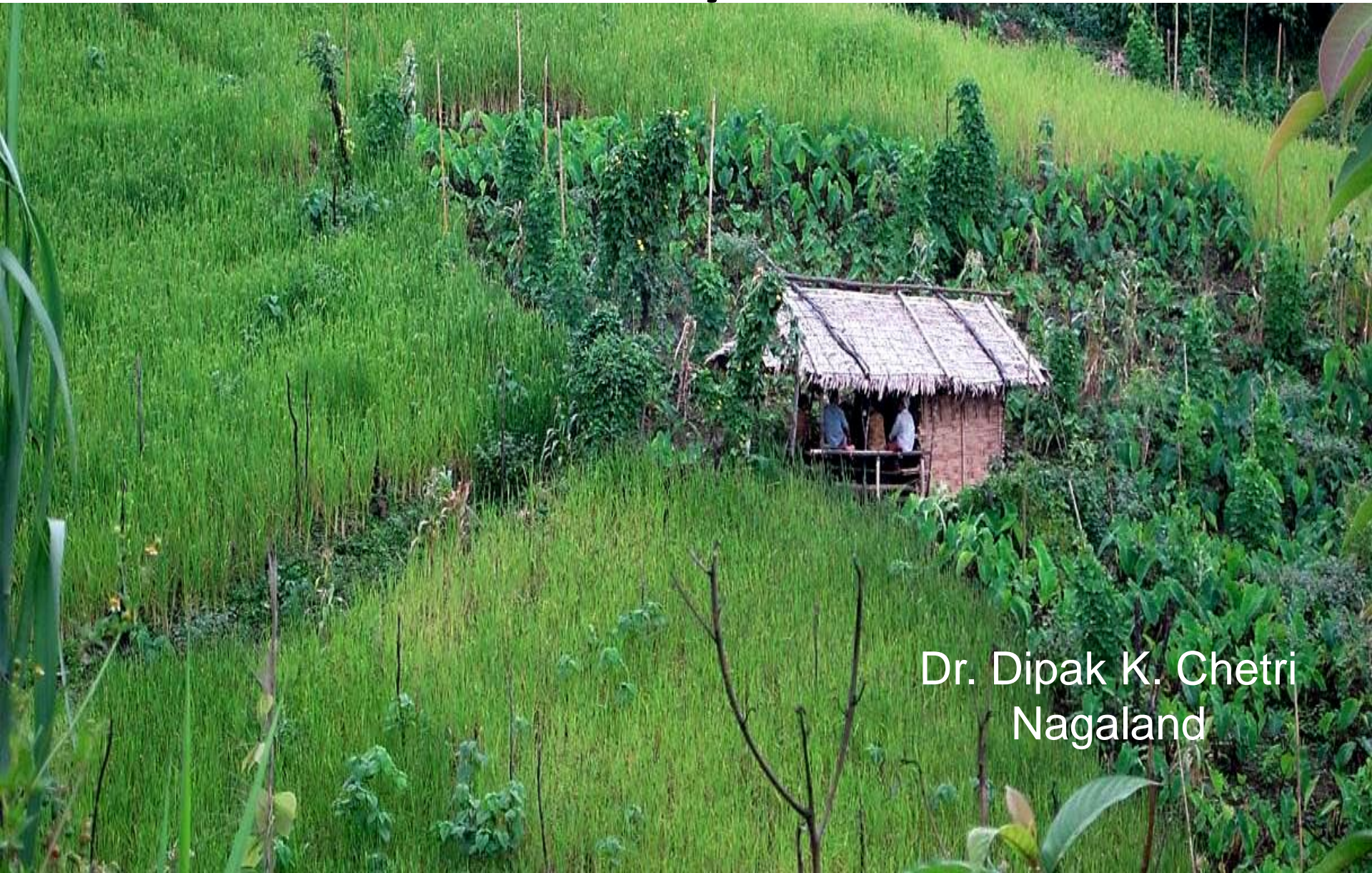


JHUM INTENSIFICATION/OPTIMIZATION



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Nagaland

Mapping of *Jhum* lands in Mizoram (Source: GIZ)

District	District area (Sq.Km)	Jhum area(Sq.Km)	% of Jhum area	No of HH doing jhum
Aizwal	3450	83	2.39	7307
Champhai	3432	114	3.33	8314
Kolashib	1348	16	1.17	2945
lawngtlai	1992	71	3.56	12549
Lunglei	4520	105	2.32	6508
Mamit	3045	49	1.60	4187
Saiha	1975	37	1.89	1723
Serchhip	1357	39	2.85	4181
Total	21121	513	2.43	47714

Retention of tree poles in Jhum Fields



Catchment area surrounding the jhum field



Planting commercial crops



Water conservation



CONTOUR BUNDING/OBSERVATION PLOT:



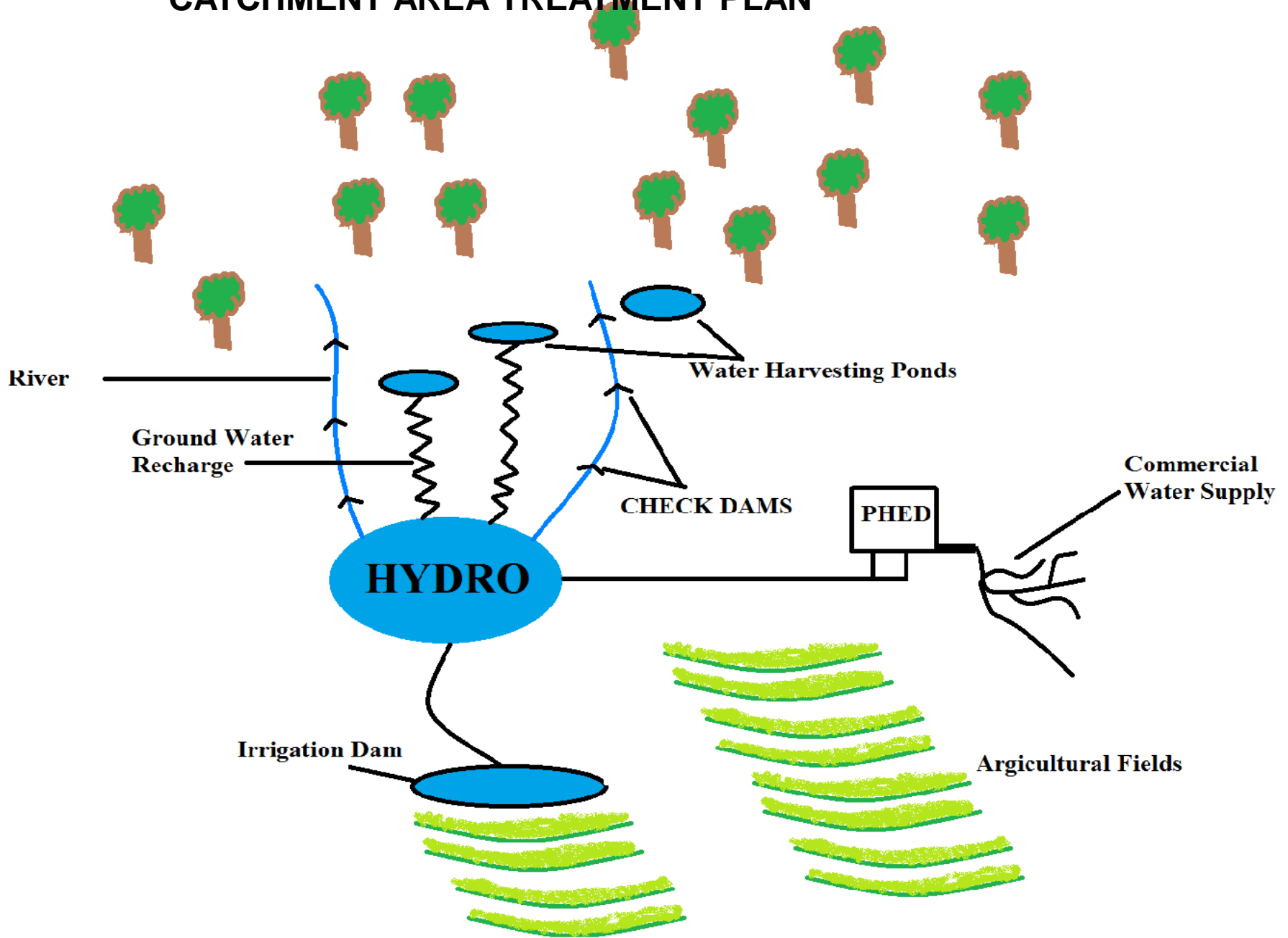
The wonder of soil filled cement bags



The Power of bamboo



CATCHMENT AREA TREATMENT PLAN



ALDER BASED FARMING



ALDER BASED contd...



Jhum Intensification?



REASONS FOR ABONDONING JHUM FIELDS

Due to decline of soil fertility

Due to decline in crop yield

Due to heavy infestation of weeds

JHUM INTENSIFICATION PRACTICES:

- **Jhum will not go away easily from Naga farming system, therefore improved jhum practices can be an option for improving the livelihood and ensure food security.**
- **SARS through trials has developed options for Jhum optimization.**

OPTION:1.

Jhum Year	Activities
1st Year Jhum:	Slash and burn of new jhum(conserve fire resistant trees through the process of pollarding, pruning and trimming)
	Lay out physical barriers with wooden logs, bamboos (whole or split),stone boulders along the contour lines/bunds or plant life barriers like Tithonia or broom grass on the contour
	Construct contour bunds/trenches by using 'A' frame technique
	If possible, bench terracing should be constructed
	Make compost pit or vermi compost
	Sow the rice either by dibbling or line sowing method.
	Sow secondary crops along the contour bund and boundaries
	Plant tree saplings/ horti plants on the contour line

Jhum Year	Activities
2st Year Jhum:	Slash the paddy stubbles and weeds, prune/trim the matured trees and minor burning of the field
	Protect the young trees and horticulture crops during burning by covering with banana sheath.
	Apply vermicompost and biofertilizers during land preparation
	Sow the rice and intercrop with leguminous crops
	Mulch the young trees/horti plants with weeds during intercultural operations.

Jhum Year	Activities
3rd Year Jhum	Slash the paddy stubbles and weeds, prun/trim the matured trees and minor burning of the field should be done
	Integrated nutrient management may be applied, since soil fertility status is very low during the third year
	Sow paddy with leguminous crops.
	Mulch the young trees/horti plants with weeds during intercultural operation
	Follow other practices as usual

Jhum Year	Activities
4th Year Jhum	Keep the Jhum field fallow OR The same field can be converted to an Agro forestry system by maintaining the trees in the field and growing shade loving plants such as ginger, large cardamom, passion fruits under the trees till the next jhum cycle. Shade loving crops under trees



OPTION: 2

Jhum Year	Activities
1st & 2nd Year Jhum	Follow all the improved Jhum practices as in option 1
3rdYear Jhum	After field preparation sow cover crops such as soybean, velvet bean, rice bean etc.
4thYear Jhum	Slash, burn and clean the field, sow the rice along with other crops, maintain young trees.
5thYear Jhum	keep the field fallow for the next Jhum cycle.

OPTION: 3

*(This option is very effective in short jhum cycle)

Jhum Year	Activities
1st & 2nd Year Jhum	Follow all the practices as given above
3rdYear Jhum	Slash down the paddy fields after the harvest of 2nd Year crop, planting of Tithonia plant at 1mx1m spacing during On set of monsoon and keep for fallow.
4thYear onwards	Tithnoia plant are allow to grow for few Years after which it is slashed for next cultivation of crops

DETERMINATION OF THE QUANTITY OF SOIL LOSS IN JHUM FIELDS:

- About 90% of jhum fields in Nagaland are cultivated with 30 to 60 degree of slope. Most of the top soils are washed down during rainy season.**

SOIL CONSERVATION MEASURES



Split Bamboo



Colacasia



Broom Grass



Tree logs

SOIL CONSERVATION MEASURES *contd....*



TRIALS ON SOIL CONSERVATION MEASURES

Table-1

TREATMENTS	1 st year MT/ha	2 nd year	3 rd year	Total MT/ha	Control plot			Total soil loss MT/ha
					1 st Year	2 nd Year	3 rd Year	
Wooden logs	11.10	12.50	0.60	24.20	32.50	35.00	1.16	68.66*
Bamboo split	11.50	12.00	0.54	24.04				
Whole Bamboo	13.00	14.20	0.65	27.85				
Live barrers Maize&Taro	10.00	15.10	0.62	25.72				
Total	45.6	53.8	2.41	101.81				
Mean	11.4	13.45	0.60	25.45*				

Max. soil erosion takes place from	March-October
Av.soil loss from treated plots in first year	11.40 MT/ha
Av.soil loss from treated plots in second year	13.45 MT/ha
Av.soil loss from treated plots in third year	0.60 MT/ha
Total soil loss from treated plot in 3 years	25.45 MT/ha
Total soil loss from control plot in 3 years	68.66 MT/ha

FALLOW MANAGEMENT:

- To restore soil fertility and recharge soil moisture & underground water**
- To create secondary forest which will provide economic yield of trees & others subsidiary income.**
- To act as a medium for effective carbon sequestration.**
- To enhances microorganism activities and maintains ecosystem**

TRIAL ON SHORT FALLOW MANAGEMENT BY USING *Tithonia diversifolia*



- **Titnonia (*Tithonia diversifolia*) or wild sunflower is a very beneficial plant**
- **It can be grown in a wide range of soil types**
- **It can add large quantities of biomass;leaves & tender twigs**
- **It can arrest soil erosion by its roots**
- **It can suppress weeds especially *Imperata cylindrica*: .**

Leave analysis of *Tithonia* result shows that it contains:

Nitrogen (N) : 3.17 %

Phosphorous (P) : 0.3%

Potassium (K) : 3.33 %

Calcium(Ca) : 2.0 %

Magnesium (Mg) : 0.3 %

Moisture content : 84 %

- **On station trial was conducted after the harvest of the second year jhum.**
- **The field was divided into two plots, one plot was Slashed during March and tithonia stems were planted at a spacing of 1m x 1m during the onset of monsoon and the other plot was kept without tithonia.**
- **The whole plots were left fallow for 4 years (1997-2000).**
- **After four years of fallow, the same area was slashed for cultivation of two years (2001-2002):**

EFFECTS ON SOIL:

PARAMETERS	CONTROL	TREATED
P^H (1:2)	4.97	5.12
EC (mmhos/cm)	0.1	0.1
OC (%)	1.65	2.1
P₂O₅ (Kg/ha)	7.0	9.25
K₂O (Kg/ha)	48.9	160.2

EFFECTS ON YIELD:

TABLE-2: YIELD OF PADDY (Q/ha)

TREATMENT	1 st YEAR	2 nd YEAR
CONTROL	7.4	1.2
TREATED	* 17.6 (137.8 %) over control	15.5

EFFECT ON WEEDS:

CHARACTERS	FIRST YEAR		SECOND YEAR	
	TREATED	CONTROL	TREATED	CONTROL
Narrow Leaves	154	296	348	192
Broad Leaves	183	178	168	406
Weeds/ sqm.	337	474	516	598

JHUM INTENSIFICATION BY USING COVER CROP:

On farm trials result findings:

Jhum Year	Activities
1st year & 2nd year Jhum	Rice and Rice with other crops
3rd Year jhum	Cultivations of cover crops only : Soya/ Velvet/rice bean etc
4th year Jhum	Cultivation of rice again
5th year on wards	Fallow



TABLE : 1. SOIL TEST RESULT:

CHARACTERS	Units	Soil Status	
		Before cover crop	After cover crop
pH		4.8	5.37
Organic Carbon	%	1.04	2.69
P ₂ O ₅	Kg/Ha	8.5	12.0
K ₂ O	Kg/Ha	128.0	180.0

TABLE:2.GRAIN YIELD AND BIOMASS:

CROPS	YIELD(MT/HA	BIOMASS (MT/HA)
RICE BEAN (Local)	1.5	5.3
RICEBEAN (Chakesang)	1.9	4.5
VELVET BEAN	1.6	3.5
SOYA BEAN	1.7	4.4

TABLE:3. YIELD OF RICE (2000-2003)

Jhum year	Crops	Yield (Q/ha)
1st year,2000	Rice	28.1
2nd year,2001	Rice	14.9
3rd year,2002	Cover crops	See in table no.2
	Rice in control plot	8.2
4th year,2003	Rice in treated plot	17.4 (112.1 %)
	Rice in control plot	6.5

Thank You

