Food and Agriculture Organization of the United Nations

HELVETAS MYANMAR

Feasibility study for the promotion of double monsoon rice cropping system

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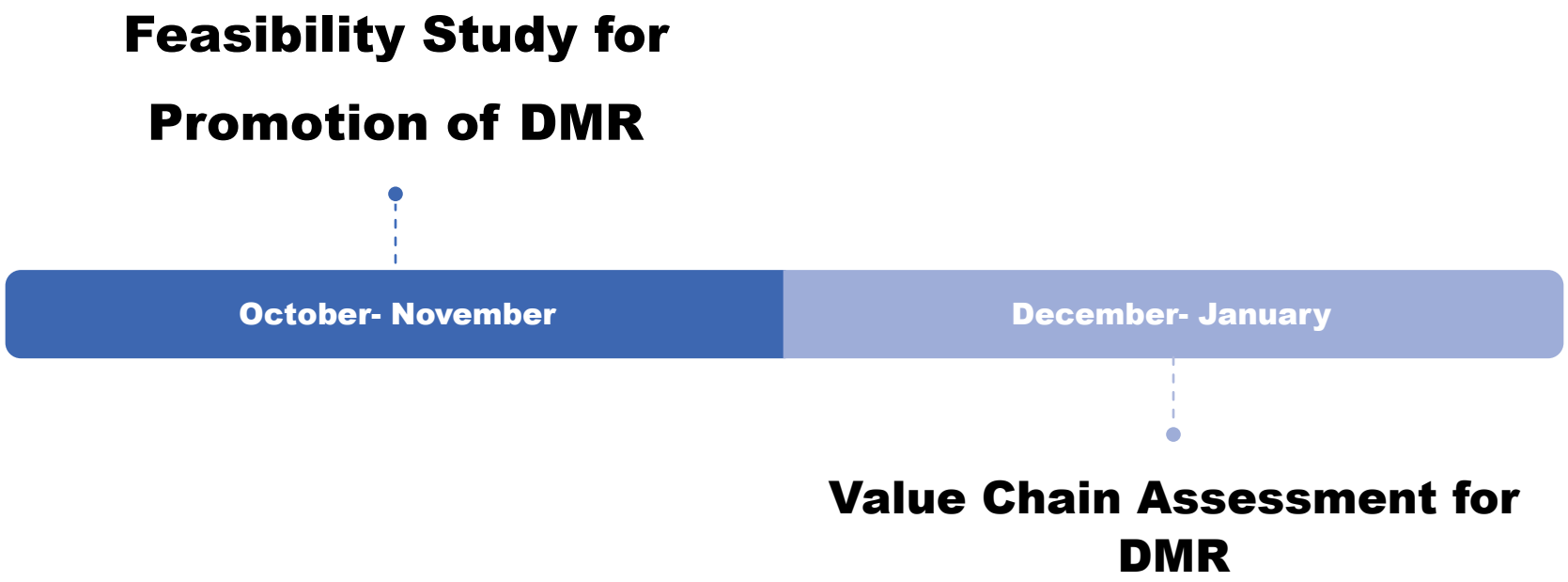
Background and Objectives of the study

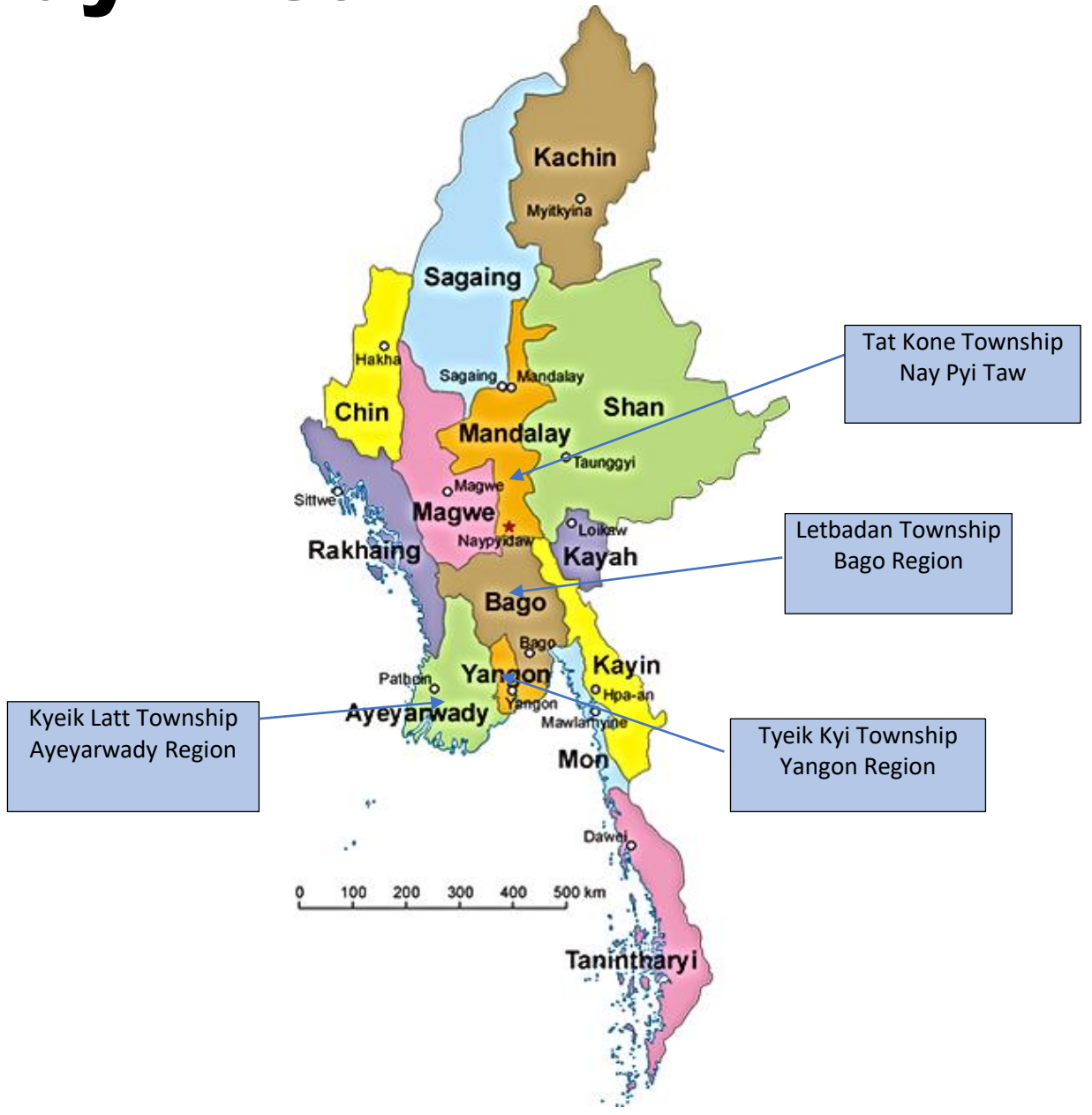
- The COVID-19 pandemic that started in March 2020 has affected the global food system and posing risks to household food security.
- The pandemic has also impacted on the food security and livelihoods of a large population besides being a major health crisis.
- The study is a part of “Support Double Monsoon Rice Cropping System for Increased Rice Production”, implemented by FAO Myanmar - TCP/MYA/3804’.
- Objectives:
  - To explore technical and socio-economic viability for introducing double monsoon rice cropping in Myanmar.
  - To assess the biophysical and economic aspects required for double monsoon rice cropping
  - To identify potential areas for introduction double monsoon rice cropping.

Scope of work for the promotion of DMR in Myanmar



Selection criteria for Study Area

a. Earlier interventions and experiences on introducing DMR
b. Agro-climatic conditions
c. Irrigation infrastructure
d. Production of potential varieties (short and medium duration)
e. Functioning and established rice value chain
f. Security situation to organise field visits and balance face to face and online interviews with stakeholders



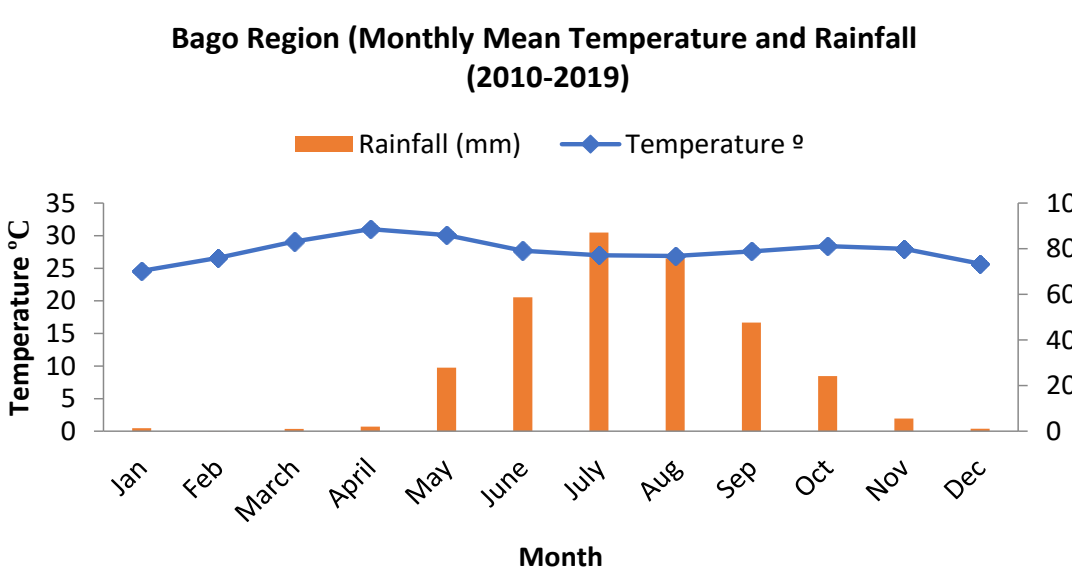
Why double monsoon rice?

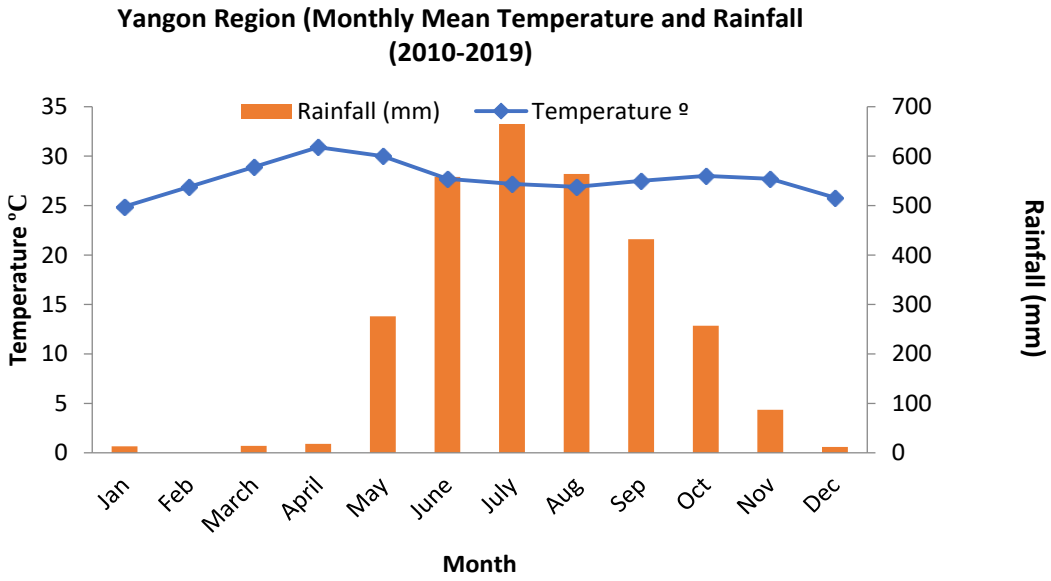
- Rice production - **a large numbers of smallholder farmers**, **lower ability to increase** their cultivation area, limited investment for irrigation services or limited technologies for achieving higher rice **yields** per acre.
- Important that these smallholder farmers are able to raise their annual rice production or annual yield to improve their annual income but **there is always a trade-off**
- Intensified systems of cereals was higher yield per unit land and time, contributed **79-96% of global supply**
- (DMR) cropping system allows **two times harvest of rice within the monsoon season and diversification** of crops in the rest of the season.
- The increase in Pre-monsoon rice production in **Cambodia** helped to reduce seasonal fluctuations in rice supply and price and adoption of technology opened
- **DMR in China decreased** due to the increased labour cost and lower grain yield in the last decade **but** yield improvement of **DMR achieved with the Integrated Crop Management (ICM)** and optimized nutrient management. A maximum grain yield of 9.40 and 10.53 MT/ ha was achieved under ICM.
- Success factors of DMR in **Vietnam** - (1) **irrigation** facilitated the expansion of the dry season crop and (2) the **selective breeding to shorten the growing period of rice f**acilitated triple cropping
- In Myanmar, Pre-monsoon rice grown in Mandalay, Kyaukse, Madaya regions, ratooning practices in delta and **food security programs in NRS**

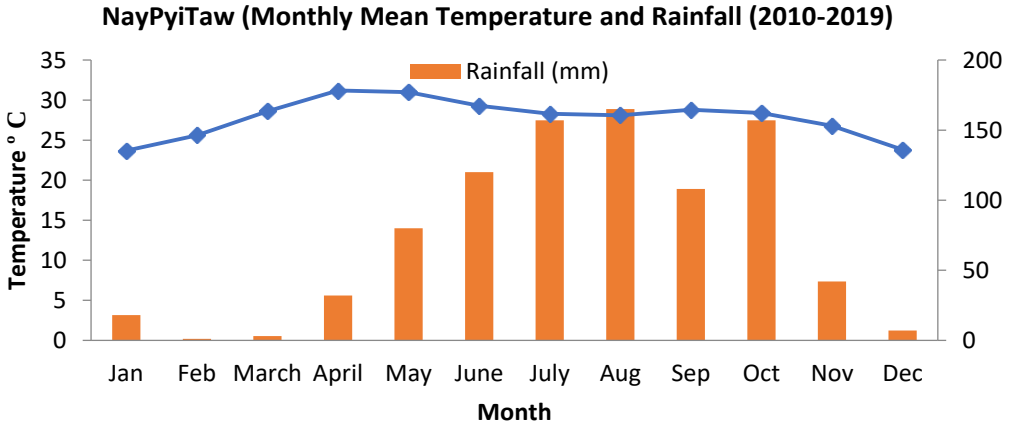
Agroecological and technical feasibility

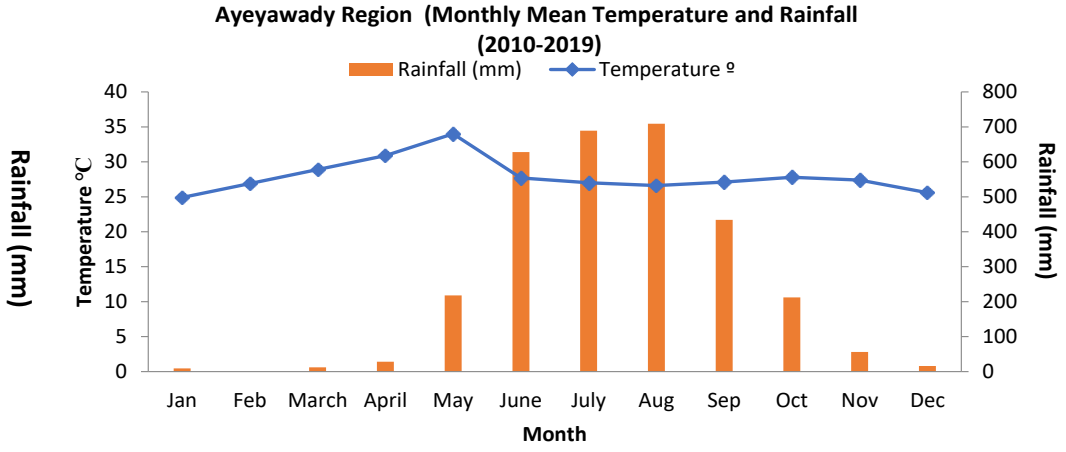
Region	Township	Rice cultivation area (ac)		Experience in Contract Farming	Experience in DMR	Access to irrigation / rainfall
		Monsoon	Summer			
Bago	Letbadan	101,846	11,766	Y	N	Y
Yangon	Tyeik Kyi	128,130	54,360	Y	N	Y
Ayeyarwady	Kyeik Latt	132,724	131,080	Y	Y	Y
Nay Pyi Taw	Tat Kone	48,258	1,442	Y	N	Y

Agroecological and technical feasibility









Cropping pattern and rice varieties

Area	Crop/ month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	D
Tyeik Kyi	Monsoon rice						P					H	
	Summer rice			H									P
	Black gram/ green gram		G									P	
Tat Kone	Monsoon rice							P				H	
	Summer rice			H									P
	Green Gram				P		H						
	Onion/ cabbage		H										P
Letbadan	Monsoon rice						P					H	
	Summer rice			H									P
	Green Gram			H									P
	Black Gram			H									P
Kyeik Latt	Pre-Monsoon rice					P			H				
	Monsoon rice								P				H
	Summer rice		P		H								
	Green manure	P			IC								

Townships	Rice Variety	Season	Lifespan (days)	Potential Yield (Kg/ha)	Price (MMK/bks)
Tat Kone	Manaw Thu Kha	Monsoon	135	5,162- 6,195	
	Sin Thukha	Monsoon	130-140	4,646- 6,711	6,300
	Byaw Tun	Monsoon	140-145		
	Paw San Hmwe	Monsoon	140-145	3,359-4,199	6,700
	Yadanar Toe	Monsoon	120-125	5,162- 7,227	
	Bay Gyar	Monsoon	140-145	5,879-6,718	6,600
	Ayar Min	Monsoon	140-145	5,879-7,558	6,400
	90 days	Summer	90-95	5,162- 6,195	5,500
Tyeik Kyi	Sin Thukha	Monsoon	130-140	4,646- 6,711	
	90 days	Summer	90-95	5,162- 6,195	5,500
	Ayar Min	Summer	140-145	5,879-7,558	6,400
	Yadanar Toe	Monsoon	120-125	5,162- 7,227	
	Byaw Htun	Monsoon	140-145		
	Kayin Ma	Monsoon	140-145		
Letbadan	Sin Thukha	Monsoon	130-140	4646- 6711	6,300
	90 days	Summer, Monsoon	90-95	5162- 6195	5,500
	Yadanar Toe	Monsoon	120-125	5162- 7227	
	Sin Thwe Latt	Monsoon	130-135	4646-6195	
	Pyi Taw Yin	Monsoon	120		
	GW 11	Monsoon	115		
	Manaw Thukha	Monsoon	140	5162- 6195	
	Thee Htat Yin	Monsoon	120	5162- 6195	
	Byau Tun	Monsoon	145		
	Shwe Ayar	Monsoon	145		
	Hmawbi-3	Summer, Monsoon	130		
Kyeik Latt	Bay Gyar	Monsoon	140-145	5,879-7,558	6,600
	90 days	Pre-monson, monsoon, summer	90-95	5,162- 6,195	5,500
	Sin Thu Kha	Monsoon	130-140	5,162- 6,195	6,300

Post-harvest management and farm mechanization

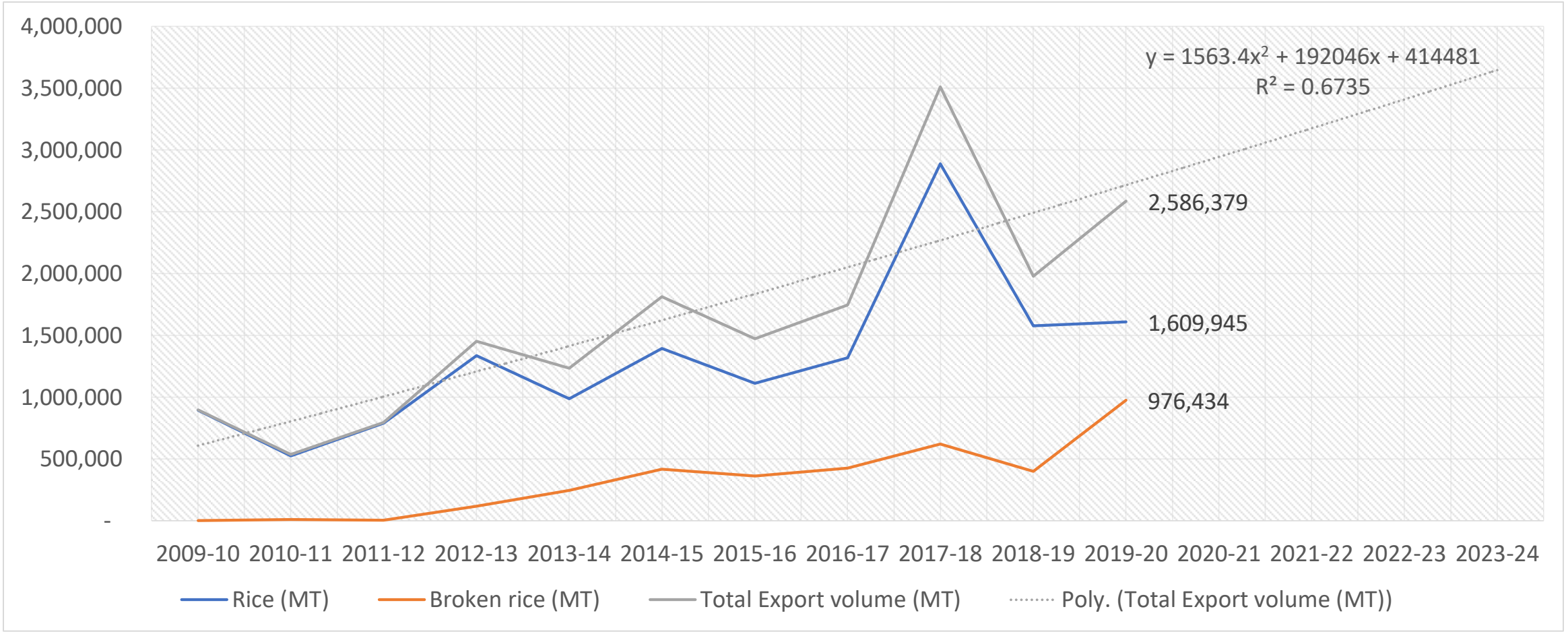
Flat-bed paddy dryer installed at a rice mill

Flat-bed paddy drier at a farmer's compound

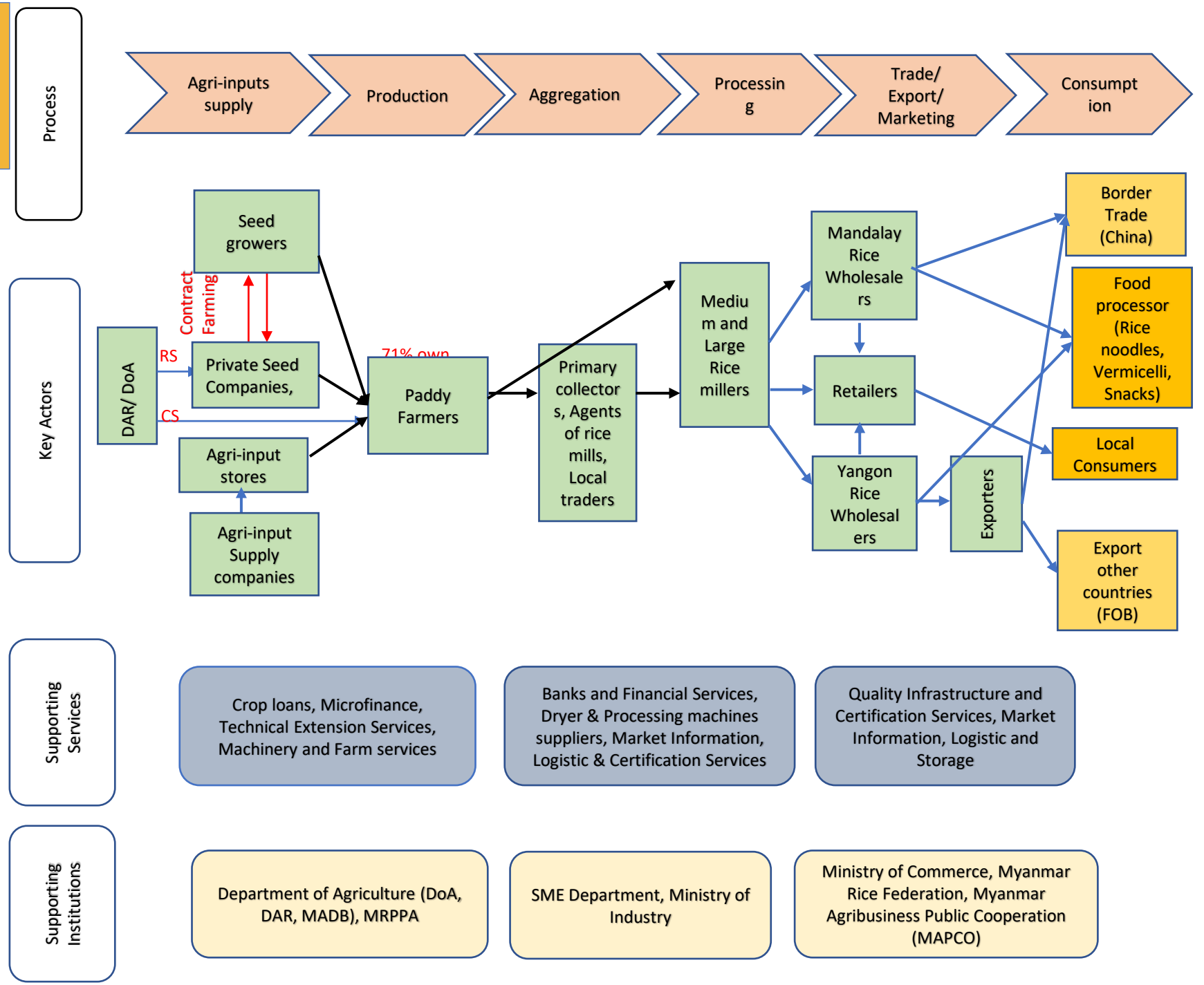
Access to farm machinery services

Farm machines	Tyeik Kyi	Kyeik Latt	Tat Kone	Letbadan
Tractors/ small tractors	89%	100%	100%	100%
Direct seeders	0%	67%	40%	69%
Transplanting machines	0%	67%	70%	38%
Inter-cultivators	0%	67%	100%	23%
Harvester/ Combine harvester	89%	100%	100%	100%
Thresher/ Winnower	0%	33%	0%	8%
Water pump	89%	100%	40%	62%

Export trend of rice and broken rice



Rice value chain map



Economic analysis of monsoon and summer paddy

Monsoon Paddy

	Tyeik Kyi	Kyeik Latt	Tat Kone	Letbadan
Labor (USD/ha)	83.96	87.28	220.75	153.51
Inputs (USD/ha)	100.87	119.58	137.04	132.41
Farm power (USD/ha)	194.94	289.42	132.37	219.58
Interest cost (USD/ha)	11.13	41.24	12.74	13.14
Total Variable Cash Cost (TVC) (USD/ha)	390.89	537.52	502.90	518.64
Yield (kg/ha)	4,011	3,355	4,749	3,427
Sale Price (USD/kg)	0.15	0.20	0.16	0.27
Revenue from sale (USD/ha)	600	685	748	913
Gross Profit (USD/ha)	209	147	245	394
RoI	**1.54**	**1.27**	**1.49**	**1.76**

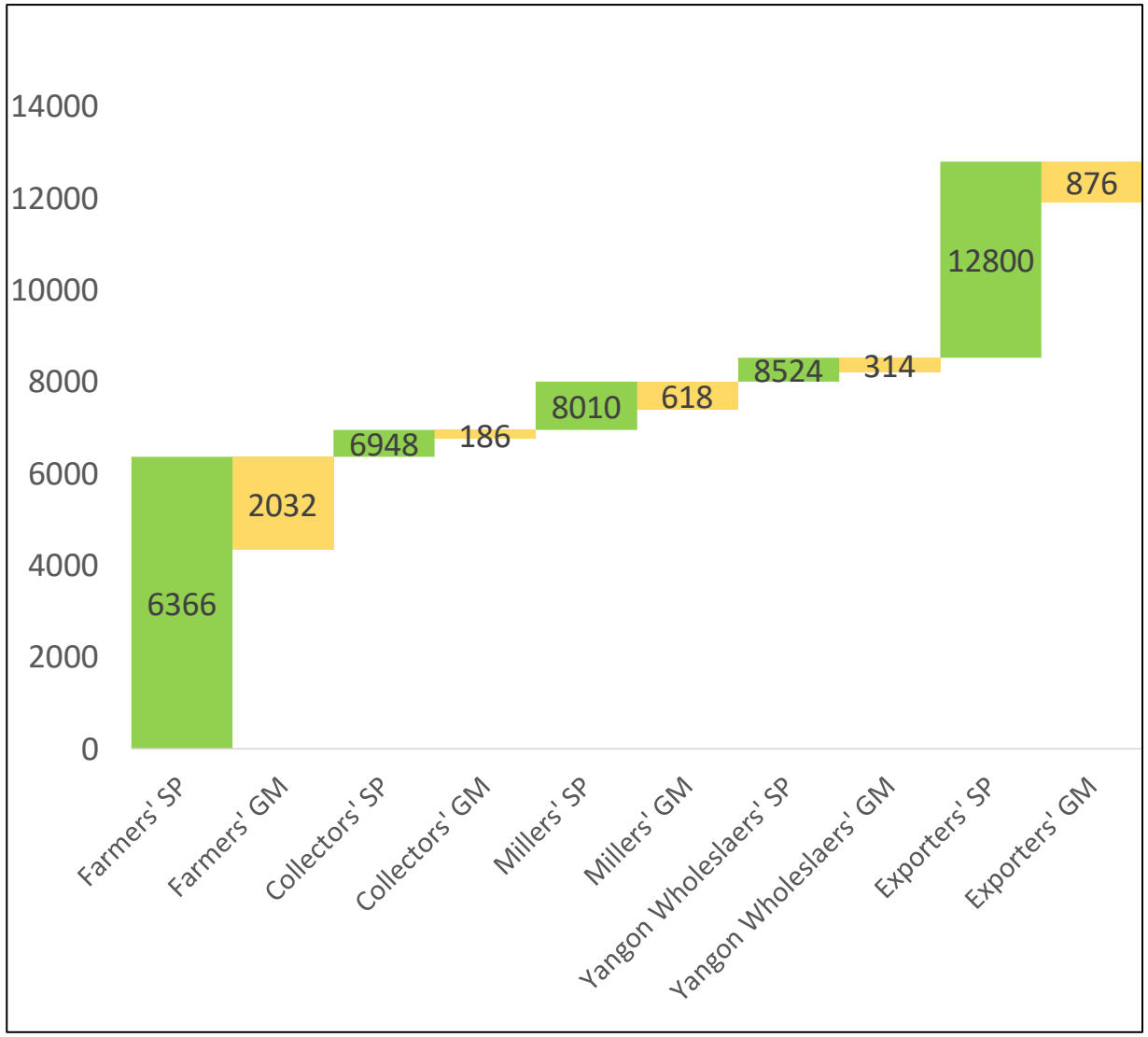
Summer Paddy

	Tyeik Kyi	Kyeik Latt	Letbadan
Labour (USD/ha)	73.3	155.1	186.2
Inputs (USD/ha)	96.5	119.6	137.5
Farm power (USD/ha)	238.7	27.8	182.4
Interest cost (USD/ha)	11.1	7.9	13.2
Total Variable Cash Cost (TVC) (USD/ha)	419.6	310.4	519.1
Yield (kg/ ha)	5,702	5,679	5,306
Sale Price (USD/kg)	0.15	0.18	0.16
Revenue from sale (USD/ha)	854	1,013	836
Gross Profit (USD/ha)	433.9	702.6	316.5
RoI	**2.03**	**3.26**	**1.61**

Economic analysis of Double Monsoon rice cropping system in Kyeiklatt

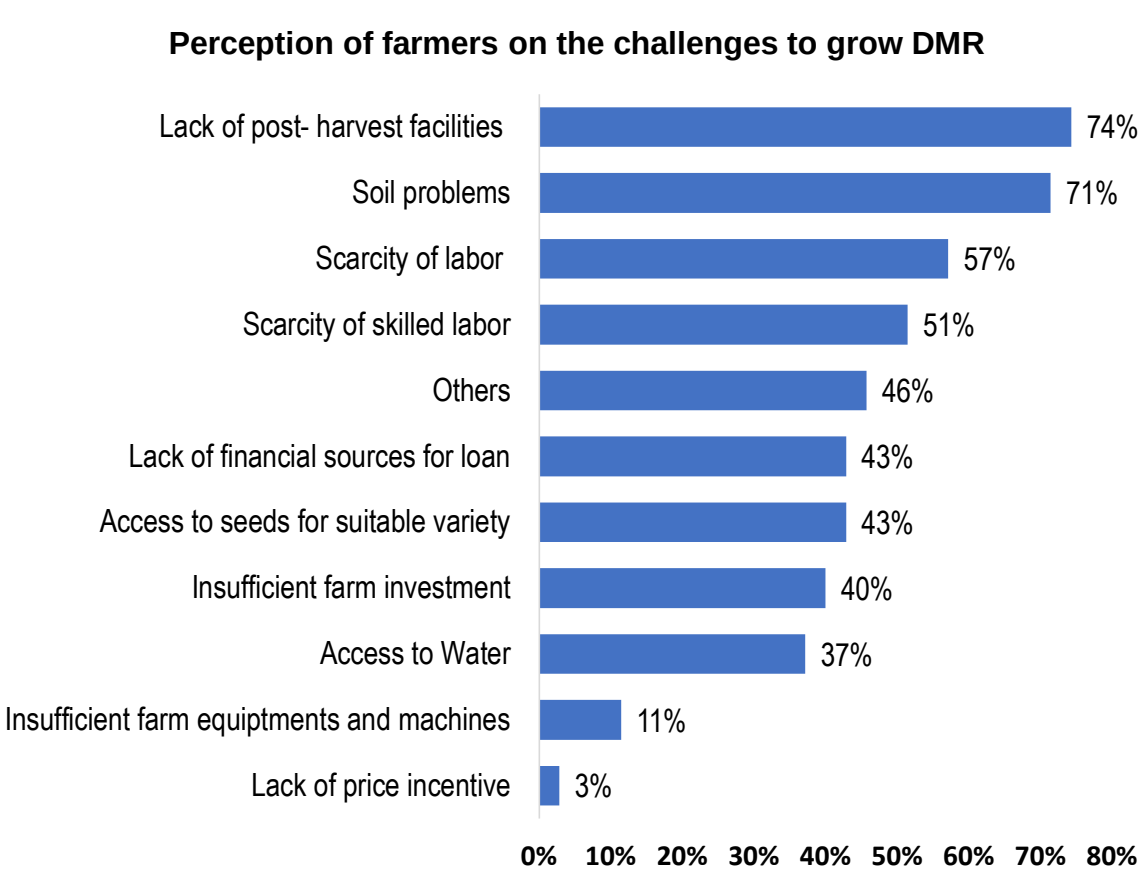
	Pre- Monsoon	Monsoon	Summer
Labour cost	188.31	334.69	210.07
Power cost	131.95	116.83	146.16
Agro input cost	119.79	165.63	255.23
Interest for loan	17.16	24.07	23.85
Total Variable Cash Cost (TVC)	457.21	641.23	635.30
Yield (Basket/ acre)	2,323.04	4,026.59	5,317.17
Sale Price (MMK/basket)	0.72	0.69	0.72
Revenue from sale	1,670.03	2,787.51	3,822.52
Gross Profit	**1,212.82**	**2,146.29**	**3,187.22**
Certification and Marketing Cost	26.29	45.44	60.36
Net Profit	1,186.53	2,100.85	3,126.85
Cost/ Benefit	**2.60**	**3.28**	**4.92**

Marginal Analysis along Rice Value Chain



Variables	(MMK/basket)	MMK/MT	USD/MT
WASP of farmers	6,366	304,593	171.31
TVC	4,334	207,368	116.63
Gross margin for farmers	2,032	97,225	54.68
Paddy collector's cost	396	18,947	10.66
Gross margin of collectors	186	8,900	5.01
Millers' cost (marketing+ Operation)	444	21,244	12
Millers' gross margin	618	29,569	16.63
Marketing cost of rice wholesaler	200	9,569	5.38
Gross margin of rice wholesalers in YGN	314	15,024	8.45
Transaction cost of exporter	3,400	162,679	91.50
Weighted average FOB Price	12,800	612,440	344.45
Exporters' margin	876	41,914	23.57

Perception of farmers and their willingness



Townships	Experience in DMR	Willing to change the variety if needed	Interested in piloting DMR (Yes)	Interested in piloting DMR (No)	Interested in piloting DMR (under some condition)
Tyeik Kyi	0%	89%	67%	22%	11%
Kyeik Latt	67%	100%	100%	0%	0%
Tat Kone	10%	100%	100%	0%	0%
Letbadan	0%	77%	54%	15%	31%

Opportunities

- **Rice seed of early maturing varieties that are preferred by the domestic and export market are available.**
- **Demand from the export market (mostly ASEAN and neighbouring countries)**
- **Readiness for farmland consolidation**
- **Availability of farm mechanization services and post-harvest facilities for quality improvement**
- **MRF ready to collaborate for market stability, CF and co-investment for required post-harvest facilities in the selected areas**

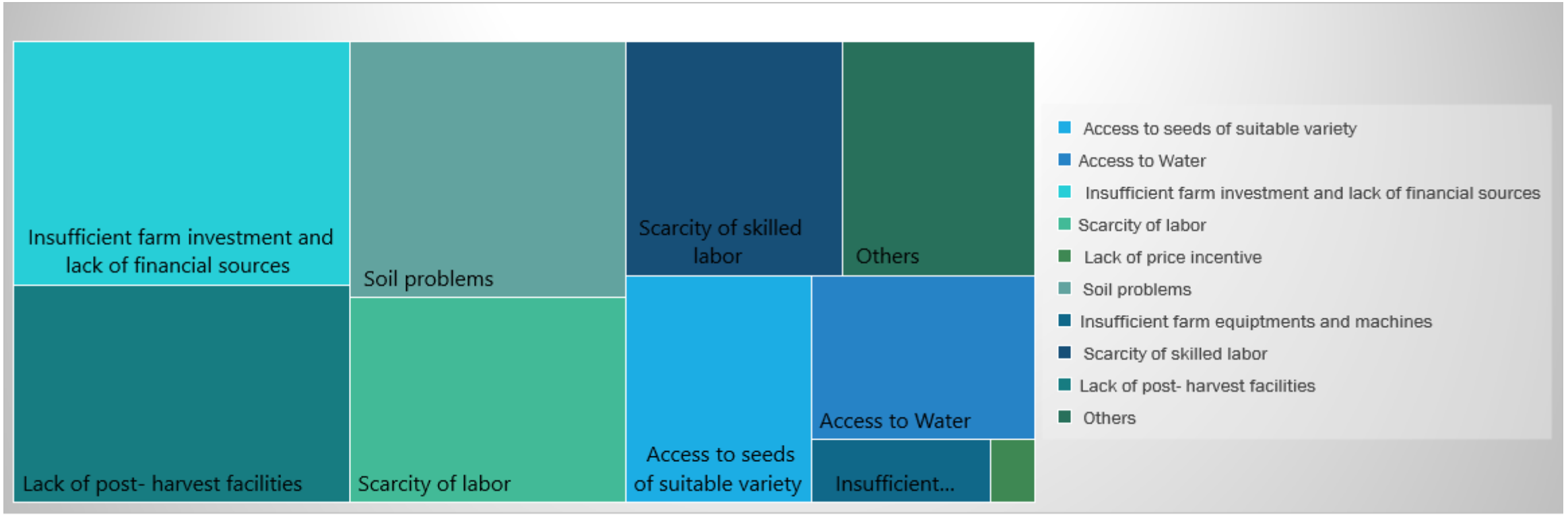
Challenges

- Past failed experience of DMR due to lack of harvesting, threshing and transplanting machines, poor land levelling and farm roads, lack of drying and storage facilities
- Complex political and security situation
- Higher cost of fertilizer and fuel
- Potential soil problems, disease problems and need of the solutions

Further considerations

- **Identification of quick win activities, medium- and long-term strategies for the promotion and merchandizing of DMR in Myanmar**
- **Re-structuring of rice seed system, policy and regulations related to seed registration and distribution**
- **Integration with existing rice value chain development mechanisms**
- **Finding out the solutions for improved soil management since the intensification of crop have impact on the quality of soil (such as crop rotation/ green manuring/ composting and application organic matter)**
- **The other potential areas for DMR are in Shwebo, Rakhine where the associates of MRF are actively operating**

Determinants of Promotion of DMR



Key determinants	Tat Kone Township	Tyeik Kyi Township	Letbadan Township	Kyeik Latt Township
Access to irrigation facilities	3	3	3	2
Availability locally adapted rice seed with market demand	3	3	2	3
Willingness of farmers	3	2	3	2
Financial viability	1	1	1	2
Temperature	3	3	3	3
Rainfall	3	3	3	2
Farm road access	2	2	2	2
Access to Post-harvest facilities	2	3	2	3
Farm mechanisation services	3	3	3	3
Land consolidation	2	1	1	2
Total score	**25/30**	**24/30**	**23/30**	**24/30**

Recommendations

Production	➢ **Selection of sites with adequate irrigation facility** ➢ **Selection of interested and willing farmers** ➢ **Selection of appropriate land plots for piloting** ➢ **Selection of locally adapted and marketable rice varieties** ➢ **Training and coaching key farmers and technology disseminations** ➢ **Engage in rice seed production** ➢ **Use of locally produced organic and natural fertilizers** ➢ **Encouraging the sustainable agriculture practices to maintain soil nutrient and integrated pest management** ➢ **Promote farm mechanization to complete tasks in time**

Recommendations

Post- Harvest Management	➢ Post-harvest facilities In applying DMR system, access to dryer and storage facilities are essential especially for the pre-monsoon rice which is harvested in the middle of monsoon period. It would be win-win benefited if the farmers are linking with the market actors who possess those facilities. ➢ Safe packaging and storage Since the promotion of DMR system aims for increased food security through increased production by intensified cropping of small holder farmers, consideration for improved profit sharing towards the farmers by initiating this type business model is highly recommended.
Marketing	➢ **Engagement with the private sector** Fair and workable CF arrangement between private company(s) should welcome and incentivized in piloting of DMR in collaborating with MRF or local rice millers for win-win benefit with sharing of risks and profits. ➢ **Engagement with the private sector** The importance of diversification to value-added export-oriented crops should be emphasized. The availability of market information should also be considered essential for identifying promising external markets.

Thank you for your attention!

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Consultant

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ဆွေးနွေးရန် အချက်များ

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ဆွေးနွေးရန် အချက်များ

- မြန်မာနိုင်ငံတွင် တမိုး နှစ်သီး စပါးစိုက်စနစ်ကို အောင်မြင်စွာ ဖော်ဆောင်နိုင်ရန် အတွက် အဓိက ထည့်သွင်းစဉ်းစား လုပ်ဆောင်သင့်သည့် အချက်များ ကို ဆွေးနွေးပေးပါရန်