

Agronomic Rehabilitation in the Tsunami affected agricultural lands

Situation after Tsunami damage

Damage to Soil and water bodies in Nagappatinam district

Sand/silt castings	1367 ha
Silting of farm ponds	3200 nos
Silting of community ponds	142 nos
Crop damage to Paddy	4021 ha
Crop damage to Ground nut	1186 ha

Cuddalore district	
Agril. Land	1593 ha
Hort.land	193.47 ha

Nagapattinam situation

Parameters	Pre Tsunami	Post Tsunami (Jan 2005), 165 samples
Soil pH	6.1-8.5	Up to 8.8
EC (silty clay) Dsm ⁻¹	0.2 – 1.1	6.7 –23.7
Organic Carbon	0.02-0.6	0.6-1.2

Agronomic rehabilitation

- to understand the multi-dimensional nature of the problem and to develop soil health rehabilitation package a traveling workshop was organized from 16th to 18th July 2005 with multidisciplinary experts of around 28 from different parts of the country
- The participants visited the affected villages in Cuddalore and Nagapattinam districts
- Spot measurements for pH and EC were conducted in fields and discussions with farmers were held



Soil and water related problems

Soil Reclamation

In the soil, Tsunami waves caused three kinds of major damages

- Deposition of slushy greyish brown clay deposit
- Deposition of sand and
- Sea water intrusion, which receded (within 3 hrs to one week from the field) leaving salts in the field

Management of clay deposit, sandy soil and Sea water entered and receded leaving salts

- The deposits need not be scraped but can be mixed with soil by ploughing and it will improve soil texture especially of the surface soil, water holding capacity and soil fertility. In the case of sea water entered/inundated lands -Leaching with sufficient amount of canal water rainfall shall help to overcome the problem. Hence during leaching the pH will not go up; ESP and EC will decrease simultaneously during the reclamation process
- These recommendations were widely shared with the Government department, farming communities and NGOs involved in the soil reclamation and been were followed in the reclamation process.



Contamination of small water ponds with sea water and deposits

- Most of the small water ponds located in the fields which, are the source of irrigation for the second and third crop, were severely affected and at present it is saline in nature.
- The following suggestions were provided and followed in the field
- Physical removal of contaminated water through tankers and connected pipelines and paving ways to recharge with monsoon rains
- Surface leaching through rainfall and canal water
- Promoting rain water harvesting –farm ponds

Heavy metal analysis – Clay deposits

S.No	Parameters	Results mg/kg
1	Copper as Cu	99.8
2	Chromium as Cr	35.5
3	Zinc as Zn	32.5
4	Nickel as Ni	12.0
5	Lead as Pb	56.0
6	Cadmium as Cd	31.0

Participatory On- farm demonstrations in the selected field sites representing the type of damages

- To develop the capacity of the local farmers through active participation in the activities – diagnosis, analysis and evaluating the results
- To develop local resource persons to share the results with other farmers in the region - to promote grassroot farmers organizations
- To promote *farmer –led horizontal extension*

Representing sites, kinds of damages and major crops

1. Vellapallam- Clay deposit – Paddy and Groundnut
2. Vettaikaraniruppu- Clay deposit- Cashew, Casurina + Groundnut
3. Anaikoil- Water stagnated- Paddy
4. Neithavasal- Water stagnated- Sand deposit –Paddy and Ground nut
5. T.S.Pettai – Sand deposit – Ground nut

Number of farmers covered

Village	Area covered/acres	No. of farmers	Crops
Anai koil	13.5- Paddy	12	Paddy- Pulses
Neithavasal	11- Paddy 7.5 Groundnut	11	Paddy- Pulse Groundnut
Vellapallam	8.28- Paddy	16	Rainfed Paddy- Pulses- vegetables
Vettaikaraniruppu	5- Paddy 5- Casurina- Groundnut	11	Paddy Casurina- Groundnut - Cashew

Strategies adopted

- Deep ploughing and land smoothening
- Spreading and incorporation of sand/clay deposit
- Removal of cyperus and other weed species
- Providing proper drainage facilities
- Sowing and *in situ* incorporation of greenmanures
- Leaching wherever possible
- Application of Farm yard Manure
- Selection of salt tolerant varieties
- Application of Biofertilizers – salt tolerant strains of Phosphobacteria and Azospirillum species, Pseudomonas applied
- Gravity drip system to enhance water use efficiency

Farm Ponds

- Removal of salt water and desilting of farm ponds
- Strengthening of bunds and introducing fodder crops

Major Training needs of the farming communities

(around 25 contact farmers to be trained)

- Seed treatment and storage mechanisms
- Soil management with the focus to enhance soil organic matter
- Integrated Pest Management
- Water saving irrigation methods
- High value multipurpose tree crops
- Livestock management – especially the small ruminants
- Fodder crops
- Market linkages
- Post harvest technology and value addition

Changes in soil qualities

Villages	pH					EC				
	Jan 2005	April 2005	July 2005	Oct 2005	Dec 2005	Jan 2005	April 2005	July 2005	Oct 2005	Dec 2005
Annaikovil (Mohanasundaram)	7.1	6..99	-	8.1	8.2	8..3	0.48	-	1.1	o.313
Neithavasal (Rajakannan)	7..3	7.86	7.6	6.83	6.8	15..5	5.89	5.7	1.18	0.60
Vettaikaraniruppu (Govindasamy)	7.4- 8.2	8..34	-	7.0	7.68	0.4- 2.3	1.76	-	0.62	0.098
Vellapallam (Nagarajan)	7.8	8.96	8.6	7.1	8.0	15.0	0.13	4.92	1.52	0.434

Dialogued experiences of the farmers

Farmers of the region express that soil salinity is gradually getting reduced

This region needs not only salt tolerant varieties, but both flood and salt tolerant varieties are needed – Numerous flood resistant local landraces are in cultivation in few pockets

Varietal developmental programmes need to consider market value of the grains (eg TRY 1 and 2 are flood resistant but not preferred by the farmers)

Need to improve the field level drainage systems

Demonstrative value to other farmers

Interactive mode, field visits and exposure trips are being followed as methods of training

In each of the village around 25-30 farmers are being trained on soil reclamation, soil management, pest and disease management, water management.

These farmers would emerge as local resource persons
Learnings are converted into common guidelines to address the problems in the future

Conclusion

- **Unexpected problems like Tsunami damage to agricultural land and water bodies needs multi-stakeholder participatory diagnoses and arriving suitable consensus**
- **Traveling workshop mode with spot measurements with experts representing 11 institutions and organizations helped to avoid blanket recommendations and to provide area/regions specific guidelines covering multiple dimensions**
- **Participatory On- farm demonstration would help to develop area specific models and evolve local resource persons**
- **Promoted to develop farmer led-extension and grassroots organizations to encounter future problems and disaster preparedness**
- **Develop towards Integrated Farming System to address the long term livelihood security of the small and marginal farmers of the region**