Details the expropriation process. Note that only the land actually affected by the building or rehabilitation of infrastructures is acquired by the State (but not the land of the entire irrigation command area).
- Requires surveys to identify some, but not all, potentially affected populations.
- Includes provisions on resettlement and rehabilitation, requiring structured plans and programs.
- Requires some level of consultation with stakeholders.
- Requires environmental and social impact assessments (ESIA) of the environmental and social impacts of projects to be carried out on the expropriated land.
- Recognizes need for experts to be involved.
- Attempts at greater transparency in the decision-making process.

The whole land acquisition (i.e., expropriation) process is under the supervision of the Land Acquisition, Resettlement and Rehabilitation Central Committee, consisting of the Vice-President as the chairman, and ministers from concerned union ministries, officials and experts from government departments and organizations as members. The Central Committee is responsible for establishing the Land Acquisition Implementation Committee and the Resettlement and Rehabilitation Implementation Committee, each composed of officials from the relevant government departments and organizations, landowners, local representatives, ethnic representatives and experts.

The law includes the possibility to object the land acquisition and/or the rehabilitation plan by filling a complaint to the Union or Regional/State government, which should be reviewed by the Land Acquisition Implementation Body and, if necessary, may be brought to court.

The process for expropriation follows several steps: i) a project proposal by the government department/organization willing to acquire land for public purpose, to be reviewed by the Central Committee, ii) issuing a notification declaring the necessity of land acquisition; iii) a survey detailing the foreseen cost of the land acquisition, by calculating at the "current market price" the value of impacted land and buildings, crops, loss in livelihoods and job opportunities iv) a notice at relevant offices, departments and "places easily noticeable by the public" and to each affected person as listed in the project, v) the possibility for owners of the expropriated property to file a complaint to contest the validity of the appropriation and vi) the compensation and/or

¹⁹ (Sala and Chay 2019)

relocation proposal as such. To navigate through this process, farmers require appropriate, affordable, and timely support.

The law states that the compensation for the expropriated property must be fair and just. It should be paid in advance based on the fair market value of a property, excluding changes in value after the irrigation project came into effect.

Implications and shortcomings of the institutional set-up

As the State is the only entity that can expropriate in the public interest, the scope of the law does not extend to evictions by private entities or concessionaires. In this case, the entire expropriation process, including compensation and relocation is borne by concessionaires or private investors according to relevant state legislation such as the EIA and any specifications in the contract or agreement between the concessionaires/investors and the State, if any. According to existing EIA procedure, the Government has the responsibility for carrying out the acquisition and distributing compensation, but the funds for compensation are to be provided by the company acquiring the land.

There are important gaps regarding how "affected persons" are defined under the law, e.g., "landowners" and "persons related to the acquired land". Landowners must have "strong evidence" of ownership - which is not defined and could be subject to widely varying interpretation. Given the challenges in documenting land ownership in Myanmar, this may be challenging for many. The definition of "landowner" does include a nod to the many people in the country with customary tenure, as a landowner includes "[a] person who is accepted by local community and recognized by the Nay Pyi Taw Council or relevant Region or State Government as the owner according to customary practices of ethnic nationalities, though he/she has no legal document." However, this requires recognition by the Region or State Government, which introduces several additional layers of government in the decision-making - and a great deal of uncertainty about who will be recognised. In addition, these provisions do not recognise that customary law ownership is grounded in a community's unique and intimate connection to the land nor, significantly, does the Law appear to protect collectively ownership by communities. Customary tenure is currently not protected under Myanmar law (it has been excluded from the application of the amended VFV Law); that is likely to happen only when the National Land Law is adopted which is still several years away.

The law does not require consideration of alternative locations, minimization of the land taken or alternatives such as leasing the land.

There are insufficient protections for landowners while negotiating for their compensation and there are no provisions for "persons related to the acquired land". While the Law notes in the objectives that it seeks "to ensure fair compensation and damages for affected persons," the law is lacking the necessary safeguards to ensure the process is fair and transparent.

The compensation provisions do not meet international standards and are lower than the 1894 Law standards. The LARR 2019 does not cover i) Impacts resulting from restrictions (rather than outright acquisition) on land use or on access to land; ii) Improvements made to the land; (iii) Other physical assets besides buildings; (iv) Other types of plants besides the defined categories of standing crops (trees, shrubs, etc. that have economic value as well); (v) Other types of animals besides livestock (i.e., fish ponds); (vi) Loss or restriction of access to resources such as water, non-timber forest products, grazing, etc. which may be important for maintaining livelihoods for many communities; (vi) Social infrastructure.

In practice: experiences of donors

Asian Development Bank²⁰

Projects implemented so far by ADB were under the former 1894 LAA. ADB considers the LAA's requirements as falling short of the objectives of ADB's Safeguard Policy Statement (SPS) due to the lack of standard methodologies and implementation guidelines. Notably, the LAA does not cover the most critical aspects of the SPS requirements on income and livelihood restoration and does not recognize any rights to Project affected persons without land title ; the latter are not eligible to any assistance and compensation for their lost non-land assets and income and livelihood.

The flaws identified by ADB are addressed through ADB's own SPS. ADB requires the government to follow these guidelines in order to access ADB's loans. Under the ADB guidelines, affected communities are given choices for entitlement and eligibility, land donation or negotiated land acquisition. The Resettlement and Ethnic Group Framework (REGF) provides the guidelines on land acquisition, management of resettlement impacts, and management of impacts on ethnic groups. The guidelines address the safeguard requirements of ADB related to involuntary resettlement and indigenous people and relevant Government of Myanmar regulation on land management/land acquisition and ethnic groups development.

On the other hand, compensation is paid from the Government counterpart funds, so the expropriation mechanism is a hybrid process that follows ADB guidelines and government institutions:

- Due diligence analysis to assess the impacts of the project
- Preparation of resettlement plans (usually by a consultant)
- The expropriation committee suggests an area for relocation but ADB has a say on it
- Development of compensation measures → submit to the Land Acquisition, Resettlement and Rehabilitation Central Committee for endorsement → send to ADB for no objection → implementation.

The goal of ADB with their compensation scheme is to ensure that those who are being affected by the development project should not be worst off, but at least remain the same or getting much better for their livelihoods.

According to ADB guidelines and practices:

- the criteria considered in land valuation are: size + crops and trees on it
- the criteria that are not considered: the quality of land, the socio-economic environment (comparing old and new locations), a detailed review about the diversity of rights enjoyed by the land users (ownership, possession, usufruct, leases, sharecropping, etc.).

According to interviews, there were no major issues regarding compensation schemes on the current Agriculture Inclusive Development Project (IAIDP), implemented together with AFD. Besides being stated in ADB's resettlement plan²¹ for the above-mentioned project, ADB representative insisted on the fact irrigation systems that ADB has been rehabilitating have been selected in order to avoid private land acquisition -- ADB is not funding any irrigation system extension in Myanmar. Compensation concerns a few households who grow crops and/or constructed secondary structures (shops) within the perimeter of IWUMD administered right of ways (RoWs, i.e. canal sides). Despite being "illegal", such households are also considered for compensation.

Resolutions process in a case of a dispute during expropriation process:

• The preferred option is to address complains and disputes locally. ADB tries to settle all complaints before the civil work start, which may take several months or years.

²⁰ The irrigation projects reviewed are co-funded by AFD, which relies on ADB Safeguard Policy Statement for land acquisition.

²¹ https://www.adb.org/sites/default/files/project-documents/47152/47152-002-rp-en.pdf

• If conflicts remain unresolved when civil starts, local folks can complain through ADB-created Grievance Redress Mechanisms. Another avenue is the Complaint Resolution Committee set out in the Law on expropriation. In the last recourse, a complaint is filed at court.

<u>World Bank</u>

Most of the above points are relevant with WB's experience in Myanmar. WB developed its own due diligence guidelines, namely the Operational Policy (OP) 4.12 on "Involuntary Resettlement" and the OP 4.10 on "Indigenous Peoples". Any beneficiary of WB's loan has to follow these OPs when implementing irrigation work:

- WB asks the department (IWUMD) to draft a Land Acquisition Action Plan (LAAP) with support from a third-party service provider.
- LAAP is used for consultation with affected people.
- Upon agreement from WB, the LAAP is implemented by the IWUMD and DALMS (cadastral department) with help of a third-party service provider (i.e., a NGO) hired by the WB.

Resolutions process in a case of a dispute during expropriation process is addressed through the WB's "Grievance redress / dispute resolution mechanism":

- The entry point for accessing the grievance mechanism are local water users groups (WUGs). If grievances or disputes between farmers cannot be solved at the WUG level within 30 days of the submission of the grievances, the issue will be brought to the Project Implementation Committee (PIC, chaired by IWUMD) for mediation.
- If the grievance cannot be addressed/solved by the PIC, the issue is brought to the Project Management Unit at the national level.

As in the case of ADB, WB discards projects that may lead to de facto large-scale expropriation/acquisition of private land.

3.2.2 Land tenure security

Legislation and institutional set-up

As explained above (2.3 and 2.4), a "land reform" happened with the advent of the Thein Sein – quasi-civilian – government from 2011 onward. In 2012, two major laws, the Farmland Law 2012 (amended 2020) and the Virgin, Fallow and Vacant (VFV) land law 2012 (amended 2018) were enacted. The Farmland Law generated the distribution of millions of Land Use Certificates (LUCs) mostly in lowland areas and especially on irrigated land – inundated paddy land still being the main focus of the government. The VFV law reiterated the view that non-cultivated land is necessarily under-utilized and can be allocated to investors. Under the VFV law, individuals found cultivating land categorized as VFV have to register use otherwise they can be fined and/or put in jail. Though the 2020 amendment of the Farmland law does recognize shifting cultivation as farmland, customary land use and more importantly communal uses are not acknowledged hence not eligible to titling.

Implications and shortcomings of the institutional set-up

Most irrigation systems have been developed in long-settled areas (e.g., the Central Dry Zone) and therefore land use has been long secured – even before the 2012 Farmland law, farmers had access to other proofs of land use, such as Farmer Booklets, Tax receipts, etc. Therefore, there are only few issues of land tenure insecurity found within the perimeter of irrigation systems reviewed for this study. The main issue pertains to the limited capacity of the cadastral department (DALMS) to update the LUCs. Whether because of demographic growth leading to land fragmentation, land transactions or land restructuration under an irrigated perimeter, the cadastral maps (*kwin* maps) are most of the time out of date.

We should however note that land tenure security issues may arise in the course of projects implemented in the Ayeyarwaddy Delta²², especially on low-lying/flooded land where land use rights have not always been secured. The lack of documentation on land use in such areas notably pertains to their low productive nature, so that it often happened that farmers would not declare their land holdings in order to avoid selling a quota of their rice production (see section 2.2) on such lands as it was the case before (GRET 2018a).

In practice: experiences of donors

Remarks

Currently, the two main areas of focus for irrigation projects are the central Dry Zone and the Ayeyarwaddy Delta. In these two areas, the population is essentially *bamar* – the dominant ethnic group – for whom customary land tenure barely applies. The Dry Zone region is the historical center of the Burmese agrarian society's development, so that land tenure has long been secured and monitored by the central government apparatus.

Asian Development Bank- Agence Française de Développement

In the design phase of any irrigation project, ADB studies land ownership inside the command area. The land profile produced includes land size and current land use. However, ADB does not pretend to address any potential land issues that could happen within their project's area, such as conflicting land claims, or land concentration.

AFD contracted an independent study on land tenure issues within the rehabilitated irrigated area of the IAIDP (Dry Zone). The study's findings confirm that land tenure has been secured by farmers since decades and that they all received LUCs. However, some farmers may have been purposely avoiding titling their land so to be able to change land use without undertaking a legal process – which is almost unfeasible for smallholders, especially on paddy-land.

The main land issues outlined by the AFD contracted study relate to outdated cadastral maps, which don't necessarily reflect the right user's name, and/or the actual land-plot area, the latter issue having an incidence on agricultural loans provided by the Myanmar Agricultural Development Bank (MADB). Another -- though limited -- issue is land plots recorded as "ya" (upland) instead of paddy land, which also has an incidence on MADB loan (paddy land loan is much higher). However, it seems farmers managed to secure an agreement with MADB officers to bypass this wrong categorization.

World Bank

World Bank funded Agriculture Development Support Project (ADSP) seems to take a more proactive approach with regards to land tenure. During the assessment phase, Land Use Certificates (LUCs) of Project Affected People (PAP) are checked and assessed based on the onsite survey to verify the accuracy, or are revised based on the result of the on-site measurement with the participation of land owners themselves. Besides, the PAP category also includes tenants, sharecroppers and agricultural laborers who gain income from using parts of the project site.

One component of the ADSP aims at supporting production of new digital cadastral maps for the targeted irrigable areas. New land user right certificates (LUCs) should be issued – if necessary – to farmers based on these maps.

²² For instance, the Korean International Cooperation Agency (KOICA) is in the course of implementing the Establishment of Integrated Agriculture and Irrigation Development Master Plan (EIAIDMP) for the Ayeyarwaddy Delta. Unfortunately, the authors could not reach a KOICA representative for further precisions and comments on the project before completion of this report.

3.2.3 Land market, concentration & consolidation

Legislation and institutional set-up

The 2008 constitution embraces a market economy, in which the ownership and protection of private land property rights are clearly recognized (Articles 35, 37, 356 and 372). The Farmland law 2012 finally legalized land transactions (sales, rent, mortgage, inheritance) though previous studies showed that even before 2012, farmers managed to bypass restrictions on land transfers and maintain a land market, though much less active than it became after 2012 (Boutry et al. 2017). Since the 2012 farmland law and the legalization of land transfers, much speculation occurred in peri-urban areas notably, with farmers foreseeing great financial benefits from converting farmland into other uses, notably housing, but also for husbandry purpose. For such reasons, some farmers have purposely avoided titling their land in order not to be legally bond to the strong restriction on land use change applied to the farmland category. Peri-urban land markets trigger a "domino effect", which sees farmers investing the money (fully or in part) of profitable land sales into farther and less expensive areas to carry on their agricultural livelihoods (Boutry et al. 2016).

Implications and shortcomings of the institutional set-up

There is no doubt that an irrigation project increases the productive capacity and value of agricultural land located inside the command area. And given that land markets are largely wealth-biased, a possible effect of a free land market could be the concentration of land into the hands of well-off farmers. Since there is no restriction to land accumulation under the farmland law, in *bamar* lowlands there are clear trends toward land accumulation and a concomitant increase in landlessness rates (Boutry et al. 2017). This process works possibly through speculative land purchases before the rehabilitation/construction of the irrigation schemes or after the civil work had been carried out.

In practice: experiences of donors

Asian Development Bank- Agence Française de Développement

From the feasibility study until the irrigation system is used, irrigation project proponents do not monitor land transactions. ADB sets a cut-off date to determine the owner and the size of land inside the command area before the start of the rehabilitation work, but does not follow the process of land transfers that unfolds. The project conducts an ex-post study on the livelihood of beneficiaries, but land tenure and land transactions are not featured in the survey. On the other hand – since the only ADB project (IAIDP) is co-funded by AFD – AFD took the initiative to contract an independent study on the possible effects of rehabilitating the irrigated perimeter on the local land market. The study found a local land market characteristic of other rural areas, with transactions mostly (if not only) done amongst villagers. No significant land accumulation process that could be attributed to the rehabilitation work was observed.

ADB does work on land consolidation principally in order to favor crop diversification. According to interview, this is however challenging as farmers are not ready to implement land consolidation – a change in mind-sets that the normal 6-years period of ADB's projects does not allow. The AFD independent study on land issues also underlined that several land consolidation initiatives brought by the government were rejected by farmers in the concerned area. A study by GRET on peri-urban Mandalay (Boutry et al. 2016) brought to light that land consolidation programs, though coming together with stricter enforcement on land use change, could not curb active land markets and speculation and, at the contrary, led to land acquisition strategies by speculators tricking farmers into giving their land as collateral without their consent.

<u>World Bank</u>

According to a WB project document, there are activities to raise community awareness of beneficiary farmers on operating in market economy with tradable land rights by educating farmers about the farmland values and options that the market economy provides. The aim is to protect farmers against uninformed or duress land transactions.

<u>Remarks</u>

One interviewed donor remarked "off the record" that the choice of irrigated systems to be rehabilitated – although several locations are usually screened with the donor's own criteria – may be influenced by wealthy land owners having connections to the IWUMD. However, such issue is difficult to dig into without further fieldwork and investigation.

3.2.4 Environmental trade-offs

Legislation and institutional set-up

The 2008 Myanmar Constitution provides several important references to environmental conservation and sustainable development. Section 390 states, "Every citizen has the duty to assist the Union in carrying out the following matters":

- Preservation and safeguarding of cultural heritage
- Environmental conservation
- Striving for development of human resources
- Protection and preservation of public property.

The Environmental Conservation Law (ECL) was adopted in March 2012. It stipulates the basic principles of environmental conservation. According to the law, MONREC is responsible for implementing a system of Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) to determine whether or not a project or activity to be undertaken by any government department, organization, or person may cause a significant impact on the environmental conservation in sustainable development, ministry's responsibility to develop relevant guideline and regulation, setup of a monitoring system, waste management, and conservation of natural resource and cultural heritage. Section 10 of the rule details the duty and power of the ministry and department for adopting an EIA system.

As required by the Environmental Impact Assessment Procedure (2015), any public or private irrigation schemes larger than 5,000 ha is required to conduct an Environmental Impact Assessment (EIA)²³. The Ministry of Natural Resources and Environmental Conservation (MONREC) is the focal agency for overall environmental management in Myanmar. The Environmental Conservation Department (ECD, under MONREC) oversees the EIA procedure.

This procedure sets out specific requirements for scoping EIAs, Initial Environmental Examinations (IEEs) and Environmental Management Plans (EMPs); defining roles and responsibilities of the ECD and project proponent; and placing punishments for violating the requirements.

The National Environment Policy (NEP) (2019) is expected to be approved soon and will supersede the NEP (1994). The NEP (2019) contains 23 policy principles that can be grouped into three broad categories: (a) a clean environment and healthy functioning ecosystems, (b)

²³ For irrigation schemes between 100 ha and 5,000 ha, only an Initial Environmental Examination (IEE) is required.

sustainable economic and social development, and (c) mainstreaming of environmental protection and management.

Finally, the Myanmar Sustainable Development Plan (MSDP) provides the long-term vision of a peaceful, prosperous, and democratic Myanmar. The MSDP is well aligned with Strategic Development Goals, and cross-cutting issues, such as equity, inclusion, and sustainability, are also integrated into it.

In recent years, improvements have been made with respect to staffing and allocating responsibility for environmental management including the establishment of the National Environmental Conservation and Climate Change Central Committee (NECCCCC), MONREC, and ECD with offices at the union, state/region, district, and township levels.

The EIA Division under the ECD is organized into five sector teams for the review of EIAs/IEEs/EMPs: (a) Mining; (b) Hydropower; (c) Infrastructure; (d) Industry (Manufacturing); and (e) Agriculture, Livestock, Fishery, and Plantation. Under section e), the Environmental and Social Impact Assessment Guidelines for Hydropower Projects in Myanmar have been developed for the Ministry of Natural Resources and Environmental Conservation and the Ministry of Electricity and Energy under the International Finance Corporation's (IFC) Hydro Advisory Program.

Implications and shortcomings of the institutional set-up

Although the EIA procedure has been described as fairly standard and generally meeting international good practice (Schulte and Baird 2018), many significant challenges remain in effectively implementing the Procedure. This is largely due to the limited resources and institutional capacity of ECD to review, approve, and follow up on EIAs for investments and developments across all sectors leading to a significant backlog of EIA/IEE/EMP reports. The number of EIAs/IEEs/EMPs submitted is increasing every year, but only 6.9 percent of the 2,783 reports submitted since 2014 have been approved, leaving 250 EIAs, 482 IEEs, and 1,859 EMPs awaiting approval (MoNREC and World Bank Group 2019).

Still linked to the weak institutional capacity of ECD, another challenge pertains to the little resources committed to compliance and monitoring as the ECD is dealing with the review and approval of a significant volume of reports. In the current context, compliance activities are only carried out in response to complaints from the local community, and there is not an effective monitoring and inspection regime in place.

As with any cross-sector mechanisms embedded within one particular ministry, a challenge in the implementation of EIA for irrigation projects is the coordination with other project proponents and ministries responsible for infrastructure, industrial or agricultural development.

In practice: experiences of ministries and donors

World Bank and Asian Development Bank

The World Bank and ADB, along with other international organizations, have been actively supporting the ECD in developing the EIA procedure since 2016. So that again, although the EIA procedure is considered in line with most international good practices, the main challenge resides in the limited resources of the ECD for reviewing EIAs and implementing compliance activities.

Besides, both WB and ADB have their own guidelines, respectively Environmental and Social Management Framework (ESMF) and Safeguard Policy Statement (SPS). Through the reviewed documentation from both donors, it appears that environmental assessments put much focus on impacts such as air and water pollution, soil erosion, community health and safety, and climate change (in the construction phase). Both organizations take into account changes in land use and especially deforestation as it impacts on sedimentation and the irrigation scheme efficiency. Though the ESIA Guidelines for Hydropower Projects stress past experiences of such projects in leading to the development of informal settlements by construction workers and their families -- which in turn may become a driver of deforestation, illegal hunting, etc. – the available

documentation from WB and ADB does not seem to take such issues into account. Besides land use change through deforestation, land tenure issues and related conflict may arise as a result of this process.

Finally, contrarily to the ESIA Guidelines for Hydropower Projects guidelines that call for a mapping of land ownership and any land acquisitions that have occurred within the last five years, WB's and ADB's document provide only for an analysis on land use and land tenure at the time of the assessment.

3.2.5 Multi-functionality of wetlands

Legislation and institutional set-up

There is currently no integrated approach to water resources in Myanmar. Although a National Water Policy (NWP) was adopted in 2014, it remains to be translated into directly applicable laws. With regards to the multi-functionality of wetlands, the NWP mentions fisheries only once and as an "auxiliary" use of water resources: "Primary utilization of the country's vast water resources consists of agricultural, domestic and industrial needs and hydro-electric energy production. Auxiliary uses of the water resources include transportation, fisheries and sociological purposes. As such, water resources projects' planning needs to be comprehensive enveloping all above aspects for the whole nation" (NWP, Article 4.6).

The Agricultural Development Strategy (ADS) that was adopted in 2018 promotes linkages across agricultural subsectors, notably through modernization of crop agriculture, livestock, and irrigation, but also fisheries and forestry/agro-forestry. It also aims at supporting the aquaculture sub-sector.

In legal terms, water for agriculture is managed by the Irrigation Law 2017, while fisheries resources are managed under the Freshwater Fisheries Law (2011), and aquaculture under the Law Relating to Aquaculture (1998). Though there are no specific provisions for co-management (or community) fisheries under the national law of 2011, Ayeyarwaddy Region and Rakhine State have adopted their own laws – respectively in 2012 (amended 2018) and 2014 – thanks to the decentralization process. Community-managed fisheries have been promoted through these two laws.

The Irrigation Law 2017 introduced the creation of Water Users Groups (WUGs) in the legislation, delegating management and maintenance of irrigation facilities at the local (village) level, while the IWUMD oversees supra-local irrigation facilities. As far as fisheries resources are concerned, access is constrained as most productive inland fisheries (particularly in the Ayeyarwaddy Delta) are to be exploited under licenses (leasable fisheries, tender licence fisheries, implement license fisheries).

Implications and shortcomings of the institutional set-up

There is currently no dedicated framework for the management of wetlands in Myanmar, which is thus tackled through different legislations and naturally prone to overlapping and contradictory laws and policies. Though the ADS or the NWP stress the need for an integrated approach on water-resources management, the institutions and committees supposed to create this integration are still very much nested within sector ministries, thus posing issues of coordination.

The lack of a unified legal framework poses many difficulties in managing water and land resources in wetlands such as the Ayeyarwaddy Delta. The multiple and often competing uses over flooded land are exemplified by conflicts between rice farmers who want their fields drained at the end of the wet season and fishers who want to retain water on the floodplain for as long as possible to increase production and until a time when fish prices rise. Water regulation decisions – especially regarding management of sluice gates for draining water out of the fields – are often

taken without consultations with a wide range of stakeholders, resulting in conflict among them (World Bank and MoALI 2019).

In practice: experiences of ministries

In practice, uncoordinated development objectives, notably between agriculture (i.e. crops) and fisheries, put an increasing pressure on land and water resources in wetlands. As stressed by the National Water Policy, water is primarily understood as a resource for agriculture so that in multifunctional wetlands, agricultural interests are prioritized over fisheries ones. While temporary agricultural uses of flood recession land were long undeclared and therefore unformalized under the law (see above), recent land allocation programs performed by the National League for Democracy (NLD) government (2010-2020) led to the distribution of LUCs on such lands. Consequently, conflicts ocurred between farmers cultivating during the dry season and fishers seeking access during monsoon. Amidst a lack of coordination between the cadastral department (DALMS) and the Department of Fisheries (DoF), these conflicting land plots may still be registered as fishing grounds (or inn) by the DoF and as such, leased as communal fisheries (GRET 2018a). Conflicts also happen over these newly registered paddy fields' local drainage canals. The DoF underlined the systematic prioritization of agricultural interests in conflict resolution process. It also stressed that development of drainage canals by private individuals has the full support of the Department of Agriculture and DALMS although it modifies the whole configuration of Inn and other fishing grounds. These canals are coveted by fishers especially when water recesses, but farmers - who are often themselves former fishers - may claim exclusive access to these as part of their registered land plot (GRET 2018a).

The promotion of aquaculture – even small-scale – may raise further issues with regards to water management in wetlands. According to Article 36 of the 1991 Freshwater Fishery Law, "No one shall erect, construct, place, maintain or use any obstruction such as a dam, bank or weir in a freshwater fisheries waters without the permission of the Department." Therefore, the legal conversion of water resources for aquaculture purpose requires that landowners apply for a difficult-to-obtain "change of land title document" known as La Na 39 (now La Ya 30). Given the 1991 Freshwater Fishery Law's protective restrictions (restated in Article 37 of the 2012 Ayeyarwady Freshwater Fishery Law), landowners, as well as temporary fishery lessees, have typically "circumvented" legal barriers by bribing local government authorities²⁴. This may lead to further mis-management of water resources and further constraint access to fishing grounds for small-scale fishers in particular.

4 Transversal research themes for understanding irrigated land tenure

We have seen through the typology elaborated in section 1 that, at the national scale, irrigation systems encompass a highly diverse set of infrastructures and techniques, extending from fully equipped irrigation schemes to non-equipped flood recession agriculture. This diversity is echoed by a wide range of land tenure issues, explored in section 2. The linkages between these two dimensions are logically framed by the existing legislation and institutional framework presented in section 3, with which donors interact through the rehabilitation of irrigation schemes. On the basis of these findings, we provide in this section a short analysis on relevant transversal themes for understanding irrigated land tenure dynamics and for further research in this field.

4.1 Donors' approach to irrigation in Myanmar: an indicator of weak land tenure security?

Strikingly, there is no current extension of irrigation scheme supported by international donors. Moreover, both interviews with donors and review of project documents (WB, ADB-AFD) made it clear that large-scale land acquisitions are a deterrent for the eligibility of proposed projects. Therefore, there are only rehabilitation programs of irrigation schemes in Myanmar at the moment, contrarily to some other countries, notably Cambodia. This can be explained by the fact that previously built irrigation schemes have been poorly implemented and maintained through time. There is therefore a greater need for rehabilitation than extension of new irrigation schemes.

Another possibly contributing factor is the history of large-scale land acquisitions characterizing Myanmar. From 1991 to October 2016, approximately 2 million ha of land were allocated, principally to agro-business and individual entrepreneurs, against a backdrop of evictions and conflicts pitting smallholder farmers against other actors such as companies, individual investors or ministries (San Thein et al. 2018). Large areas of land were unrightfully acquired through the Wasteland Instructions and later the VFV Law (see section 2.4). And if the legal framework with regards to land acquisition and compensation slightly improved recently, the major LARR law (2019) and other requirements such as ESIAs often fall short with regards to international standards (World Bank and MoALI 2019). Besides, as underlined for the Cambodia part of this study, individuals carrying out the EIAs are paid by the company that submits the projects, leaving the door open for biased results and conflicts of interest. Finally, major projects who led to (or aimed at) large-scale land acquisitions, as in the case of the Letpadaung copper mine, or the still pending Myitsone Dam on the Ayeyarwaddy river have faced growing opposition and protests.

Therefore, it seems that international donors are logically concerned by any project that could lead to land acquisition too large to be properly monitored.

4.2 Irrigation/water management and the "value" of land

The Myanmar government and donors alike clearly conceive irrigation as a main tool for improving the agricultural value of land. It seems, however, that such value is considered from a purely technical point of view (its fertility and suitability for agriculture) without further consideration for inclusion of land as an asset and a potential commodity. To be exact, the monetary value brought to land by access to irrigation water and the presence of irrigation infrastructures is formulated and taken into account only in the perspective of compensating possible land acquisitions (both under the Land Acquisition, Resettlement and Rehabilitation Law and donors' due diligence guidelines). Beyond potential financial costs that the government and donors could bear during the construction phase of an irrigation project, socioeconomic consequences of market-driven land concentration and linkages with indebtedness,

mechanization, social differentiation and land speculation are patently lacking from the conception (and for instance monitoring phases) of such projects – with exception of AFD which contracted an independent study on these issues (see 3.2.3).

While the Myanmar legal framework does not provide any clear mechanism to regulate land markets and limit land accumulation, studies show that at least in the Delta access to irrigation infrastructures (motor pumps, but also paying sluice gates' keeper to release water) in order to grow summer paddy has been and is still a factor of land dispossession for smallholder farmers and land accumulation for wealthier ones (Boutry et al. 2017).

The mixed agricultural and financial value of land brought by access to irrigation water is also relevant for understanding conflicts. This is particularly true in the case of disputes relating to alluvial lands. As explained in section 2.6, inter-villages and inter-individual conflicts are driven by the high demand and limited availability of these very fertile lands. Despite the legal framework (Farmland law 2012/2020) considering the allocation of alluvial land temporary in nature and land use rights untransferable, allocated land plots are often subjected to transactions and can generate substantial wealth for local elites (GRET 2018b).

Finally, the "value" of land also depends on national policies and their emphasis on a particular type of land use. As explained in section 3.2.5, in multi-functional wetlands water management can fuel conflicts between farmers on the one hand, and fishers on the other. Given the decades-long national policy of developing agricultural land, agricultural departments have gained much more weight in administrating and managing land access than, for instance, the Department of Fisheries. Therefore, the agricultural value (for growing crops and, in the last decades, for aquaculture) of the land disproportionally prevails on other potential uses in framing water management. Consequently, water management conflicts between farmers and fishers are systematically adjudicated in favor of farmers and the expense of fishers.

4.3 Irrigation as an instrument of State control/legitimation

Against the backdrop of national policies, which aimed to boost agricultural production through the last four decades (Boutry et al. 2017), the development of irrigation can be seen – at least in some instances – as a way of asserting State control and/or legitimation over the national population. Although Myanmar uplands are no longer a target for the systematic development of irrigation schemes and international donors' support, experience from the past decades provides a clear illustration of this process.

In Chin State, as mentioned in section 2.5, terracing for inundated paddy culture was actively supported with government funds under the *Upland Farm Mechanization Project*. Gravity-fed pipe irrigation and the delimitation of watershed forests were supported with funds from UNDP and WFP in the 1990s and 2000s. This program – together with other means²⁵ – allowed the then Ministry of Agriculture and Livestock, through its Department of Agricultural Mechanization (AMD), to extend its control over the uplands. Through this program, the centralized legal land tenure framework was applied for the first time to paddy terraces. Land Use Certificates grant a full ownership right, including the right to sell, mortgage and rent lands, while a number of communities may wish to include different provisions to strengthen the internal control of lands. For example, a number of communities would prefer that land sales remain regulated within village customary institutions so as to avoid lands falling into absentees' or outsiders' hands, and raising social inequities (Boutry et al. 2018).

Agricultural development and water management in the Delta were also employed by the central government in order to counteract "communist" insurrections. Incentivized clearing of forests and mangroves by farmers came hand at hand with polders built with WB's funds in order to get

²⁵ Timber was also brought progressively under the control of the Department of Forest and consequently escaped customary administration and management, particularly in the vicinity of the State capital Hakha.

rid of the rebels. This later caused issues of land tenure security for farmers whose paddy lands are still classified as forests (Boutry et al. 2017).

If we go back to alluvial islands, access to these highly coveted lands – for flood recession agriculture make them valuable – has increasingly been a mean of State legitimation. With the transition from the military-backed USDP (2010-2015) to the NLD government (2015-2021), allocation programs of alluvial lands already allocated under the former government served to create new allegiances to the later, and to assert its legitimacy (GRET 2018a).

The role of irrigation programs – as one of the many facets of development – in increasing State control would be worth researching in order to better assess their impact on the long run.

5 Conclusion

As per the findings of this study, most of the land currently located in command areas across the country is not subject to major tenure insecurity. Identified land tenure issues are principally observed in areas of partial water control – especially wetlands of the Ayeyarwaddy Delta – where conflicting uses over land and water management can lead to conflicts (e.g., between farmers and fishers).

This being said, a greater focus should be put on the indirect impacts of irrigation projects. First, the value brought by irrigation to land holdings – both in agricultural and financial terms – would be worth taking into account. Without access to fieldwork, this study could not bring definitive findings regarding the impact of irrigation programs on land transactions and related land accumulation processes within command areas. Questions however remain on how prospects of greater yields and therefore financial value of the land may lead to land exclusion for the poorest – and quasi-systematically indebted – farmers.

As of today, the military coup that happened the 1st February 2021 may totally change the reality of irrigation programs, and their possible impact on land tenure. If looking back at former military governments, concerns over fair land acquisition are likely to rise again. And while most foreign aid has been suspended for the time being, one may wonder how uncompleted projects will deal with this new context in the near future.

6 List of references

6.1 Documents cited

- ADB. 2016. "Republic of the Union of Myanmar: Irrigated Agriculture Inclusive Development Project." Irrigation Development and Management. Asian Development Bank.
- Allaverdian, Céline. 2019. Land Allocation on Alluvial Land. GRET. Myanmar Land and Livelihoods Policy Brief 3. Yangon.
- Amy Soe and Thanda Kyi. 2016. "Overview of Irrigation Development and Government Policy in Myanmar." *FFTC-AP*, 11.
- Aung-Thwin, Michael. 1984. "Hierarchy and Order in Pre-Colonial Burma." Jsoutasiastud Journal of Southeast Asian Studies 15 (2): 224–32.
- Boutry, Maxime, Céline Allaverdian, Marie Mellac, Stephen Huard, San Thein, and Tin Myo Win. 2017. "Land Tenure in Rural Lowland Myanmar. From Historical Perspectives to Contemporary Realities in the Dry Zone and the Delta." Of Lives and Land Myanmar Research Series. Yangon: Groupe de Recherche et d'Echanges Technologiques (GRET). http://mylaff.org/document/view/4011.
- Boutry, Maxime, Céline Allaverdian, Tin Myo Win, and Khin Pyae Sone. 2018. Persistence and Change in Hakha Chin Land and Resource Tenure: A Study on Land Dynamics in the Periphery of Hakha. GRET. Of Lives and Land Myanmar Research Series. Yangon.
- Boutry, Maxime, Marie Mellac, Charlotte Ravaux, Céline Allaverdian, Khin Pyae Sone, and Tin Myo Win. 2016. "The Golden Lands of Mandalay. Land Dynamics and Livelihoods in Peri-Urban Areas of Mandalay (Amarapura and Patheingyi Townships)." Research report. Yangon: Groupe de Recherche et d'Echanges Technologiques (GRET).
- Campbell, Stephen. 2019. "Reading Myanmar's Inland Fisheries: Postcolonial Literature as Theoretical Lens." Inter-Asia Cult. Stud. Inter-Asia Cultural Studies 20 (1): 2–18.
- FAO. 1999. "AQUASTAT Country-Profile: Myanmar." Rome (Italy): Food and Agriculture Organization. http://www.fao.org/nr/myanmar/aquastat-myanmar.pdf.
- ——. 2013. "Myanmar." Irrigation in Southern and Eastern Asia in figures AQUASTAT Survey 2011. Rome (Italy): Food and Agriculture Organization. http://www.fao.org/3/ca0401en/CA0401EN.pdf.
- Fujita, Koichi, and Ikuko Okamoto. 2006. "Agricultural Policies and Development of Myanmar's Agricultural Sector: An Overview." Discussion Papers 63. Institute of Developing Economies, Kyoto University. https://ir.ide.go.jp/dspace/handle/2344/138.
- GRET. 2018a. "Land Reallocation Assessment: Ahlan Site, Ahlan Village Tract, Maubin Township." GRET Land Tenure Project: Understanding rural land issues to engage comprehensive policy dialogue in Myanmar. Groupe de Recherche et d'Echanges Technologiques (GRET).
- 2018b. "Land Reallocation Assessment: Yae Le Gyi Village, Taw La Lote Village Tract, Maubin Township." GRET Land Tenure Project: Understanding rural land issues to engage comprehensive policy dialogue in Myanmar. Groupe de Recherche et d'Echanges Technologiques (GRET).
- GuB (Government of the Union of Burma). 1947. *The Constitution of the Union of Burma*. Rangoon: Superintendent of Government printing.
- Hochet, Peter. 2015. "La Problématique de l'accès Au Foncier et de Sa Sécurisation (Rapport Final)." Initiative pour l'irrigation au Sahel. COSTEA, CTFD.
- Hwa, Cheng Siok. 1965. "Land Tenure Problems in Burma, 1852 to 1940." Journal of the Malaysian Branch of the Royal Asiatic Society 38 (1/207): 106–34.
- Ivars, Benoit. 2020. "Alluvial Tactics: Land Access and Control on the Ayeyarwady River." *Journal of Burma Studies* 24 (1): 37–78. https://doi.org/10.1353/jbs.2020.0003.
- Ivars, Benoit, Charles-Robin Gruel, The Ngone Oo, and Jean-Philippe Venot. 2021. "Slippery Land, Ever-Shifting Boundaries: Claiming and Accessing Alluvial (Is)Lands in the Ayeyarwady Delta, Myanmar." Journal of Political Ecology 28 (1): 146–74. https://doi.org/10.2458/jpe.2309.

- Ivars, Benoit, and Jean-Philippe Venot. 2019. "Grounded and Global: Water Infrastructure Development and Policymaking in the Ayeyarwady Delta, Myanmar" 12 (3): 26.
 - —. 2020. "Claiming and Re-Claiming the Ayeyarwady Delta, Time and Again: The Case of Nyaungdone Island, Myanmar." *Journal of Political Ecology* 27 (1): 517–38. https://doi.org/10.2458/v27i1.23675.
- IWMI. 2015. "Improving Water Management in Myanmar's Dry Zone for Food Security, Livelihoods and Health." Yangon (Myanmar): Integrated Water Management Institute, National Engineering and Planning Services, Myanmar, Myanmar Marketing Research and Development Research Services.
- Khin Latt. 2016. "Improving Water Management and Irrigation Development in Myanmar for Food Security."

https://www.myanmarwaterportal.com/storage/eb/articles/93/Improving-watermanagement--irrigation-development-in-Myanmar-.pdf.

- Lieberman, Victor B. 1980. "Provincial Reforms in Taung-Ngu Burma." Bulletin of the School of Oriental and African Studies 43 (3): 548–69.
- MoNREC and World Bank Group. 2019. "Environmental Impact Assessment System Diagnostic." Washington, D.C.: World Bank Group.
- Mya Than. 1984. "Burma's Agriculture since 1962 From Stagnancy to Breakthrough." In Unreal Growth: Critical Studies in Asian Development, edited by Ngo Manh-Lan. Dehli: Hindustan Publishing Corporation.
- Mya Thein. 1997. "The Economics of Farm Size and Land Policy in the Transition to a Market Economy." Sojourn: Journal of Social Issues in Southeast Asia 12 (1): 124–34.
- Obendorf, Robert. 2012. "Legal Review of Recently Enacted Farmland Law and Vacant, Fallow and Virgin Lands Management Law: Improving the Legal & Policy Frameworks Relating to Land Management in Myanmar." Yangon: Food Security Working Group. http://www.forest-trends.org/documents/files/doc_3274.pdf.
- Sala, Sebastian, and Hosana Chay. 2019. "Unpacking Decentralization: Improving How States and Regions in Myanmar Issue Artisanal and Small-Scale Mining Permits." Yangon: Natural Resource Governance Institute.
- San Thein. 2012. "Study on the Evolution of the Farming Systems and Livelihoods Dynamics in Northern Chin State." Yangon: GRET.
- San Thein, Jean-Christophe Diepart, Hlwan Moe, and Céline Allaverdian. 2018. "Large-Scale Land Acquisitions for Agricultural Development in Myanmar: A Review of Past and Current Processes." 9. MRLG Thematic Study Series. Vientiane: MRLG.
- Schulte, William J., and M. H. Baird. 2018. "Myanmar's Nascent Environmental Governance System: Challenges and Opportunities." Natural Resources and Environment 33 (2): 21– 26.
- Silva, Sanjiv de, Petra Schmitter, Nyan Thiha, and Diana Suhardiman. 2019. A Handbook for Establishing Water User Associations in Pump-Based Irrigation Schemes in Myanmar. International Water Management Institute (IWMI), CGIAR. Colombo (Sri Lanka). https://wle.cgiar.org/handbook-establishing-water-user-associations-pump-basedirrigation-schemes-myanmar.
- Turnell, Sean. 2008. Fiery Dragons: Banks, Moneylenders and Microfinance in Burma. Copenhagen: NIAS Press.
- Venot, Jean-Philippe, Samuel Bowers, Dan Brockington, Hans Komakech, Casey Ryan, Gert Jan Veldwisch, and Philip Woodhouse. 2021. "Below the Radar: Data, Narratives and the Politics of Irrigation in Sub-Saharan Africa" 14 (2): 27.
- Venot, jean-philippe, and Jean-Philippe Fontenelle. 2016. "Politique de l'Irrigation Au Cambodge : Articulations et Enjeux Des Interventions de l'AFD." Phnom Phen, Paris: COSTEA. https://doi.org/10.13140/RG.2.2.22908.59524.
- World Bank and MoALI. 2019. "Myanmar Country Environmental Analysis. Sustainability, Peace, and Prosperity: Forests, Fisheries, and Environmental Management." Washington, D.C.: World Bank.

6.2 Geospatial datasets

- ESA-CCI (European Space Agency Climate Change Iniative) 2016. Land cover, https://maps.elie.ucl.ac.be/CCI/viewer/index.php
- FAO 2005. AQUASTAT Global Map of Irrigation Areas. Food and Agriculture Organization of the United Nations (FAO).

http://www.fao.org/nr/water/aquastat/countries_regions/MMR/index.stm, 06/03/2020

- Joint Research Center 2020. Global Surface Water, <u>https://global-surface-water.appspot.com/download</u>
- MIMU (Myanmar Information and Management Unit). <u>http://geonode.themimu.info/search/?title_icontains=Myanmar%20River%20Network%</u> <u>20250K%20scale&limit=100&offset=0.</u>
- ODM (Open Development Mekong) 2018. Myanmar Dams Shapefile, <u>https://data.opendevelopmentmekong.net/dataset/myanmar-</u> <u>dams/resource/2b98adde-b793-4423-b5a3-0003e4088368?type=dataset</u>.

Annex 1. List of interviewees

Mathilde Gasperi	AFD Yangon Senior Project Officer
Ryutaro Takaku	ADB headquarter (South-East Asia department)
Anuja Kar	World Bank Economist (Myanmar Agriculture Development Support Project)
Nay Nwe Linn Maung	World Bank Consultant (Myanmar National Food and Agriculture Systems Project)
Duncan Boughton	Michigan State University, Agriculture and Rural Development Sector Working Group, Yangon
San Thein	Technical Advisor, Myanmar Agricultural Development Strategy

Annex 2: Question guideline for Key Informants interview

Introduction

- Brief explanation about the survey and interview objectives
- Short self-introduction by the interviewee (background, experiences in the irrigation sector)
- Quick presentation of the typology for both countries (to quickly dive into the subject matter)

General mode of intervention in the irrigation sector

- Brief history of the organization in terms of support to irrigation in Myanmar? How did it start? The question of the origin?
- Type of irrigation schemes that are supported in Myanmar and Cambodia
 - o Rehabilitation New scheme
 - Location (agro-eco systems)
- Type of support provided by the organization (direct or indirect via third parties)
 - Institutional: e.g. law/policy making
 - Technical: e.g. design-engineering-supervision
 - Social: e.g. water management
 - Financial: e.g. support the investment
- Do you provide support always with the same package of intervention versus flexible/adaptive support? Any differences according to agro-eco system? Explain

Issues identified during feasibility study

- How are made decisions to support irrigation (explain)
 - Cooperation framework with governments (which ministry, etc.)
 - In conjunction with other partners (who, etc.)
- Do you use any particular document to conduct the feasibility? Your own organization due diligence guideline? Other reference guideline such as Environmental Social safeguards? State law and policy?
- If you use documents other than State law and policy, what is the government readiness to work with them?
- Do these documents have any specific content concerning land tenure management? Explain
- Content of the feasibility study
 - Identification of agrarian changes/dynamics (land expansion, cropping, livestock, natural resources management)
 - Identification of household beneficiaries?
 - Identification of households excluded (but not expropriated)? Do they benefit from other measures?
 - Identification of households who will be expropriated?
 - Describe mechanisms of compensation and relocation
 - o Identification of local stakeholders with influence on water management
 - State, private sector, other
 - Water use arrangement
 - Land rights study
 - Identification of local stakeholders with influence in land management
 - Identification of pre-existing land tenure arrangements in existing command perimeter
 - Pre-existing land market (sale-purchase/in-out tenancy)
 - Identification of land tenure arrangements in future command perimeter (in case of expansion)
 - Identification of land tenure arrangements in new location (for expropriated households)

- What sort of issues conflicts are typically found during the feasibility phase (in general, not only land)? How do you (or your partners) go about these?
- Are results of the feasibility study made public? How? Are there subject to complaints? How are these addressed?

Issues during construction or rehabilitation

- Are there new services provided to farmers during the construction/rehabilitation of the irrigation scheme. By whom? Do you (or your partners) monitor these?
 - Micro-credit
- Training
 - Titling
 - Other
- Are there new issues coming up during the construction/rehabilitation of the irrigation scheme? Do you monitor these? Do you (or your partners) intervene?
 - Conflicts, specify
 - Free or coerced land market
 - Land speculation
 - Uptake of credit

Issues during implementation

- Are there new services provided to farmers after the construction/rehabilitation of the irrigation scheme, once the irrigation scheme functions? By whom? Do you (or your partners) monitor these?
 - Micro-credit
 - Training
 - o Titling
 - o Other
- Are there new issues coming up after the construction/rehabilitation of the irrigation scheme, once the irrigation scheme functions? Do you monitor these? Do you (or your partners) intervene?
 - Conflicts, specify
 - Free or coerced land market
 - Land speculation
 - Uptake of credit
- Water use agreement
 - How the agreement is established (designed). Do you have a role in this?
 - What are the key element of this water use agreement?
 - Is there any specific content concerning land issues on the water agreement? Specify

Prospects

• In general, do you think land issues are sufficiently studied and addressed in your intervention? Why?