

# Development Potentials of Floating Rice Cultivation in Ayeyarwady Delta Region, Myanmar

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# Physical Features

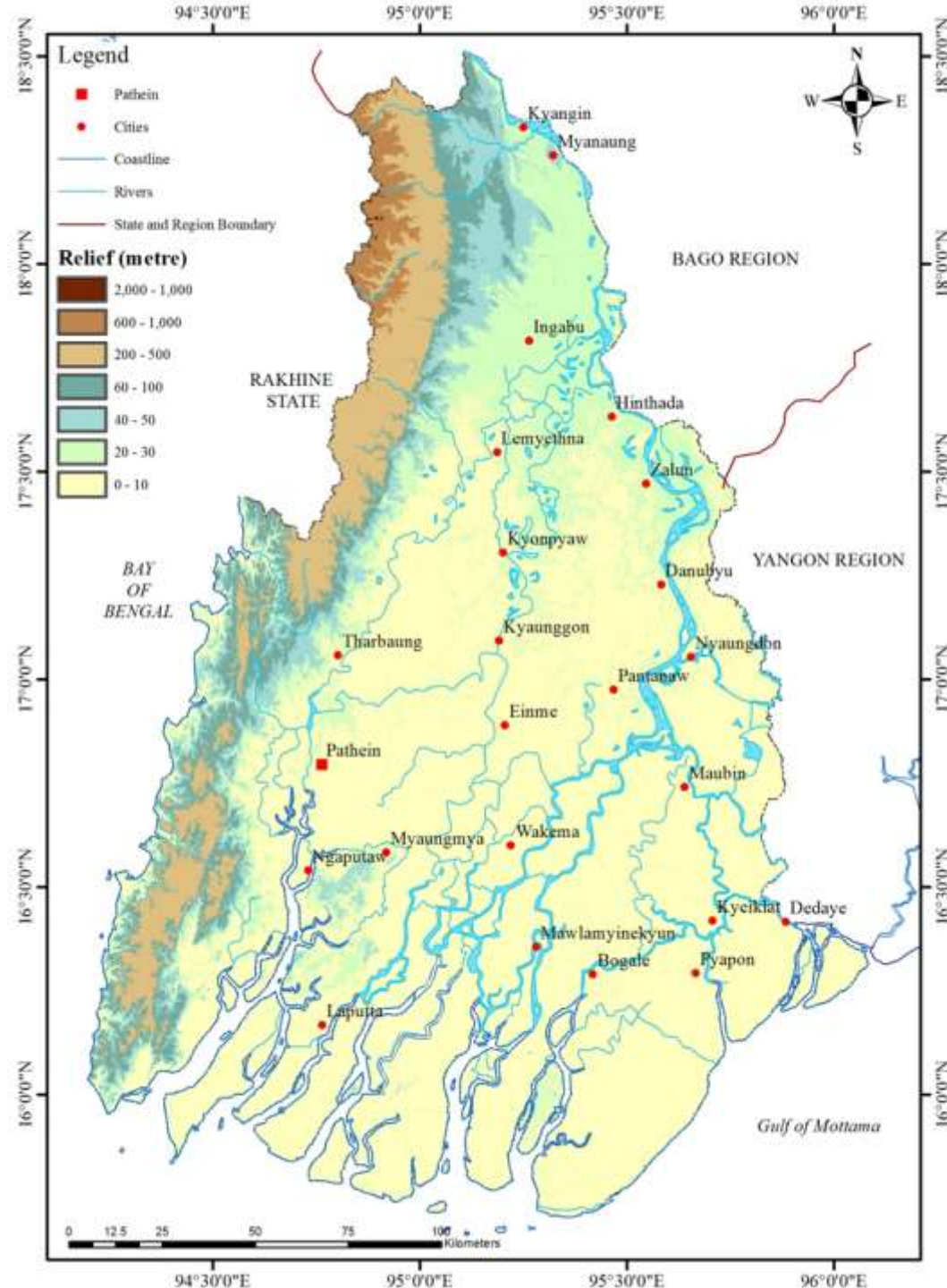
35034 square kilometers (13528 square miles) - 5.18 % the total area of Myanmar

west by the southern Rakhaing Yoma range - east by the Bago Yoma.

the delta system - extends near Myan Aung ( $18^{\circ}15'N$ ) to the Bay of Bengal and Andaman Sea, 290 km to the south.

at Kyangin Township, the elevation of the plain is 76-152 meters (250-500 feet).

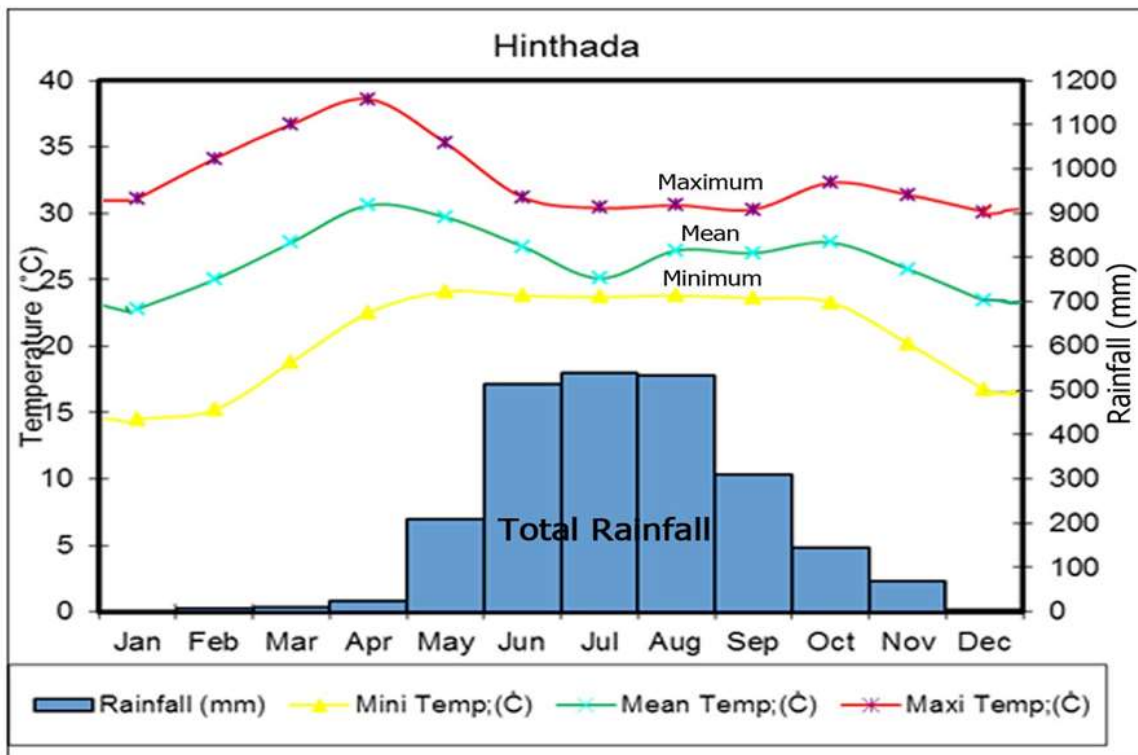
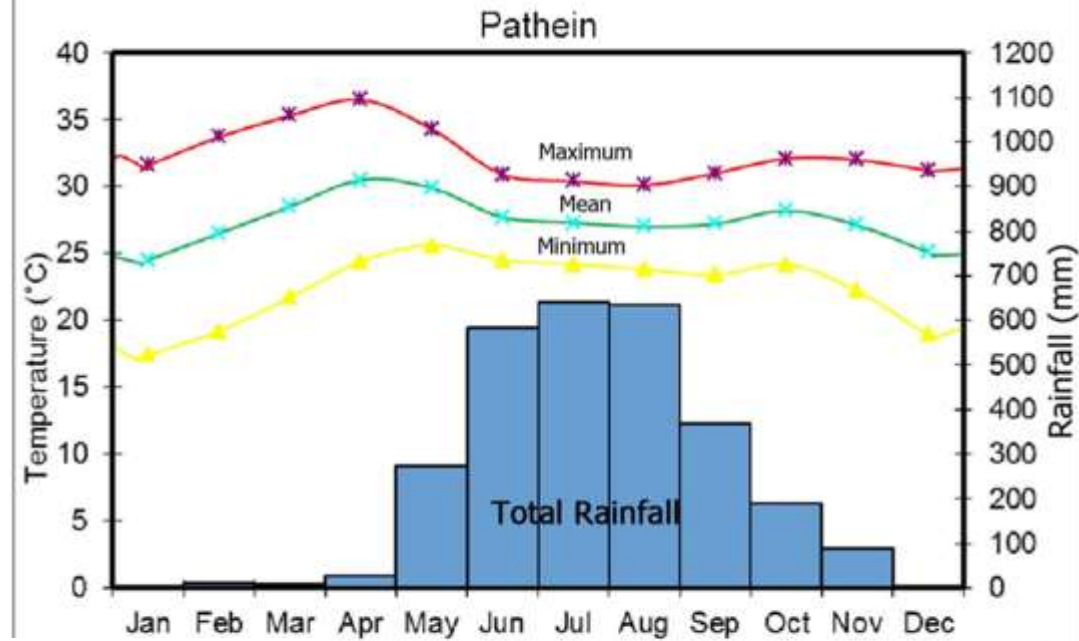
appearance of delta morphology becomes more vivid to the south of Pantanaw Township.



# Climate

region experiences Tropical Monsoon Climate (Am)-

average annual rainfall of about 1,500-2,000 mm (2,500 mm -3,500 mm(N to SW)



◆ Mini Temp;(°C)   
 ◆ Mean Temp;(°C)   
 ◆ Maxi Temp;(°C)

The annual maximum temperatures 32.4°C (88.52°F) in Pathein & 32.7°C (89.06°F) in Hinthada

(due to its location distant from the sea)

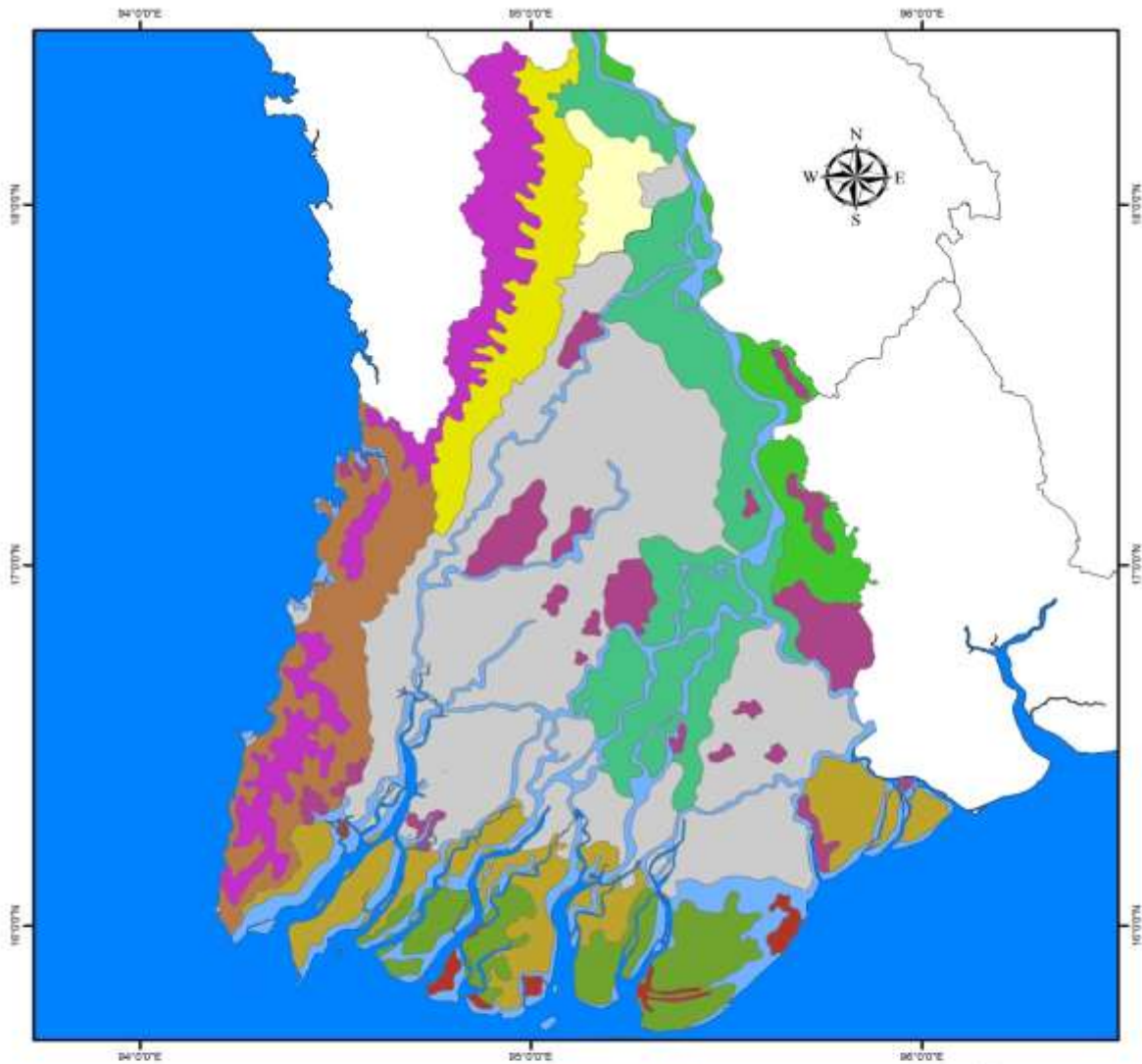
Cyclones can cause serious storm surges (The storm forms in the Bay of Bengal occasionally passes through the region(Nargis storm )

## Soils Type

recent alluvium brought down by the Ayeyarwady River.

large sediment load delivered annually to the gulf by the Ayeyarwady and Thanlwin (Salween) Rivers.

Loss of sediment may have also impact on the fertility of the agricultural land consequence of deforestation and land use changes in the fragile upstream areas



### Legend

#### SOILNAME

Alluvial Soil	Meadow & Meadow Alluvial Soil
Dune Forest & Beach Sand	Red Brown Forest Soil
Gley & Gley Swampy Soil	Saline Swampy & Meadow Gley Soil
Lateritic Soil	Swampy Soil
Mangrove Forest Soil	Yellow Brown Dry & Indaing Soil
	Yellow Brown Forest Soil

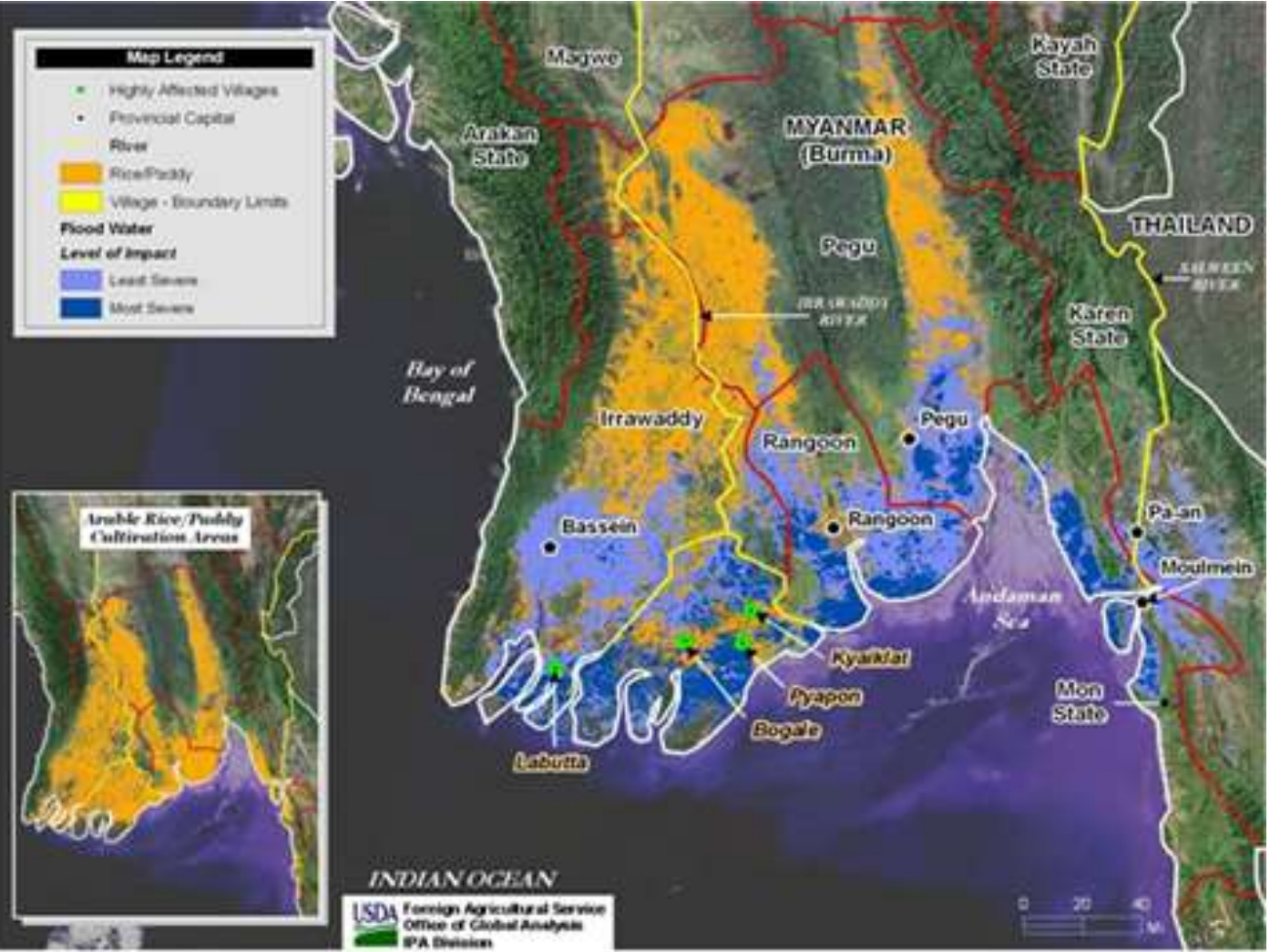
# Flood

The threat of flooding usually -June, July, August and late September to October with the highest risk in August around the period of peak monsoon rains

In the Ayeyarwady River basin, farm land, towns and cities situated in the low lying area are protected by embankments from flooding.

The protection of west and east bank of Ayeyarwady River in the delta area was completed in 1929-1930.

In 1974(90 years)47.5 ft (14.48 m) at Hinzada - many crop areas in the delta were inundated



- In 1991, the damage of **Hteinngu** embankment (1,146,000 ha of paddy land, 68,000 ha of other crops. 74,740 houses flooded, 74,674 animals drowned and 326,926 people from 269 villages from 8 townships affected)
- In 1997, Hinzada, which was 0.1 ft (0.03 m) higher than the 1974 flood level. (202342 hectare (500,000 acres))

### **Land Reclamation in Nyaungdone Island**

- Nearly 40468 hectare (100,000 acres) of unused deep water field- 29 village tracts
- Area - Nyaungdone Island (77056.88 hectare)

## **Flood-based Farming System**

- ❖ **5 percent of all national land - produces most of the rice requirements of the country( total Paddy cultivated areas- for Union -8067 hectors- 48% - 43% of GDP**
- ❖ **Annual rice production - 30 % of total production in Myanmar.**
- ❖ **Most of the agricultural land - small-scale farmers (JICA, 2013)**
- ❖ **fishery - second important source of income after farming in the delta**
- ❖ **Rice - black gram and vegetables as winter crops**
- ❖ **Some vegetables - the surplus as other source of income(cauliflower, cucumber, water melon, pumpkin, leaf on small-scale farmland)**
- ❖ **vegetables - important income source mainly for landless farmer**
- ❖ **Rice farming, aquaculture, poultry and pig farms are being operated**

# Agriculture under pressure by climate change, flooding and salinity intrusion

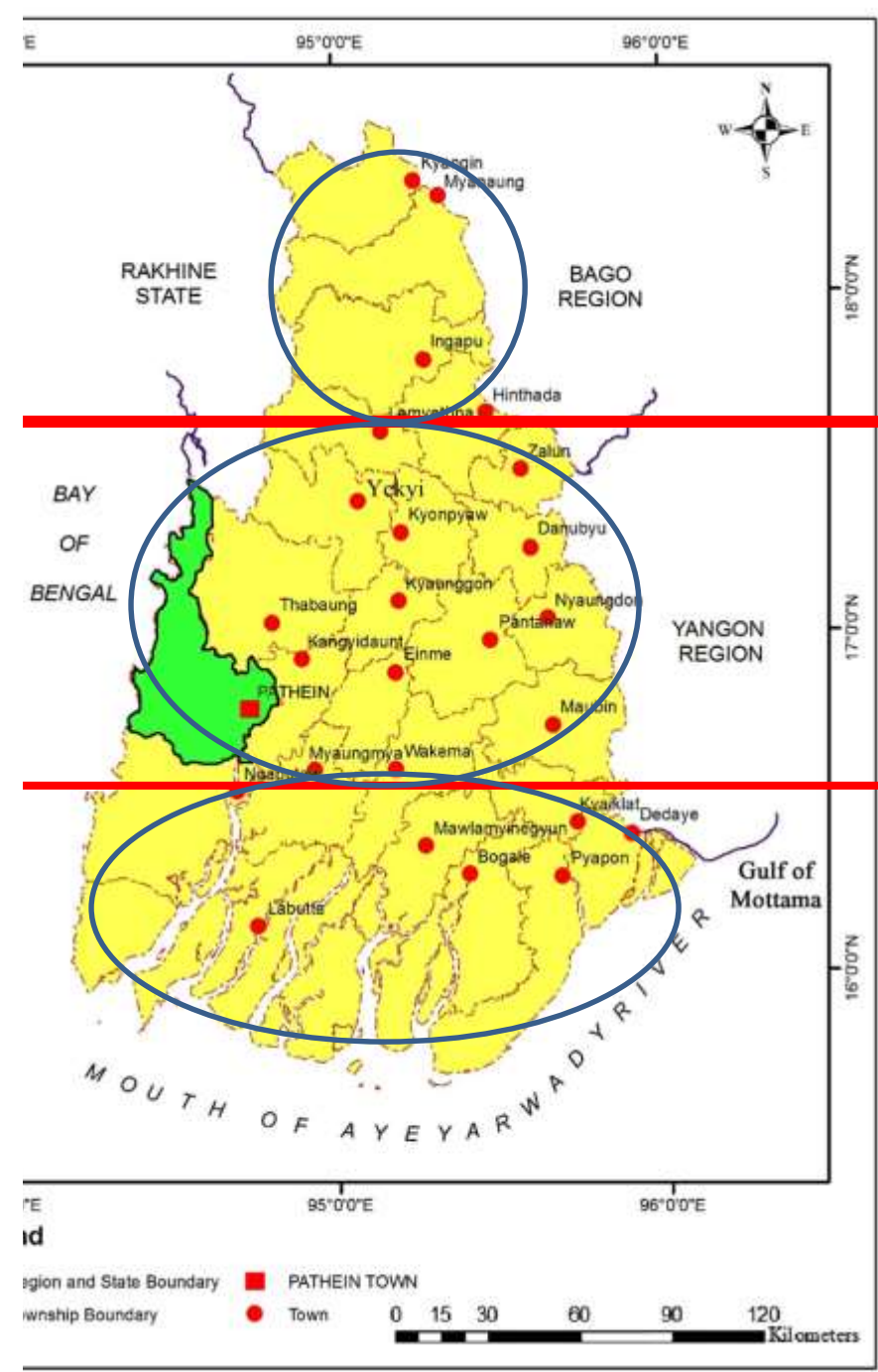
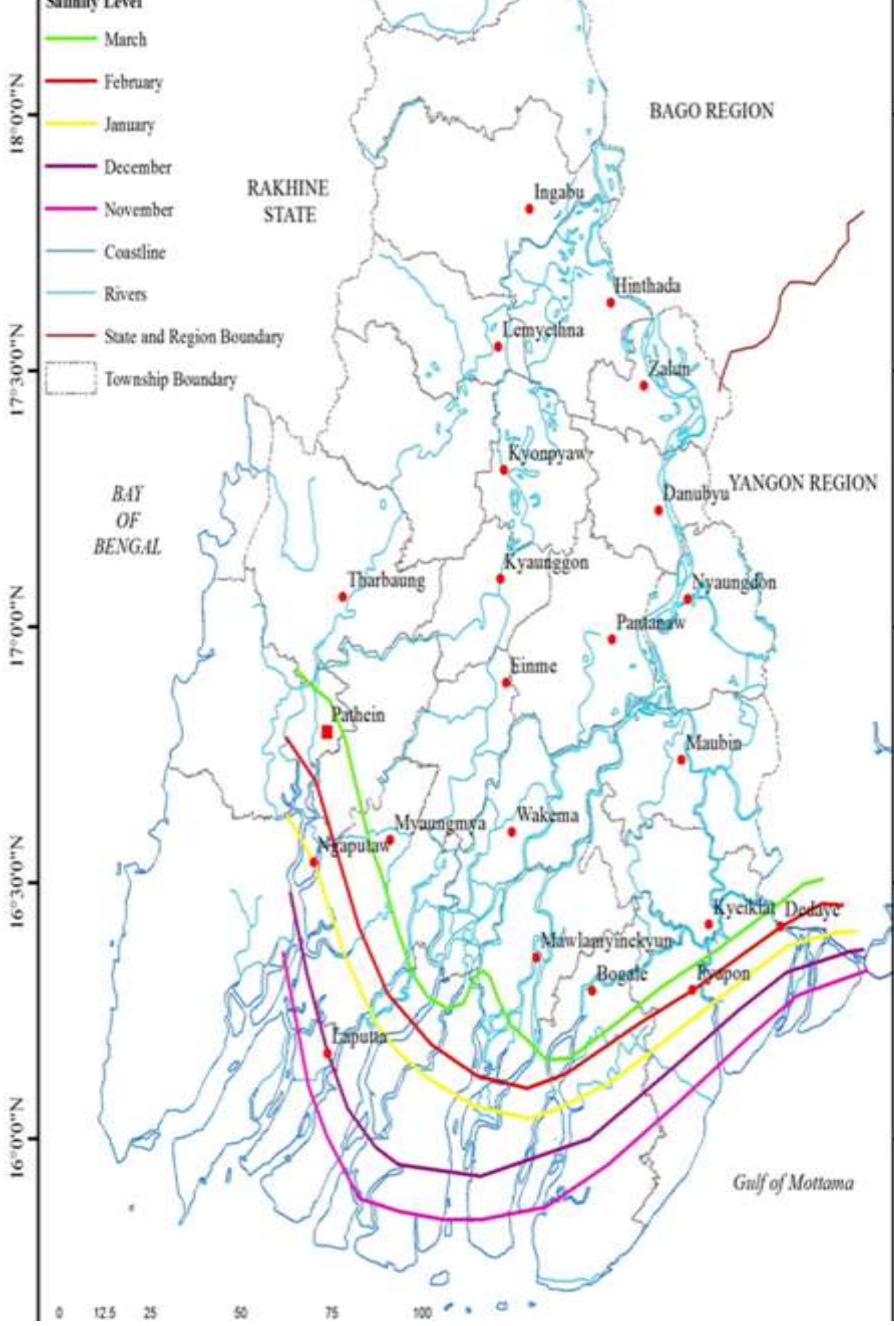
- Agriculture in Ayeyarwady - is **vulnerable** to climate change.

## Changes in Physical Features

- **rise in temperature** in Myanmar is expected to have major negative impacts on agricultural production and food security (Wassmann et al., 2009).
- Increased river and **flash floods** (mainly in the Middle and Upper Delta) will damage the crops and therefor the income of the farmers.
- increasing **salinity intrusion** is largest - period during which fresh water is available will likely decrease- have direct impact on agricultural production.(Nargis-2008)
- an **increase of the discharges -water level** - the area along the rivers and coastal areas, the probability of flooding increases (2008, 2012, 2015)
- ( **enough land for potential for floating rice or deep water rice**)



# Salinity Influence in the Ayeyarwady Region



## Current Cropping Patterns

(A)	J	F	M	A	M	J	J	A	S	O	N	D
FR												
SP												

(B)	J	F	M	A	M	J	J	A	S	O	N	D
FR												
BG												

(C)	J	F	M	A	M	J	J	A	S	O	N	D
FR												
Veg												

(D)	J	F	M	A	M	J	J	A	S	O	N	D
SP												

Paddy - Paddy (lowland) **Pattern (A)**

Paddy - Vege

**Pattern (C)**

Paddy- pulse (Highland and Soils) **Pattern (B)**

Fallow - Paddy

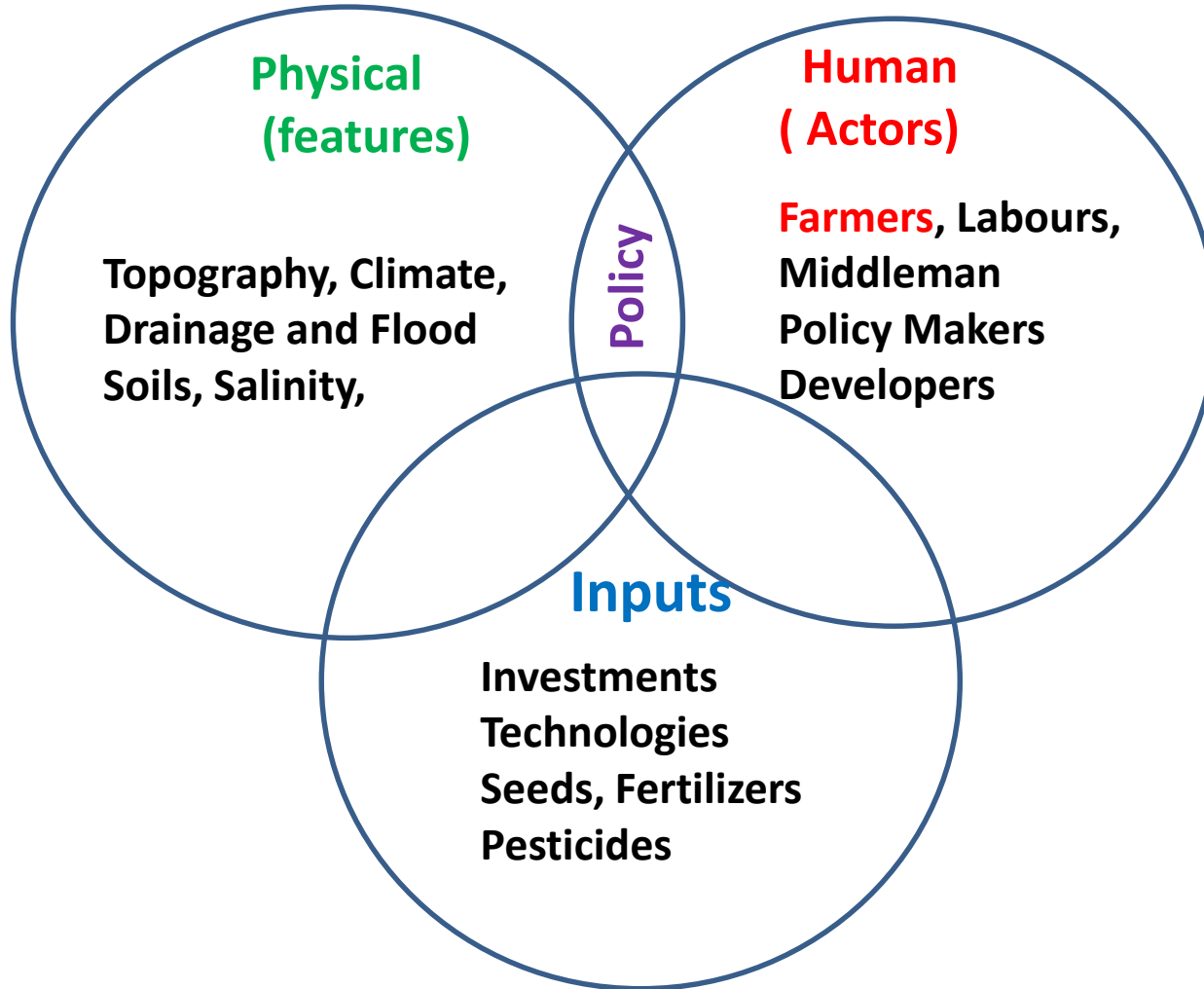
**Pattern (D)**

Pulses – productivity low- 12.5 baskets per ha ( 408 kg per ha)

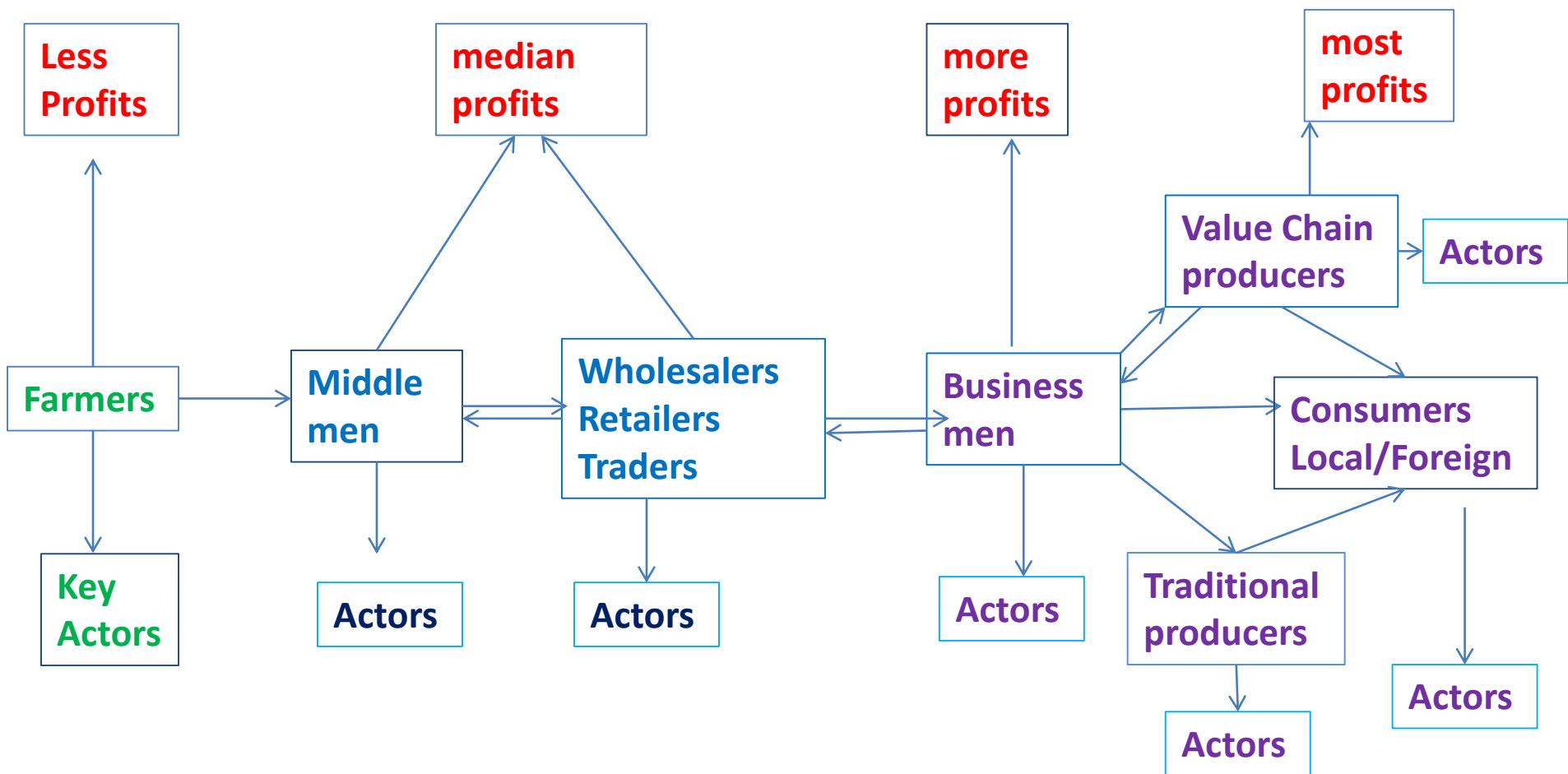
FR is still dominant in Ayeyarwady Region

(Based on Pilot survey on Paukkyaing village (16-10-2017), 18 farmers out from 50 farmers)

# Basics Requirements for Development of Floating Rice Cultivation



# Cultivating, Producing and Marketing of FR in Ayeyarwady Region



Farmers - key for development ( Total population- 6,166,378 (2016)

\*based on field survey to Mezali and Paukkyaing Villages, Nyaungdone

**Actors** (farmers, middle man, business man and policy makers) are keys for in development of floating rice (deep water rice)

## **Why do farmers have less profit?**

lack of knowledge on making records (costs and benefits, seeds, amount of fertilizer & Pesticide used)(**need to have trainings for it**)

limited knowledge on how to overcome the impact of climate change (**need to change with changing their environment ( cropping pattern, seeds, technologies)**)

lack of knowledge on market conditions and value chains (**need to share these knowledge to farmers- only sell to middleman**)

lack of knowledge on systematic **seed selections, soils**, methods



Still using- traditional harvesting methods (**need to educate the farmers- low quality of rice**)



Farmers have- well experience  
in cultivation of both floating  
rice and short-term rice (seeds,  
method, (**potential FR farmers**))

## Cost differences between floating rice and high yield rice

cost for One acre (2.47 hector)	Floating rice	Short-term rice(HYV)	Remarks
For plowing	20000 kyats	20000 kyats	1 USD= 1350 kyats
Seeds	15000 kyats	14000 kyats	
irrigation	-	20000 kyats	
Plowing (2time)	-	15000 kyats	
fertilizer	-	23000 kyats	
herbicide	-	10000 kyats	
Harvesting & Transporting	50000 kyats	50000 kyats	
Total	85000 kyats	152000 kyats	67000 kyats (dif)

**sources; Field survey at Paukyaing Village, Nyaungdone TS (17-10-2017)**

- **Another sources of income from FR field**
- Farmers catch fishes - former days - 5 viss ( 8 kilo) per day  
Now , farmers -3 viss ( 4.8 kilo) per day  
Price of fish -1500 -3000 kyats/viss

According cropping patterns- April and May mostly free from farm works



# Constraints for development of Floating rice

*Taunghti Sitpwar (FR)* - **difficult to harvest** because of long soft stalk ,  
difficult to use agriculture machinery in deep water.

## Difference in yield compare to HYV

FR - **low yield** (40 -45 basket per acre , 3500 x 40 baskets = 140,000

kyats /ST rice (90 - 100 basket, 5000 kyats x 90 baskets= 4,500,000 kyats

**Taste**- hard to consume

**Market** – has no stable market for FR

**Policy**- still encouraging farmers to grow HYV

**Farmers** has lack of knowledge on adaptable of climate change

has only little knowledge on Environmental deterioration and  
conservation

# Conclusions

favorable in physical conditions -Last 10 years- no flooding but now flooding – common

flooded due to poor drainage of local creeks and streams which are blocked by construction of terraces and embankments- great loss of farmers' investments during 2011 and 2012.

**farmers** – willing to grow FR, if they get technological assist.

share experiences from Vietnam and Cambodia - researchers to framers

should Follow the sustainable development goals

Should encourage the FR cultivation to conserve our farm environment and biodiversity.

Should emphasize on Value chains products and getting market for FR.

**A number of reforms** - in agricultural sector with encouragement of improved agricultural methods, mechanization, the right use of insecticides and fertilizers.

## Key issues:

- Existing governmental land policy
- lack of knowledge on new technology
- Availability of new seeds
- Financial constraints for (both farm and culture)
- Local labour shortages/ Mechanized
- Price fluctuations of products
- Market Demand and Market price stability
- Mono-crop/Single crop/crop diversifications
- Flood/ Water scarcity
- Soils Conditions

Preparing at paddy field, PaukKyaing village, Nyaungdone Township.



10-6-2017

# Floating Rice Cultivation at Paukyaing Village, Nyaungdone Township



10-6-2017



14-9-2017

## Floating Rice Field at Paukyaing Village, Nyaungdone Township,



Close Up

10-6-2017

## Group Discussions with Farmers





Thank you very much for your kind attention