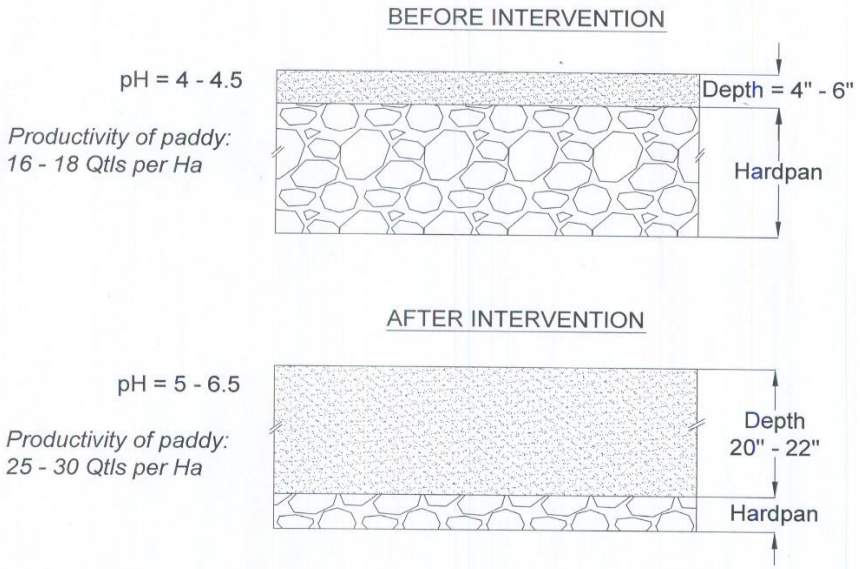
AWPB REFERENCE NO. A.2.1.1.(II).(A)

2019-2020 4th Quarters

OPERATIONAL GUIDELINES FOR BREAKING HARDPAN AND LIMING IN WRC/TRC AREAS IN FOCUS DISTRICTS IN MIZORAM UNDER THE COMPONENT OF IMPROVE SOIL FERTILITY

[AWPB Reference No. A.2.1.1.(ii).(a)]

CHISEL PLOUGH (LIMITED TO SOIL DISTURBANCE)



Office of The State Project Director,
FOCUS, MIZORAM
ZIDCO BUILDING, MINECO, KHATLA
PIN-796005
Email:focusmizoram2018@gmail.com

1.0: OPERATIONAL GUIDELINE FOR HARDPAN BREAKING AND LIMING etc. AT WRC/TRC AREAS UNDER THE COMPONENT OF SUPPORT TO WETLANDS (IMPROVE SOIL FERTILITY) DURING 2019-2020

1.1: INTRODUCTION (WITH REFERENCE TO PIM, FOCUS)

Agriculture in Mizoram state is practiced on hill slopes and terraced low lands. The forest cover has been reduced from over 90% to 88% during the last 25 years due to the practice of shifting cultivation (locally called jhum). The quality of forest also depleted during this period. Normally farmers have been farming on hill slopes by clearing forests and preparing the cleared land for rain-fed mixed cropping systems for 1-2 years in Mizoram. They leave the land as fallows and return after 8-10 years to cultivate it the same way for 1-2 years. However, they continue to cultivate wet land rice on the terraced lowlands year after year. ***The farmers cultivate wet land rice on terraced lowlands called Wet Rice Cultivation (WRC).*** Villages in Mizoram also have another important multi-purpose resource - the Village Forest. These forests traditionally were protected and used as village safety net forests --water conservation for local domestic uses and as a source of forest produce, including the non-timber forest produce for the community uses (not for commerce). Such resources have dwindled in the recent past, and their rejuvenation/conservation is a necessity to protect water resources and other forest-based livelihoods.

The main objective of ensuring sustainable agriculture without resorting to jhum will be to intensify efforts on: ***(i) Soil And Water Conservation through Mechanical and Vegetative methods; (ii) Promoting Settled Agriculture on sloping lands; and (iii) Increased Rice Production from Low Lands.*** The project will take into account emerging climate resilient best practices, which include demonstration of technological practices to adapt to current climate risks such as suitable plant genotypes, in situ moisture conservation, run off water management, disease and insect-pest management, and matching cropping systems to current precipitation levels.

1.2: SUB-COMPONENT 1.2 – SUPPORT TO SETTLED AGRICULTURE:

The project does not directly promote settled agriculture though many farmers have made the transition from jhum only production system to jhum and settled agriculture mixed system mainly on account of high levels of labour requirement and hard labour on a day to day basis throughout the year, disinterest of younger generation in jhum cultivation and the need for cash income. The project will support two aspects related to settled agriculture: ***(i) The Existing Settled Agriculture Comprising Terrace Rice Cultivation in Terraces and Orchards and Plantations in Sloping Uplands; and (ii) The Landless Households (Households that have access to Jhum Land but not to land with tenurial security).***

1.3: SUPPORT TO EXISTING TERRACE RICE CULTIVATION:

The project will support farmers undertaking terraced rice cultivation. The main aim of this will be to ***Increase Soil Fertility***, ***Productivity And Cropping Intensity***, ***and Stabilize***

Productivity. One to two FIGs in each village, comprising of about 10-20 members will be established and supported by the selected Lead Farmer and by the project in each village. FIG members will be provided training on Improved Farming Systems and better agro-techniques for the chosen crops and production of improved seeds.

The main aim of this activity will be to increase soil fertility, productivity and cropping intensity, and stabilize productivity. The project will form FIGs and train them on Improved Crop Husbandry. The project will also promote additional measures for improving ***Soil Fertility by growing Sesbania Rostrata and Azolla Pinnata under Rice Cultivation Systems.*** This apart, developing supplementary irrigation system such as ***lift irrigation, water harvesting ponds for rice cultivation in low land areas will also be supported.*** The project will select short duration improved local paddy varieties in consultation with KVKs/ATARI. In addition, the project will also support introduction of second crop (pulses/ginger/ onion) after rice cultivation, rice-fish cultivation and fish farming in ponds in each of the selected villages depending on the feasibility to undertake this activity. The project will support 10,880 households covering 5,440 ha. Each household with terrace rice cultivation will get support for 0.5 Ha.

The project will promote use of improved locally developed paddy varieties, such as CAU-R1, and Komati, or the identified elite lines from the local Rice Germplasm, including landraces in the selected villages for increasing paddy production. In addition, the project will also support Rice-Fish Cultivation and Fish Farming in Ponds in the selected villages depending on the feasibility to undertake this activity. The possibility of two crops of decent productivity with first crop of Lowland Rice and an Upland Crop (e.g. onion, garlic, field pea, lentil, and other legumes) after rice will be explored through proper crop planning using water balance analysis and improved agronomic practices.

This intervention will enable the farmers to sustain their activity and take up settled agriculture as means of improving income levels and reduce dependence on 'Jhum.'

The settled agriculture sub-component will promote conversion of jhum into settled agriculture, thereby, increasing the 'jhum' cycle and reduction in jhum practice.

The Project Does Not Directly Promote Settled Agriculture though many farmers have made the transition from jhum only production system to jhum and Settled Uplands and (ii) the Landless Households (Households that have access to jhum land but not to land with tenurial security)

1.4: With reference to the above Project Implementation Manual (PIM), the four (4) FOCUS Districts prepared AWPB for 2019-2020

The outcome after the consolidation of AWPB at PMU Level, the breaking of the Hardpan and Liming on 1000 Hectares of WRC/TRC plan have been worked out for 2000 Beneficiaries on Settled Agriculture under WRC/TRC (Support to **WETLAND @ IMPROVE SOIL FERTILITY AWPB Reference No.A.2.1.1.(ii).(a)**). The strategies for the above said intervention are as follows: -

2.0: STRATEGY FOR HARDPAN BREAKING; LIMING AND GREEN MANURING ETC. IN SETTLED WRC/TRC UNDER IMPROVED SOIL FERTILITY (SUPPORT TO EXISTING SETTLED AGRICULTURE) DURING 4TH QUARTER OF 2019-2020.

2.1: WHY INTERVENTION?

Generally, most of the top soil (4-5 inches depth) of Wet Rice Cultivation (WRC) area have been thoroughly stressed on account of the constant tillage at normal depth for such a long duration of time (presumably 100 years or more). Consequently, this results in soil fertility loss or depletion of soil health, demanding more inputs thus increasing Cost of Cultivation/ Production etc. and also decreasing its Productivity and Production year by year and also complication by labour scarcity and youth losing interest in farming resulting devoiding of countryside or Exodus of Youth to Urban are some of the Rampant occurrence.

The constant tillage at the normal depth gradually developed HARDPAN or PLOUGHPAN at the point where the normal tillage depth reached. The Hardpan restricted Water Permeability and Root Penetration and Aeration etc.

Therefore, Deep Ploughing with tractor mounted- Chisel Plough (With Limited Soil Disturbances) coupled with Liming followed by Green Manuring has been prioritised to be implemented in 1000 Ha under the IMPROVE SOIL FERTILITY IN WRC/TRC COMPONENT (AWPB Reference No A.2.1.1(ii).(a)) . Vertical Increase in the Productivity and Production which is eco-friendly or climate resilient is envisaged if the above-mentioned intervention is implemented.

2.2: WHAT TO ACHIEVE?

1. To bail out Hardpan by loosing the soil and increasing Water permeability, Roots Penetration and Aeration etc.
2. To increase Production & Fertility- Vertically and To achieve Per Drop, More Crop.
3. To achieve Doubling Farmers' Income by 2022 (National Target).

4. To Consolidate (Real and Vertical) fragmented WRC areas so as to achieve Farm-Mechanisation by setting up of more Custom Hiring Centres through CSS and Financial Institution like NABARD etc.
5. To change Farming into Business/ Enterprise (Market Driven Agriculture-Export Oriented by visioning KMMTTP)
6. To adopt Integrated Farming System (IFS).
7. To achieve Precision Farming (PF).
8. To Boost Organic Farming.
9. To mitigate Migration of youth from Rural to Urban
10. To achieve Incorporation of 3 vital Resources Management i.e. Natural Resources Management + Sociological Resources Management + Agricultural or Farm Resources Management.

2.3: HOW TO CARRY OUT? (AWPB Reference No. A.2.1.1.(ii).(a))

The following Operational Guideline should be strictly followed by the concerned FiGs while implementing the above-mentioned Soil Fertility Improvement Measures: -

- All the Implementation task should be done by the concerned FIG under the supervision of FOCUS Staff.
- Identify the compact WRC/TRC areas with the sole beneficiaries.
- Restricted Tender should be floated in the local News Paper etc. to the register Custom Hiring Centres who can provide Chisel Plough with 5 tines (3—4 kmph @ 55 cms depth) which is effective for limited soil.
- The Community Procurement Procedures shall be strictly pursued for procurement of critical inputs like Slaked lime; Green Manuring Seeds etc.
- In case the community is unable to source the required goods/materials locally, the District Management Unit shall source the requirements on behalf of the community as a centralised procurement in consultation with the Procurement officer.
- All activities performed should be documented properly with the photographs (video and still camera).
- The concerning FIG Committee Meetings' Minutes should not be deviated from, by any possible means.

- Work Supervision in the individual WRC/TRC should be done by the owner of the land or his representative and if any arbitrary/ies arise/s the concerning FIG will address accordingly and promptly.
- Soil sample should be drawn on the particular spot before and after the execution of the workplan takes place.
- Crop-cutting experiment record must also be conducted before and after the actual intervention is followed.
- FOCUS protocol should always be complied with whilst undertaking the official business (Implementation of the work will be done by FIG members. Technical Assistance, Supervision and Monitoring will be carried out by Technical Staff of FOCUS with the consent of DPM etc)
- 1000 no of households covering an area of 500 ha (0.5ha/unit per beneficiary) each in Champhai and Serchhip Districts and thereby achieving 2000 numbers of Households and 1000 hectares or Unit should be selected during 2019-2020. Preferably in a Cluster Approach and Particularly in the Compact Area.
- Mandatory monitoring should be performed as per the PIM.

2.4: BRIEF AND SUPPLEMENTARY EXPLANATION OF WORKS

1. Selection is done based on the past farm management practices, WRC/TRC soil testing results, and existing WRC/TRC only.
2. Harvest/Production History from each Village/FIG/Households will be collected in order to compare the impact of the Project intervention.
3. The field selected should be irrigated and kept moist before ploughing is done in order to work easily into the depth of the soil for breaking of the Hard Pan. Tractor Mounted-Chisel Plough (4Kmph @55cm depth) will be used for breaking the Hard Pan/Plough Pan underneath.
4. After breaking of the Hard Pan by Tractor Mounted Chisel Plough. Application of Slaked Lime will be done by manual broadcasting. Irrigation should be given after the application of Slake Lime for effective reaction of lime in the soil.

3.0. COSTING FOR HARDPAN BREAKING AND LIMING IN 1 (One) HACTARE/UNIT IN WRC/TRC AREAS.

Sl. No	ITEM OF WORKS	RATE Rs/Per Unit	QTY	AMOUNT				Remarks
				FOCUS	Beneficiaries	Others	Total	
A	**IRRIGATIONS**							
	i) Wetting the field to ease the earth works/ field preparation by Lift Irrigation (Machine).	₹ 500/per hr	2 hrs		₹ 1000	-	₹ 1000.00	
	ii) Keeping field condition to ideal moisture content level for effective reaction of slaked lime in the soil by Lift Irrigation Machine.	₹ 500/per hr	2 hrs (3times)= 6 hrs		₹ 3000	-	₹ 3000.00	
	iii) Manual labourers. Human Supervision etc.	₹ 500/per MD	5 MD		₹.2500	-	₹ 2500.00	
	Sub Total of (A)				**₹ 6500**		**₹ 6500.00**	
B	**FIELD PREPARATION**							
	i) Deep Ploughing by Tractor Mounted-Chisel Plough (4 Kmph @55Cms Depth)	₹ 1300/per hr	4 hrs	₹ 5200			₹ 5200.00	
	ii) Drilling of Slaked Lime with tractor Mounted-Rotavator	₹ 1300/per hr	3 hrs	₹ 3900			₹ 3900	
	iii) **Manuals Labourers:**							
	i) Vegetative Clearance, if any.	₹ 500/ per MD	5MD		₹ 2500		₹ 2500.00	
	ii) Broadcasting of Slaked lime	₹ 500/ per MD	4 MD		₹ 2000		₹ 2000	
	iii) Supervision of Work.	₹ 500/ per MD	5 MD		₹ 2500		₹ 2500	
	Sub Total of (B)			**₹ 9100**	**₹ 7000**		**₹ 16,100.00**	
C	**COSTS OF CRUTIAL INPUTS** 1. Slaked lime	Rs.1300 per Qtl	6 Qtls	₹ 7800	-	-	₹ 7800.00	
	Sub Total of (C)			**₹ 7800**			**₹ 7800.00**	

D	**<u>OTHER CHARGES</u>** 1. **Transportation and Handling of Slaked Lime.** i) From District HQ to FIG ii) From FIG to the Operation Site	 LS LS	 LS LS	 ₹ 2000	 ₹ 2000		 ₹ 2000.00 ₹ 2000.00	
	<u>Sub Total of (D)</u>			**Rs.2000**	**Rs.2000**		**Rs. 4000.00**	
E								
	2. CONTIGENCY i) Price Escalation etc.	LS	LS	₹ 1100	₹ 2000		₹ 3100	
	Sub Total of (E)			**₹ 1100**	**₹ 2000**		**₹ 3100**	
	GRAND TOTAL			**₹ 20,000**	**₹ 17,500**		**₹37,500.00**	

3.1: <u>COSTS ANALYSIS</u>

i) For 1000 Unit/Ha. i.e. 1000 X 37500 = ₹ 375,00,000

ii) FOCUS Share i.e. 1000 X 20000 = ₹ 200,00,000

iii) Beneficiary Share i.e. 1000 X 17500 = ₹ 175,00,000

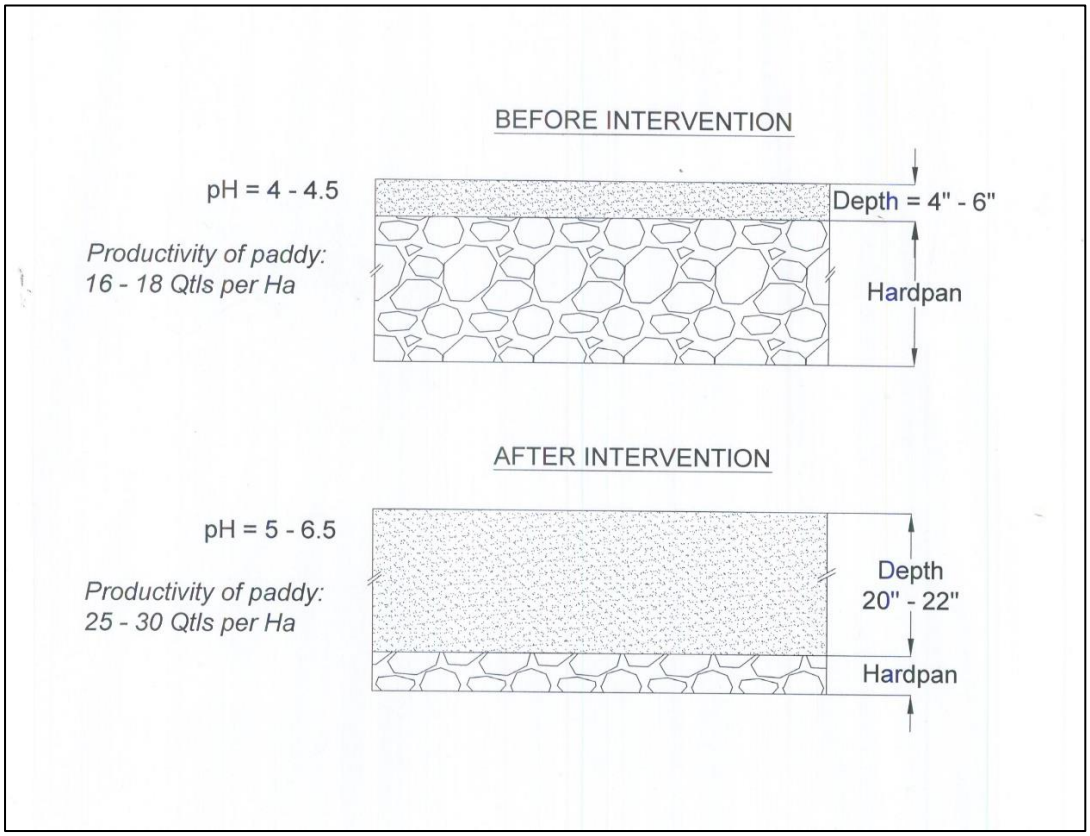
iv) Others Share i.e. NIL

3.2 <u>FOCUS: BENEFICIARY - FUND - SHARING RATIO</u> i.e. 53.33:46.66 Say 53:47

<u>4.0: IMAGES OF REQUISITE IMPLEMENTS</u>

a. Chisel Ploughs

b. Expected Impact



5.0: NOTE:

THE REMAINING INTERVENTIONS TO IMPROVE SOIL FERTILITY SUCH AS GREEN MANURING ETC. WOULD LIKELY TO BE CARRIED ON IN THE NEXT QUARTER OF 2020-2021- AWPB i.e. APRIL 2020 – JUNE 2020.

FOCUS , MIZORAM
Focusmizoram2018@gmail.com