

Scaling climate services requires tailoring climate information delivery to address the needs of farmers with different livelihoods strategies, socio-economic context, and management for various cropping systems. Tailoring the climate services to each livelihood should respond to specific climate risks, management responses, dissemination channels, delivery time, information products and stakeholders' network among other aspects.



Photo source: Vietnamdiscovery.com, adventure-life.com

CLIMATE SERVICES NEEDS IN MEKONG RIVER DELTA: FLOOD IRRIGATION PADDY

OVERVIEW

Scaling climate services for rural livelihoods

This report presents a summary of the climate services baseline for the main cropping systems supporting the rural livelihoods in Mekong River Delta (MRD) of Vietnam. The national assessment on the demand for climate services is a major activity under the project, 'Applying seasonal climate forecasting and innovative insurance solutions to climate risk management for the agriculture sector in Southeast Asia', also known as 'DeRISK Southeast Asia'. The Ministry of Agriculture and Rural Development (MARD) – Department of Crop Production (DCP) is the primary partner for implementing the national assessment with support from the local authorities situated in MRD. This summary is complemented with a database capturing detailed information for all the livelihoods in MRD.

This technical step should support further actions towards a climate services strategy for MARD and defining efficient mechanisms to reach Vietnamese farmers with the weather- and climate-based advisories and the stakeholders' network for sustained service delivery. DeRISK Southeast Asia with support from MARD, National Center for Hydro-Meteorological Forecasting (NCHMF) and CGIAR Research Program for Climate Change, Agriculture and Food Security (CCAFS) in Southeast Asia, is implementing field-level pilots for climate services delivery to build evidence and support the scaling process in Vietnam.

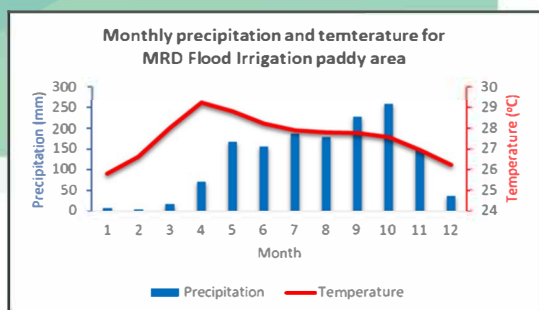
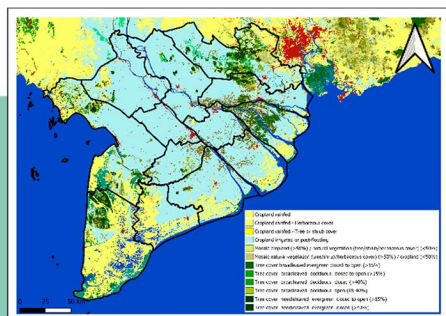


Figure 1. MRD climate and land cover: (a) land cover, (b) annual precipitation and temperature cycle for Mekong River Delta Flood Irrigation Paddy.

AGRO-ECOLOGICAL ZONES (AEZ) AND AGRICULTURAL LIVELIHOODS

General overview of study sites

The MRD is located in Southwest of Vietnam. It is situated between 8°30'–11°30'N and 104°30'–106°50'E and is the vulnerable end of the Mekong river (Kuenzer et al., 2013). It is one of the two most important rice granaries of the country, alongside Red River Delta in the North, with 2.4 million hectares of total agricultural land area in MRD. Crop land area covers almost the whole region (blue in Figure 1a) and irrigated cropland account for 90% (Van Kien et al., 2020).



Agricultural products from MRD are also exported to the international market.



The most dominant topography is low-level plain, with elevation not more than three metres above sea level and criss-crossed by a complex system of canals and rivers with very low slope.



Regarding soil fertility, clay soil texture in both layers' topsoil and subsoil and without modifiers and the same as soil with saline modifier occupied the largest extent with large alluvium in rice cultivation area (Minh & Trí, 2016).



With reference to geographical location, topography and geological characteristic, the region has a Type 2 distinguished climate where there are two pronounced seasons: wet from May to October and dry from November to April (Dung, 2018).



Figure 1b depicts the average monthly temperature and precipitation in the study site area, indicating that mean precipitation in wet season reaches the highest level in October, at about 300 mm.



In contrast, in dry season, high temperature and significantly low precipitation are reported.

LIVELIHOOD ZONES

Main livelihoods in Mekong River Delta region

Table 1. List of main livelihoods in Mekong River Delta region

LLH No.	Livelihood name
004	Mekong River Delta: Flood irrigation paddy
005	Mekong River Delta: Flood irrigation paddy and cash crops
008	Mekong River Delta: Flood irrigation paddy and orchards
009	Mekong River Delta: Flood irrigation paddy and tourism
010	Mekong River Delta: Orchards
011	Mekong River Delta: Lowland paddy and coconut
012	Mekong River Delta: Upland paddy
014	Mekong River Delta: Orchards and coconut
015	Mekong River Delta: Cash crops (root crops)
016	Mekong River Delta: Flood irrigation paddy and aquaculture
017	Mekong River Delta: Lowland paddy and aquaculture
019	Mekong River Delta: Vegetable production
020	Mekong River Delta: Orchards and cash crops
022	Protected areas: Small scale paddy production
023	Mekong River Delta: Saline irrigation paddy
026	Mekong River Delta: Saline irrigation paddy and cash crops
027	Mekong River Delta: Saline irrigation paddy and orchards

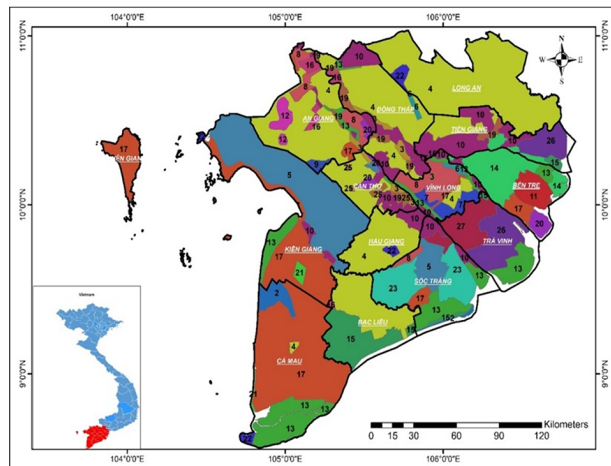


Figure 2. Livelihood map in Mekong River Delta and Flood irrigation paddy (in yellow)

Table 1 and Figure 2 show the list and distribution of typical rural livelihoods (LLHs) in MRD developed using the Consolidated Livelihood Exercise for Analyzing Resilience (CLEAR) approach implemented in Vietnam – a collaboration between World Food Programme (WFP), Vietnam Institute of Fisheries Economic and Planning under MARD and International Center for Tropical Agriculture (CIAT). The maps developed from this process were validated and updated through a participatory workshop with local agricultural experts and stakeholders (details in Annex).

The MRD is an agro-ecological region covering 13 provinces in the south of Vietnam. Out of the 13, eight provinces attended the validation process organized by the project including Can Tho, Dong Thap, An Giang, Tien Giang, Kien Giang, Tra Vinh, Ben Tre and Soc Trang. The original livelihood maps from WFP-CLEAR were used for the five provinces that were absent during the workshop.

The region shows diverse livelihoods that are dependent on different combinations of key crops, particularly rice, orchards, and cash crops. However, based on climate conditions, paddy rice in MRD is separated into two different livelihoods: flood irrigation paddy and saline irrigation paddy. In this report, MRD flood irrigation paddy is taken into consideration (the yellow region number 4 region in Figure 2) to assess the climate service's needs.

SOCIO-ECONOMIC INDICATORS IN THE FLOOD IRRIGATION RICE

Livelihood flood irrigation paddy covers a large area of Mekong delta region, especially in Can Tho, Dong Thap, An Giang, Tien Giang, Long An, Bac Lieu and Hau Giang. Table 2 provides a short description of socioeconomics within the analyzed livelihood area. Almost half of the households own their land (49 %) and have relatively low poverty rates (only 12% being poor or nearly poor). The proportion of female headed households is 42%. Kinh ethnic accounts as the dominant group, while 3% belong to Khmer. The region is mostly dedicated to agriculture with a small fraction of natural forest cover (2%).

Table 2. Socio-economic indicators in the Flood irrigation rice

Socio-economic indicators	Value (%)
Share of poor + nearly poor households	12%
Share of female head households	42%
Share of households who own land	49%
Dominant ethnic groups	97% Kinh (Viet), 3% Khmer
Professional qualifications	86% Uncertified training 8% Certified training 2% Graduate 2% Primary vocational 1% Vocational college 1% Secondary and high vocational

SELECTED CROPPING SYSTEMS

There is a diversity of crops and cropping systems in MRD. For example, rice-cash crops rotation, fruit trees mono-cropping/intercropping or rice/aquaculture, etc. MRD is known as the “rice basket” of Vietnam with 73.9% agricultural land utilized for rice cultivation, in which double-rice and triple-rice are two typical cropping systems and they are all rotation systems (Kuenzer et al., 2013). Additionally, two-rice-crops per year are mostly planted in the northern parts of the delta which are away from rivers and are the dominant crop in livelihood flood irrigation paddy. On the other hand, triple-rice is cultivated mainly in the central part that is directly connected to river systems (Nguyen et al., 2015). These two systems were identified during the climate risk workshop (CRW) and considered in the detailed description below.

DEMAND FOR CLIMATE SERVICES

Assessment of climate services needs in Mekong River Delta

Crop calendar and management practices



The triple-rice cropping system takes about one year to complete its life cycle with three different seasons: winter-spring, summer-autumn, and autumn-winter. Before the beginning of the first season, a series of management practices are applied such as land preparation, weeding, ploughing and herbicide application. Soaking seeds in water for rapid sprouting is also one important practice. Seed sowing is normally carried out in mid-November, followed by top dressing and pesticide application. As the tillering stage begins, the second top dressing is applied to promote growth. The flowering and maturity begin right after heading and are completed in three weeks.

Climate risks experienced in the last 10 years



From the period 2010 to 2019, climate risks such as flood, intense rainfall, drought, and saline intrusion were recorded in the study site. While intense rainfall and flooding were more common, drought and saline intrusion happened two to three times and these phenomena directly influenced the cropping systems in MRD particularly the Flood irrigation paddy.

The major challenge in Flood irrigation paddy region based on results from CRW is the occurrence of flood. This climate risk happened frequently with at least five to 10% decrease in productivity per year, especially from August to October. The years 2010, 2011, and 2018 were the worst since it stroked during the harvesting from the previous season and seed sowing for the upcoming one, causing severe losses in infrastructure and agriculture (i.e. dam/dike broken) and total loss (100%) of agricultural productivity and quality based on the participants from CRW.

Institutional support



Implementation of adaptation measures requires support from various organizations, both public (mainly) and private sectors, to address the barriers to adaptation. From the public sector, they are mainly governmental organizations/units from provincial to communal level, whose mandates are to support farmers directly or indirectly in the form of information, techniques, and finance, to help them better manage their agricultural production activities. The table below summarises the institutions in the support network of farmers in the livelihoods, the results from CRW.

Management responses supported by climate service



The construction of dykes has historically been the principal strategy of Vietnam to mitigate the effects of the flood on agricultural production, specifically in the most threatened regions (Smajgl et al., 2015). Dike systems in the Flood irrigation paddy in MRD have been operated and improved frequently since the flooding in 2011. Currently, there is about 10,000 km canals and 20,000 km of dikes found in MRD (Van Kien et al., 2020).

Additionally, soft adaptation measures, including crop calendar adjustment, irrigation/drainage regulation, alternate wetting and drying (AWD) irrigation or cultivation trainings for farmers have the potential to substantially mitigate livelihood threats from flood. In terms of saline intrusion and drought, although these phenomena did not affect the cropping systems seriously, recommended climate responses are still applied to eliminate unwanted impacts. The responses for drought are comprised of digging drain ditch, choosing drought tolerant varieties, improving pumping infrastructure and operating water storage system according to tide are used whenever it happens.

Climate information needs



Rice production in the Delta may be severely impacted by extreme events such as drought, flood and saline intrusion, which are increasingly more complicated due to climate change (Sebastian et al., 2016), causing decreased agricultural productivity and product quality. A participatory assessment in MRD, co-organized by MARD-DCP and DeRISK Southeast Asia in 2019, indicated that the farmers' needs for climate information are temperature, precipitation, wet/dry season starting day and duration for better crop calendar development.

In terms of disaster forecast, even though this information is updated and disseminated before each season, it is relatively limited in time of delivery to apply prompt management responses. Therefore, information needs for extreme events are comprised of drought and saline intrusion. The information product shall cover the first six months of the year and shall be delivered to farmers about one-month prior to the start of the dry season. Storms and flood are expected to be disseminated at least 10 days prior and shall focus on August, September, and October months, when the phenomena happen at high frequency and intensity. The information shall also include response measures for rice. The climate information should be broadcasted through various channels such as TV, radio and mobile phones.

ANNEX: CLIMATE RISK WORKSHOP

The Climate Risk Workshop (CRW) is an approach carried out to assess the needs for climate services by determining climate and non-climate risks and their impacts on main agricultural livelihoods. This activity also aimed at mapping the current and available practices that farmers and local networks implement to cope with climate variability, with the goal of identifying opportunities to improve farming practices and decision-making.

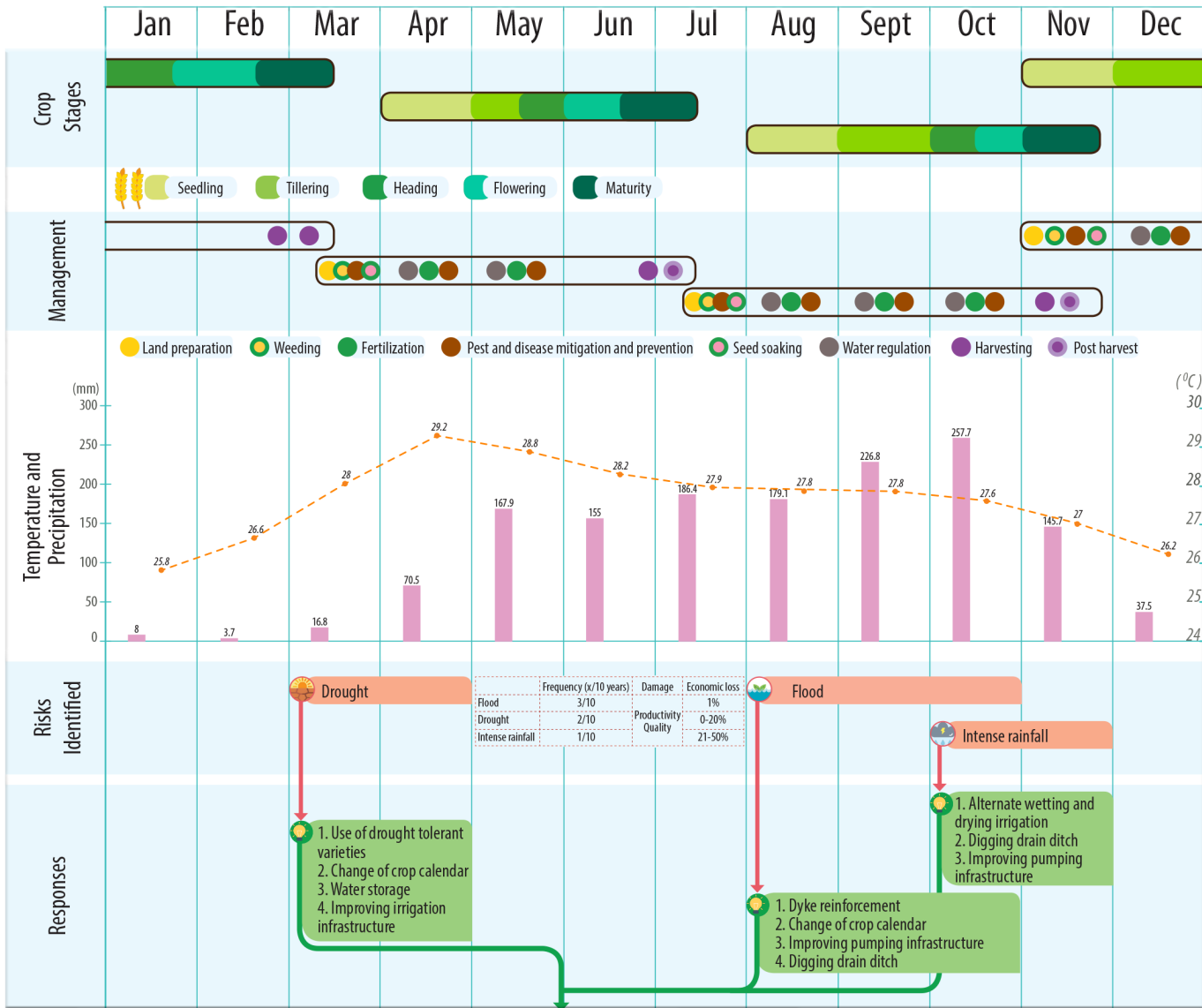


CRW in Mekong River Delta was carried out in Can Tho City with almost 50 participants, including 15 female and 26 male participants from eight provinces in the region which periodically experiences severe climate risks (Tien Giang, Dong Thap, Can Tho, An Giang, Soc Trang, Ben Tre, Kien Giang and Tra Vinh). The participants included local crop experts, national institutions such as Ministry of Agriculture and Rural Development (MARD).

At regional level, South Center of Meteo-hydrological and South Institute of Water Resources Planning were present and provincial level participants comprised of Provincial Sub-department of Crop Production & Extension Center from South Central (mainly directors, vice directors and staff of crop production).

Based on the complicated and urgent disaster risks in this area, representatives from the Departments of Irrigation play an integral part in terms of disaster management and prevention, and they were also key participants in the workshop.

ANNEX: LIVELIHOOD INFOGRAPHICS



RICE - RICE - RICE

Mekong River Delta Flood Irrigation paddy

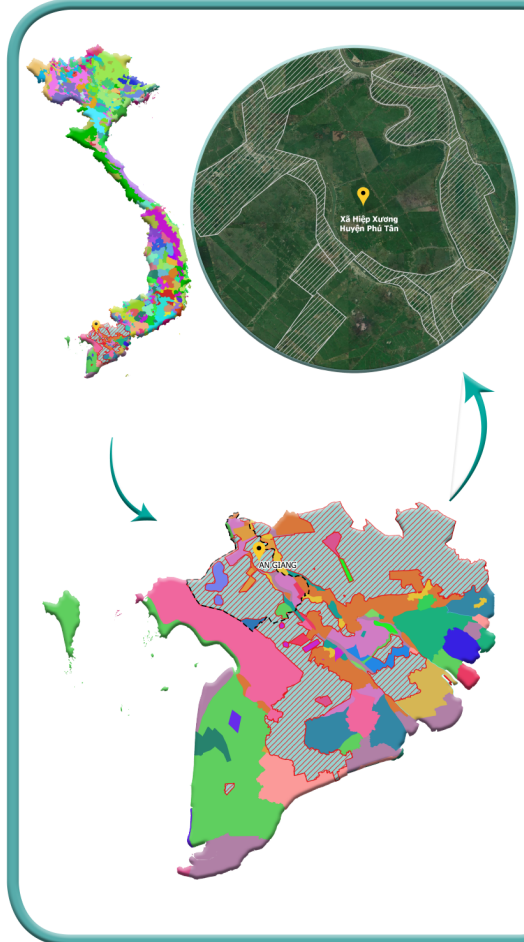
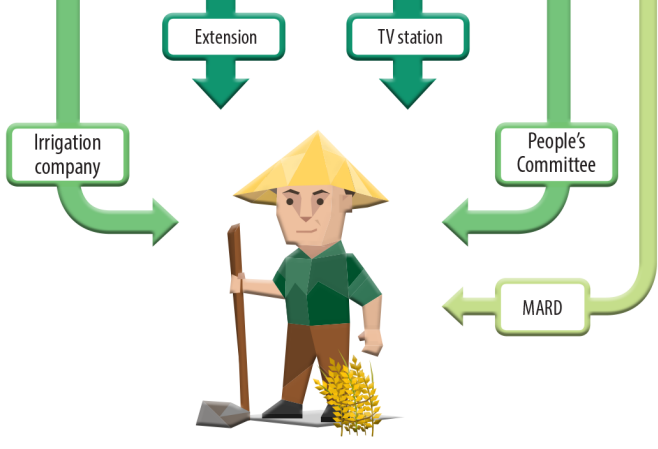
Climate Info Products

Information Booklet

Items: Forecast: • Rainy season duration (sep, oct, nov)
• Saline intrusion (feb)
• Pests and diseases (12 months)
• Dry spell, intense rainfall, storm advisories, tornado, flood tide (any time if it happen)

Lead time: • Climate factor: Begin of sep
• Extreme weather: 1 month before

Channel: • Smartphone, TV



- 12% Poor+nearly poor households
- 42% Headed by female
- 49% Share of households who own land
- 2% Forest coverage
- Dominant ethnic groups: 97% Kinh (Viet), 3% Khmer
- 86% Uncertified training
- 8% Certified training
- 2% Graduate
- 2% Primary vocational
- 1% Vocational college
- 1% Secondary and high vocational