REDUCING FOOD LOSS FOR A CLIMATE-RESILIENT FOOD SUPPLY CHAIN IN THE PHILIPPINE ECONOMY[1]

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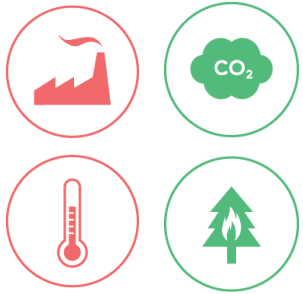
RATIONALE

- Science based studies have shown that climate change (CC) is real i.e. atmosphere and oceans have warmed, declining Artic sea ice, sea level rise, increase in GHG emissions, etc

- Anthropogenic activities are the culprit in the changes of the earth's climate… i.e. burning of fossils fuels, improper dumping of wastes, waste segregation, disposal, etc

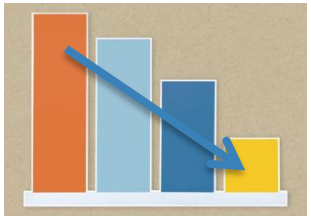


RATIONALE

- Agriculture sector is one of the highly affected by climate change

1°C increase temp = ↓19.21

1 mm increase precipitation = ↓0.24



Philippine Agriculture Gross Production Value

However, more number of rainy days would increase gross production value by 1.24

Source: Dait, 2015

RATIONALE

- Climate influence not only the agricultural crop itself but also the different production activities and processes
- In corn, increase in temperature negatively affects corn yield in terms of reducing the growth and grain filling period, induces early maturity resulting to less biomass accumulation, and induce sterility problem during flowering stage

Source: Salvacion, 2015

Responding to climate change

1. ADAPTION

- reduce vulnerability
- reduce the impact of CC
- strategy to increase resilience of society to CC

2. MITIGATION

- reduce GHG emission
- increase carbon sinks

How will agriculture adapt?

- Introduction of climate resilient technologies i.e. stress tolerant varieties, responsive cropping calendars, provide localized climate information services
- R & D on climate resilient technologies i.e adaptability trials of machine and other technologies in normal and adverse situation and weather condition
- Reduction of PH losses through improved practices and/or mechanization

How will agriculture mitigate?

- Reduction of GHGs in each of the production and postproduction chain of activities
  - enhance soil carbon deposits
  - less energy use
- Reforestation of watershed areas for irrigation

Reduced PH losses as an adaptation strategy

Table 1. Paddy losses from harvesting and threshing operations per hectare, 2017

PH Operation	PH Losses	
	percent (%)	kg/ha
Manual Harvesting and Mechanical Threshing (MHMT)	4.666	216.969*
Rice Combine Harvester (RCH)	2.590	120.598*
Saved losses, wet paddy (24%)	2.076	96.371*
Saved losses, dry paddy (14%)		85.165
Saved losses @ 63.1% milling recovery	-	53.739

* Based on the average paddy production, wb @ 4.65 tons/ha

Source: Salvador, 2018

Reduced PH losses as an adaptation strategy

Table 2. Losses from crop damage due to tropical cyclones, Isabela, Philippines, 2018

ITEM	MHMT (A)	RCH (B)	INCREMENT (A-B)
Quantitative loss			
Volume, kg/ha	844.00	725.00	
Prob. x Exposure	0.1064	0.0835	
Crop damage, kg/ha	89.812	60.538	29.264
Crop damage, milled rice	50.075	33.759	16.316

Source: Malanon 2019

Reduced PH losses as an adaptation strategy

Table 3. Paddy losses from sundrying and mechanical drying operations per hectare, 2017

PH Operation	PH Losses	
	percent (%)	kg/ha
Sundrying (SD)	3.52	163.680
Mechanical drying (MD)	1.85	86.025
Saved losses, wet paddy (24%)	1.67	77.655
Saved losses, milled rice		49.000

Source: Salvador, 2018

Reduced PH losses as an adaptation strategy

Table 4. Losses saved from using RCH and MD per hectare, milled rice, 2017

PH Operation	Losses saved kg/ha*
Rice combine harvesting (RCH)	53.739
Mechanical drying (MD)	49.000
TOTAL	102.739

Source: Salvador, 2018

Reduced PH losses as an adaptation strategy

Per capita rice consumption of one Filipino = 119 kgs

Saved losses = 102.74 kgs/ha

Source: Salvador, 2018

Utilization of MDs using rice hull as a mitigation option

Table 5. Utilization of MDs using different energy sources

ENERGY SOURCES	EMISSIONS	
	$tonCO_2eha^{-1}$	USD ($)*
Diesel	34.1764	410.12
Rice hull (RH)	0.6481	7.74
Reduced emissions	33.5283	402.38

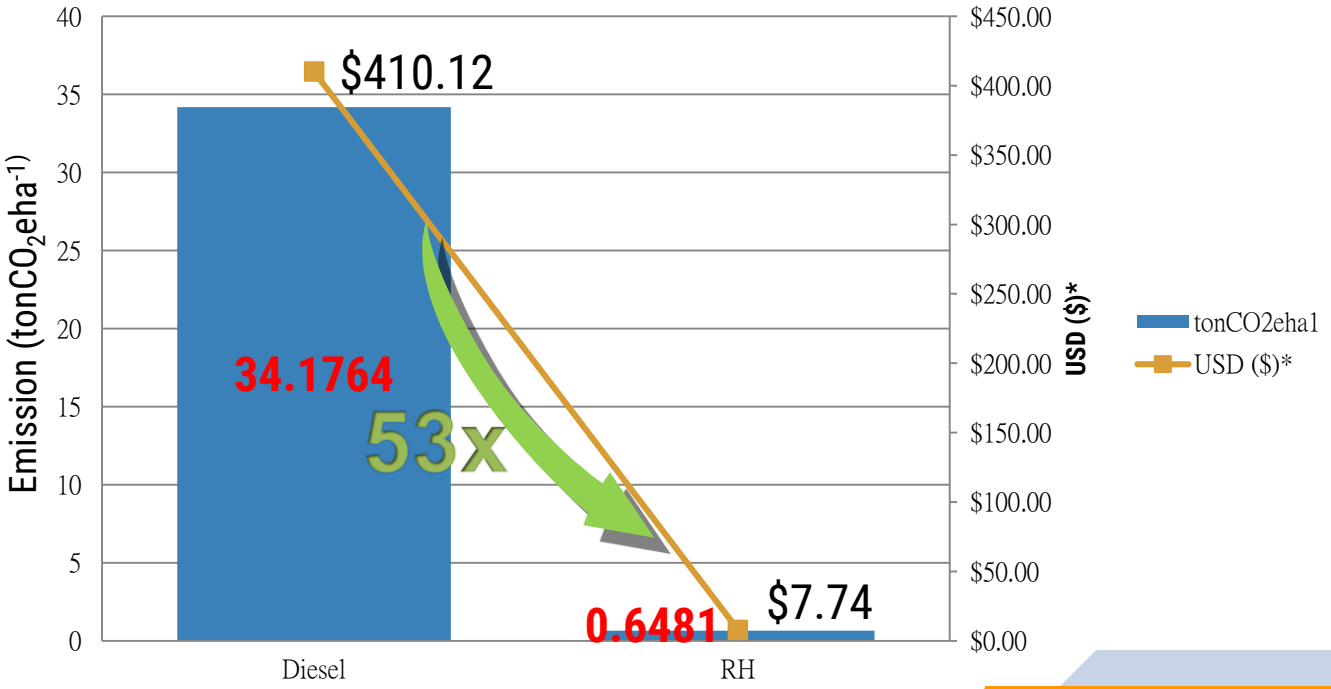
*Social cost of carbon at USD12/$tonCO_2e$ (EPA, 2017)

Source: Salvador, 2015

Utilization of MDs using rice hull as a mitigation option

33.53 tonCO$_2$eha^{-1}
Reduction in emission

402.38 USD/ha
Reduction in cost



Source: Salvador, 2015

SUMMARY/CONCLUSION/RECOMMENDATION

- Around 53.739 kg of milled rice per hectare may be saved if farmers will shift from MHMT to the use of RCH. In addition, potential losses amounting to 16.316 kgs of milled rice may be saved from crop damage brought about by tropical cyclone when using RCH.
- In the same manner, 49 kgs of milled rice per hectare may be saved from the practice of SD to MD.
- Monitoring the PH losses and estimation of losses in areas greatly affected by extreme/adverse weather events such as drought and floods has to be further studied.

SUMMARY/CONCLUSION/RECOMMENDATION

- **Reducing postharvest losses** can be considered as an **adaptation strategy** that can increase food/rice availability and at the same time lessen the impact of CC.
- Utilization of MDs using **RH fired furnace** as against diesel fuel **can mitigate** GHGs by 33.5283 tonCO_2eha^{-1}
- Addressing the challenges and constraints on the low utilization of mechanical dryer using RH fired furnace by farmers' organizations should be investigated for future R & D studies.

THANKS!