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Research Paper

A Study on the Inpact of Tsunami Hit on Agricultural Lands in Nagappatinam District

Economics

KEYWORDS : Tsunami –Affected Impacts – Rehabilitaion – Measures – New strategies.

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ABSTRACT

Farmers in the Neithavasal, Keliyur, Poombukar villages recalled that seawater intrusion and deposition of sediments from the sea have occurred also in the past.

They differentiated the incidents, based on seawater intrusion or seawater intrusion with sand or clay deposits. If it is seawater alone, they locally call it as 'kadal ponguthal' (turbulent sea water entry). Entry of seawater with deposits of soil into the field is known as 'kadal puraluthal' (rolling waves along with sea bed ediments). Seawater with clay deposit is locally called as 'porrukku', which is very fertile and used to incorporate in the field while ploughing. In these circumstances, and also when there is an increased salinity, the following remedial measures are adopted by the farmers: in case of wetland, ploughing is carried out twice, followed by leaching with good water, and application of Calotrophis leaf and other green leaf manures. This is left for decomposition, and ploughed in situ. In case of dry lands, application of tank silt (porukkuman) and farmyard manure is the usual practice.

INTRODUCTION

On 26th December 2004, a major earthquake of magnitude 9 on the Richter Scale occurred in the Indian Ocean on the northern tip of Sumatra Island. This led to fast moving, giant Tsunami waves that lashed the coastal line the Tamil Nadu and Pondicherry, and caused severe damage. Similar Tsunami waves had occurred in the Tamil Nadu coasts during 1881 and 1941, but the details of damage were not available. However, in 2004, the Tsunami ravaged the coastal areas and the those living in the coastal districts in multiple ways. There was a colossal loss of life and assets, damage to soil and water in the agricultural lands, loss of cattle and cash crops. In the context of agriculture, the Tsunami caused extensive damage to standing crops, as well as agricultural fields, in Kancheepuram, Vilupuram, Cuddalore, Nagapattinam , Tirunelveli and Kanyakumari districts of Tamil Nadu. The type and extent of damage varied across these coastal districts. Coupled with the damage to crops and soil, the loss of livestock was very severe. Most of the households lost their animals which were the major or supplementary contributors to household income. The damage to the crop and soil led to the loss of fodder, and scarcity of open grazing areas.

Damage Caused by Tsunami in Agriculture and Livestock Sector, Tamil Nadu

S.No	District	Area (ha)	Livestock Cattle & Goat (nos)
1	Nagapattinam	9567.09	128121
2	Kanyakumari	12.00	131501
3	Cuddalore	1681.22	1068
4	Kancheepuram	750.00	4
5	Villupuram	155898	0
	Total	13569.29	

S o u r c e : Area - G.O. Ms, No. dated 23.3.005

Livestock , Cattle & Goat - Post Tsunami Sustainable Livelihoods Programme for the Coastal Communities of Tamil Nadu - Design Document The above Table shows that Nagapattinam District was the worst affected, in relation to Agriculture and Livestock. M.S.Swaminathan Research Foundation (MSSRF) initiated the Agronomic Rehabilitation activities, focusing on the damaged agricultural areas and related infrastructure, reclamation of salt affected soils, and farm based water bodies for resumption of crop production. In the process, it focused on developing the capacity of the local farmers through active participation in the activities - diagnosis, analysis and evaluating the results, developing local resource persons, and to promote farmer -led horizontal extensions, and facilitating grassroots Farmers Groups.

Profile of Nagapattinam District

Nagapattinam is a coastal district; covering a total area of 2,71,583 hectares. Out of the total area, around 1,26,149 hectares is classified as wetland, 61,880 hectares as dry land, and the remaining 83,548 hectares as 'poramboke' or Government land. Around 74% of the cultivators have less than one hectare of land, and another 15% hold between one to two hectares. The remaining 11% of the households own above two hectares of land. Though the area receives an average of 1337 mm of rainfall annually, nearly 76% occurs during the Northeast Monsoon, followed by 17.3% during the Southwest Monsoon. The soil is predominantly sandy in texture, and clayey in certain pockets, with slight salinity/alkalinity. The soil in the region belongs to Valudalakudi series; dark brown to brown, deep, sandy and possessing characteristics, of mild to moderate alkalinity levels1. The area lying between Nagapattinam and Vedaranyam, dominated by sand dunes, and cultivated soils mostly sandy in texture. Regarding the water table, fresh water is overlying saline ground water. The cultivation depends primarily on rainfall, supplemented by underground water. The area lying between north of Nagapattinam, to the border of Cuddalore District is covered under the Delta Irrigation System.

Agriculture in this region is dominated by rain fed and canal irrigated cultivation, supplemented by tank irrigation for the main crop of rice, and small-scale irrigation using underground water for the secondary crop viz pulses, gingelly, groundnut etc. Paddy is the primary subsistence crop, being traditionally cultivated in different methods. More than two third of the farming community are small and marginal landholders, and paddy is the most suitable staple crop. Groundnut, coconut, cashew, mango, vegetables like brinjal, cluster bean, lady's finger etc are cultivated using small scale irrigation. Cotton, and Casuarina are the other commercially important crops. In some of the areas, pulses like green gram, black gram and cowpea are cultivated as secondary crops (relay crop) after first season paddy, or finger millet, gingelly, sun hemp etc, are grown. 1 Soil Survey Report of Tsunami affected area in the coastal belt of Nagapattinam District 8 Agronomic Rehabilitation and Livelihood Restoration of Tsunami Affected Lands in Nagapattinam District of Tamil Nadu Livestock played a major role in strengthening their livelihoods, particularly the small ruminants. Generally small ruminants are reared in stall-fed system, using tree fodder, supplemented during lean season by open grazing in the agricultural fields. Agricultural work is the major livelihood for the agricultural labourers, supplemented by major multiple livelihoods like seasonal fish catch in the rivers/backwaters, prawn farms, coconut leaf mat-making, copra preparation, etc.

Between 1891 and 2000, nearly 26% of cyclones that formed in the Bay of Bengal struck the coast of Tamil Nadu; of which 55 severe cyclones crossed the region, mostly during the months of October and November. In addition to frequent cyclones, mid-

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season drought, floods, and water logging due to the flat topography, and improper/disturbed drainage systems, make the region more vulnerable. Thus the soil resources in this region show fluctuating characteristics of soluble salt concentration and soil pH.

Tsunami: Damage to Agriculture

Focusing on damages to important natural resources like soil and water, there was major damage to drainage facilities, field bunds, sand dunes etc. The turbulent tidal waves eroded the top soil in the sloppy fields, damaged the field bunds, small canals/dikes on one hand, and on the other, it deposited clay and sand materials in the low lying fields. In both the cases, the field topography was affected, and the thickness of the sediments varied across the damaged area, depending upon the distance from the coast and the gradient. The soil as well as water sources were severely affected, and the type and intensity of the damaged soil varies across the affected area. It can be broadly classified as follows:

- Landscape de-surfacing
- Deposition of slushy grayish brown clay deposit /sand deposit
- Dislocation and deposition of coastal sand dunes (erosion)
- Seawater intrusion, which receded (within 3 hrs to one week from the field) leaving salts in the field.
- Contamination of farm ponds, community ponds and other irrigation sources by sea water
- Damage to standing crops like paddy, groundnut, casuarina, coconut, cashew

The following Table gives the details of different types and extent of damage in the District. Damage to Soil and Water Bodies in Nagapattinam District

Total area affected	4675 ha
Total area affected due to soil salanization	4657 ha
Sand/ silt castings	1367 ha
Silting of farm ponds	3200 nos
Silting of community ponds	142 nos
Standing crop damage to Paddy	4021 ha
Standing crop damage to Groundnut	1186 ha

Source:

Report on Tsunami Damage to Agricultural Lands, Soil Test Report - Nagapattinam District by Assistant Soil Chemist, Mobile Soil Testing Lab, Thiruvarur (Jan 2005).

The Table below also indicates the changes in the soil quality in pre and post Tsunami situation.

Changes in the Soil quality in Pre and Post Tsunami

Parameters	Pre Tsunami	Post Tsunami (Jan 2005)*
Soil pH	6.1-8.5	< 8.5 and it seldom exceeds 9
EC (Dsm-1)	0.2 – 1.1	Up to 23.7 especially in the clay deposits
Organic Carbon(%)	0.02-0.6	0.6-1.2 in the silt/clay deposited areas and in the remaining areas it is low

Source:

Soil Survey Report of Tsunami affected area in the coastal belt of Nagapattinam District carried out by the Soil Survey and Land Use Organization, Department of Agriculture, Govt. of Tamil Nadu The following table gives the details of the different types of livestock lost in Nagapattinam District Livestock lost in Nagapattinam District

Milch animals	424
Draught animals	14
Calves	87
Goats Poultry	3019 368

Sources: Records, Animal Husbandry Department, Nagapattinam

Rehabilitation Strategies in Tsunami affected areas

Support from Government Sector: Department of Agriculture has issued a Government Order (D.O.Lr.No.IAP4/232285/2004 dated 3.2.2005) on the possible rehabilitation package of strategies - soil testing, removal of salt, land surface leveling, gypsum application, sowing of seeds, ploughing and cultivation of crops - to the affected farmers. Immediately, the Department of Agriculture mobilized the affected farmers into Self-Help Groups and linked them to banks. The Government allotted Rs 12,500/ ha of the affected fields as an input Subsidy, and deposited the amount into the joint accounts of farmer SHGs and Joint Director/ Assistant Director. A series of soil tests for pH levels and electrical conductivity were carried out in the affected farmers' fields. The input provided during the first year of rehabilitation was adjusted against the allotted amount to the farmers.

Support from NGOs: NGOs identified affected villages and number of farmers in each village, and decided on the area to be identified for rehabilitation. NGOs took the support of consultants in drafting the agronomic rehabilitation strategies. They also mobilized farmers and agricultural labourers into Self Help Groups in some of the areas. As part of the soil management practices, and also to provide employment for the agricultural laboureres, many of the NGOs had started removing deposits of clay and sand from the fields, heaped them in the field, and transported the same to the seashore under 'Work for Cash' programme. They also managed the de-silting of canals and removing of seawater and slushy deposits from the farm ponds.

In fact, during the initial phase of rehabilitation, only a very few NGOs were involved in agronomic rehabilitation. During that period of time, reviews and reports generally indicated that Tsunami agronomic rehabilitation has not received the required attention of donors and NGOs. In course of time, the NGOs took an active role in providing support for soil reclamation, crop cultivation and rebuilding the infrastructures like canals and ponds.

From the beginning, both the Government, as well as NGOs, evolved rehabilitation strategies in isolation, and started implementing in a selected number of villages, based on their capacity and financial strength. Though the type and degree of damage varied across the affected agricultural fields, the Government evolved common recommendations and allotted relief inputs to the farm families. However, the NGOs working in the specific region, evolved and followed site-specific strategies in the regions where they operated. In both the cases, the affected farming communities were not adequately consulted in evolving and implementing the strategies. As a result, each of the groups implemented their own strategies and this situation led to confusion among themselves, and am ong the farmers, in agronomic rehabilitation of the affected fields.

There were no concrete scientific recommendations based on proper survey and situation analyses, other than the GO issued by State Agricultural Department. Hence, there was a need to understand the ground situation, and to focus on the integrated rehabilitation measures in the large scale, on a medium to long-term strategy, to help the farmers revive and strengthen the production systems. Diverse opinions were received from the farmers of Northern part of Nagapattinam on the

seawater intrusion and soil deposits on fields, based on their past experiences. Traditional Knowledge plays a vital role in mitigating the localized problems. This knowledge has developed among the local communities over a period of time in the same location (Box 1).On the contrary in Vedaranyam, Pusphavanam, Vellapapallam, Periyakuthagai, Naluvedathapathy, Koilpathu, Vettaikaranirruppu, Vilunthamavadi and Tirupoondi (southern part of Nagapattinam) areas, the huge clay/silt dominated deposits was noticed for the first time and there was no such earlier experience. Thus farmers were not confident about the impact of the deposits in the field. In this situation, State Department of Agricultural Extension issued an order for rehabilitation strategies, in which removal of deposits was recommended as one of the reclamation strategies. NGOs started the

same approach in the field, mostly to provide work for agricultural labour households under 'cash for work' programmes. The soil reclamation package developed by the individual NGOs recommended the removal of deposits. In most of the fields theses deposits were scrapped and removed from the field mostly during May 2005 onwards. In this period the region received two good rains (April - 197.5 mm and May 41.97mm). At that stage it was difficult to scrap the deposit alone (mixed with top soil) and hence in most of the fields topsoil was also removed to some extent with the clay/ sand deposits. Though a portion of the salt might have been taken away along with the top soil, most part of it must have entered into the subsurface soil and into the ground water along with the sub-surface leaching.

Conclusion

In this situation, to gain better under standing of the problem, there was a need for proper situation analysis with the support of different experts. M.S. Swaminathan Research Foundation decided to organize an interdisciplinary traveling workshop, to understand the situation and evolve site specific strategies to address the different types of problems caused by the Tsunami across the affected regions. The Report of the work shop, wither commendations, is given as Annexure I. The workshop recommendations and discussions were prepared as Brochures, both in Tamil and English, and disseminated to farmers, civil society organizations, and District Coordination Committee and Government Officials. The outcomes were also immediately uploaded in MSSRF web site (www.mssrf.org) and disseminated through Village Knowledge Centres promoted by MSSRF, wherever it operated, and in village meetings with the farming communities.

REFERENCE

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