POST-TSUNAMI AGRICULTURE
LIVELIHOOD RESTORATION
NAGAPATTINAM, TAMIL NADU, S. INDIA:
A DISTRICT-LEVEL CO-ORDINATION EFFORT

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Abstract

Nagapattinam, a coastal district in Tamil Nadu had the highest extent of agricultural land affected by tsunami in the Indian sub-continent totalling around 7,000 hectares which included all types of land. The government’s survey of damages and the package proposed for reclamation had its own limitations. At a time that NGOs and donors gave lesser priority to agricultural reclamation (early 2005), the NGO Co-ordination and Resource Centre – NCRC, took up the cause and reassessed the damages and evolved a comprehensive package of activities (with the active participation of all stakeholders). The damages and package were presented to the Disasters and Emergencies Committee (DEC) – a group of donor organizations which led to an understanding of the situation and their coming forward to support NGOs. NCRC conducted a series of workshops and meetings to improve NGOs understanding of agriculture and its importance and later played a key role in linking them with donors.

A common shared understanding was developed among NGOs in terms of a uniform package and methodology and approach in implementation. The comprehensive package included three sets of activities, ‘immediate’ for desalination, ‘short-term’ for restoring soil fertility and ‘long-term’ for sustaining the farm in the long-run. A lot of advocacy effort was taken up with individual NGOs and their donor agencies to bring about commonality.

Participatory area (village) allocation for the NGOs was completed in decentralized meetings in the presence of line departments and the farming community, ensuring working in contiguous areas. 23 NGOs implemented the common package across 42 revenue villages working with 297 Tsunami Farmers Self Help Groups (TFSHGs). Simultaneously, mass information dissemination about the package was done through printed brochures and local FM radio. NGO staff capacities were built through one-off training programmes. Effective implementation of activities was also ensured through direct monitoring visits and regular review meetings.

International Workshop on Post Tsunami Soil Management, 1-2 July 2008 in Bogor, Indonesia
At the end of the season 2005-06, the comparison of soil test values of electrical conductivity (salinity) and pH (alkalinity) taken before and after clearly showed significant reduction in soil salinity. There was a marked increase in the soil fertility status in terms of soil organic carbon and other major nutrients. In spite of heavy rainfall and flood during the season, the crop yields especially paddy was 50 – 90% of the optimum in at least 30% of villages and up to 50% in close to 60% and this changed the earlier assumption of farmers that no crop would be possible for the three years after the tsunami.

The successful first year’s reclamation effort is the result of joint efforts with the government complementing their work and package and reclamation of all tsunami affected lands and farmers (irrespective of type and category) through an effective participative co-ordination mechanism.

In the second and third years, the focus has been on promoting farming systems approach duly integrating desalination measures and disaster proofing of agriculture working on off-farm drainage channels.

**Tsunami impacts**

The 2004 tsunami caused extensive damage in southern regions of India and Andaman and Nicobar islands affecting a total of 2,260 km. of coastline; the worst affected being Nagapattinam District in Tamil Nadu State. Apart from loss of lives, damages in fisheries sector and shelters, a large extent of agricultural land was affected by tsunami.

**NCRC and Concern Worldwide**

The NGO Coordination Centre was set up in early January 2005 for coordinating the efforts of approximately 500 NGOs involved in relief operations in Nagapattinam.. With the tapering off of the relief activities, this NGO Coordination Centre transformed itself into the NGO Coordination and Resource Centre (NCRC) taking on roles that evolved during the relief operations. The centre saw an emerging need for a mechanism to ensure the effectiveness of the different rehabilitation measures proposed in terms of equity and sustainability through ensuring meaningful exchange of communication between the planners and the affected communities, strengthening the sectoral knowledge and expertise and building a common vision and perspective.

The support of Concern Worldwide India was in taking the agriculture cause into the Disasters and Emergencies Committee (DEC) initially and later supporting NCRC towards co-ordination costs and in the second and third years supporting the disaster proofing cause in full.
Nagapattinam Background

Geographical Location:

This District lies on the shores of the Bay of Bengal between Northern Latitude 10.7906 degrees and 79.8428 Degrees Eastern Longitude. The general geological formation of the district is plain and coastal. The Cauvery and its offshoots are the principal rivers.

Meteorological Information:

Temperature: The average maximum temperature for the district (from 1991 to 1996) as a whole is about 32.5 C and the average minimum temperature is 24.7 C.

Rainfall: The Northeast monsoon, which starts in October and ends in December, contributes about 60-75% of the total annual rainfall. The Southwest monsoon rains from June to September and from March to May accounts equally for the rest of the annual rainfall. The mean annual rainfall in the district is 1337 mm.

Cyclone: Cyclonic storm brings havoc normally once in 3 or 4 years and heavy downpours during the Northeast monsoon leads to flooding of the district and damages field crops and soils.

Crops: Cropped area accounts for about 65.53% of the total area. Paddy is the main crop of the district and is grown three times a year followed by groundnut. Mango, cashew and coconut are the important horticultural species in the district.

Soils: 88.71% of the soil is sandy coastal alluvium, followed by 6.57% of black soil.

Irrigation: Chief sources of irrigation in the district are the rivers, a few rainfed tanks and wells. These tanks and wells occur mostly in the upland regions.

1. 1 YEAR (2005-2006): CO-ORDINATION OF RECLAMATION INTERVENTIONS IN CROP MANAGEMENT

1.1. Objective:

The objective was to ensure reclamation of all tsunami affected agricultural lands in Nagapattinam district through NGOs complementing the government (department of agriculture) works irrespective of land ownership, type of farmers and type of lands.
1.2. Strategy:
The strategy to ensure reclamation of agricultural lands included co-
ordination of implementing NGOs with the active participation of
Department of Agriculture and Farming Community in the process.
Evolving a common and comprehensive reclamation package with the
NGOs in a participatory manner, validating the package with the Line
Departments and Farming Community and facilitation to ensure
effective implementation of the package including donor support to the
NGOs was planned. Policy advocacy with the NGOs and donor
organizations to further strengthen the implementation process has
been an important agenda. Dissemination of information to the
farming community on the package further ensures education to the
farmers. The capacity building programme to the NGO field staff and
in turn to the farming community further strengthened the whole
process.

1.3. Assessment of damage by the Government:
Two damage assessments one in January and another in March have
been taken up by the Department of Agriculture. The primary source
of information for these assessments has been the Village
Administrative Officer (VAO) and the damages relate to the standing
crop loss due to tsunami. One round of compensation for the loss of
crop was provided by the Department of Agriculture to the farmers.

The Department of Agriculture did take up soil testing processes along
with the damage assessments. It was observed that the PH of soil has
gone up and hence the alkalinity of the soil. There was an increase in
the Electrical Conductivity (EC) and alkalinity of the soil.

NCRC did organize few meetings between January and March with
the NGOs to take stock of the situation in terms of damages primarily
and to discuss on what could be done as reclamation in general.

1.4. Processes:
The need for reclamation was not felt immediately after the tsunami
because of other immediate felt needs of the community more related
to fisheries. It was only in April’05 that there was a strong realization
to take up reclamation activities in agriculture.

1.4.1. Damage assessment:
Following the damage assessments made by the Government, a
quick assessment was completed by NCRC revenue village-wise
through Village Administrative Officers (VAOs) during April’05 on the
different types of damages and the extent. As the figures varied
extensively in comparison with the government data, another intensive assessment of the damage was completed during June and July to get a relatively precise data. There were four sources of information during this damage assessment; the Self Help Groups (SHGs), the panchayat presidents, the VAOs and the individual farmers (during field visits).

The initial government assessment implied a damage of 4657.47 ha. and the later revenue village-wise NCRC assessment during April’05 reflected damage of around 5200 ha. All these assessments relate primarily to the area of standing crop loss. The second intensive assessment done by NCRC during June and July included the fallow and common lands too used for agricultural purpose by the farmers and hence the extent of damage (total area salinity-affected) doubled in many villages. 7000 ha in total were affected by salinity spread across 42 villages. The land area affected by sediment of sand or mud was 1367 ha.

1.4.2. Damages:
The damages in Agriculture found were as follows.

   On individual farmers’ lands:
   - Loss of standing crop
   - Sand / Mud sediments on agricultural land
   - Salinity of cultivable land
   - Siling of farm ponds

   On common lands:
   - Siling of common ponds
   - Siling of irrigation / drainage channels

1.4.3. Comprehensive package development:
From April to June, meetings were held regularly with NGOs to create interest among them for agricultural land reclamation on one side and to take stock of the situation on the other. In the meantime, few NGOs started working on the reclamation of agricultural lands. A comprehensive package for reclamation of affected lands evolved during June through a participatory discussion process with the NGOs and the package was sub-divided into three categories, immediate activities (all mechanical and engineering works before the season), short-term activities (measures taken up along the season) and long-term activities (measures taken up to ensure sustainability of farming in the long-run).
Immediate activities:

On individual farmers’ lands:
- Removal and transportation of sediments (if above 2 inches)
- Deep Ploughing of the fields (up to a minimum of one foot depth)
- Trenching around the fields (along the bunds)
- Clearing farm ponds (mud as well as saline water)

On common lands:
- Clearing common ponds (mud as well as saline water)
- Clearing irrigation / drainage channels (sand/mud)

Short-term activities:
- Green Manuring in-situ (before taking up the seasonal crop)
- Growing of salt tolerant crop varieties
- Application of required quantity of organic manure in the form of Farm Yard Manure/Compost/Vermi-compost as basal dose

Long-term activities (desirable):
- On-farm production of compost/vermi-compost (effective recycling of farm wastes)
- On-farm production of biomass producing trees (on the bunds to cater to the needs of manure, fodder and fuel)
- On-farm production of legume forage / fodder grasses (on the bunds)

1.4.4. Facilitating Donor support to NGOs:
As many of the NGOs needed funds for taking up the package, the costing for these was prepared. The damages, comprehensive package proposed and the costing related were presented in the Disasters and Emergencies Committee (DEC) meetings at Chennai twice. The first presentation happened with the first assessment data in June and the second presentation happened after the elaborate damage assessment in the field during July. A few donor organizations came forward for funding the NGOs and they were linked with promising NGOs.

1.4.5. Co-ordination meetings with NGOs at district and taluk levels:
A series of taluk-level meetings were held during July with the NGOs in order to get the willingness of NGOs to take up areas revenue village-wise and also to resolve conflicting situations between the
NGOs wherever there was an overlap already existing. These meetings went on well and in addition they also served the purpose of seeing the NGOs’ potential (in terms of personnel and funds) to take up more area on one side and building good rapport with them in the process. These were followed by few district level meetings in order to fill-in gaps in terms of area of coverage and to discuss on the package for a better common understanding during August.

1.4.6. *Facilitating Linkage with line departments:*

In the meantime, linkage with the Department of Agriculture and the Department of Horticulture have been strengthened and a joint workshop involving all the line departments and the panchayat presidents of the affected villages was organized in which the District Collector also participated. This workshop served for validating the comprehensive package with the community and to get the departmental plans presented. The Joint Director of Agriculture and the Assistant Director of Horticulture have been part of most of the district and taluk-level meetings organized henceforth.

1.4.7. *Facilitating Linkage of Departments, NGOs and Farming Community:*

A second series of taluk-level meetings in the respective taluks involving these two line departments (Agriculture and Horticulture), implementing NGOs, panchayat presidents and the Tsunami Farmers’ Self Help Groups were organized during August. These were basically to introduce the NGOs to the community and vice versa, declaring the area to be covered by each of the NGOs revenue village-wise (after tallying varied assessments of the damages by different stakeholders and coming to a consensus) and to reiterate the activities covered in the package getting the feedback of the community.

1.4.8. *Co-ordination of Implementation of activities in the package:*

During September and October the concentration was on the implementation of “immediate” and “short-term activities” of the package in the field by the NGOs. 23 NGOs implemented the activities in the package across the 42 tsunami affected villages. Meetings were conducted more on a weekly basis to closely review the progress of work of these NGOs, to sort out issues if any and to discuss areas of concern like long-term activities, capacity building and research.
1.4.9. Advocacy:
In the meantime, discussions were carried out with few donor organizations in order to facilitate NGOs to work with all client groups thus ensuring comprehensive coverage of all lands in the villages by the NGOs.

Individual discussions with few NGOs have been taken up to make them realize the need to have flexibility in their methodologies to ensure timely implementation of activities on one side and to avoid conflicting situations with other NGOs working in the same village on the other. Few of the NGOs responded favourably.

The Joint Director of Agriculture visited in person at regular intervals, and The District Collector and the Commissioner of Agriculture informed about the comprehensive package and NGOs intending to implement work.

1.4.10. Capacity building:
The capacities of NGO staff were built through periodical one-off training programmes. Focus has been given to the long-term activities in such trainings as they need more conviction as well as skills. Implementing NGOs in turn trained the farming communities of their respective working villages.

1.4.11. Information Dissemination to farmers:
A brochure detailing the activities in the proposed package both in the form of pictures as well as brief explanations in Tamil (the local vernacular language) has been prepared. This folder material has been given to all tsunami affected farmers in the district through the Village Information Centres (VICs) of NCRC. The brochure is basically meant for the farmers to serve as informative as well as educative material. These were also supplied to the NGOs and Department of Agriculture staff.

A programme on radio done with All India Radio – Karaikal in Tamil on the damages in agriculture and reclamation measures in progress in the field (by the NGOs) has been broadcasted during October. This reiterated further the NGOs’ implementation work happening in different parts of the district.

1.4.12. Data Collection and Triangulation:
NCRC cross-checks information given by NGOs through extensive field visits and also responds to farmers’ and NGOs’ calls by visiting their places. The VICs of NCRC do collect field data on a fortnightly basis of the progress made in the implementation of activities by NGOs in their respective covered villages.
Between February’05 and April’06, NCRC facilitated a total of 44 meetings which included discussions with NGOs, farming community and the line departments. District-level workshops, technical consultative meetings and capacity building programmes were also included in this list.

The graph indicates that productivity has been coming down over years. During the disaster years, i.e. 2003-04 (drought), 2004-05 (tsunami and flood) and 2005-06 (flood years), the proportion of habitation reporting 90% and above normal yield is close to nil. In fact, in the tsunami year, there has been complete crop loss due to lodging and salination, with about 50% of habitations reporting no yield at all. In the current year of 2005-06, the reported yield is far better (close to 30% registering 50-90% of the normal yield and close to 60% registering upto 50% of the normal yield) compared to other disaster years, the main reason could be the interventions by various agencies in these coastal districts after tsunami. This is the resultant yield in spite of heavy rainfall and floods during the season. The trend is similar in both dry and wet lands.

The above graph shows major improvements in the soil quality in terms of reducing salinity (as shown in EC), with proportion of problematic samples coming down to 6% from 71% in July 05. But the pH values show some increase in proportion of samples moving ‘towards alkalinity’ range after reclamation. This is an area to be probed further.

1.5 Crop Yields:

![Crop Yields Graph]
1.6. Effect on soil salinity and alkalinity:

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EC Levels - Comparison Between July 05 and May 06

- July 05: 71% Good Possession (EC<1), 24% Medium Salinity (EC1-3), 4% High Salinity (EC>3)
- May 06: 6% Good Possession (EC<1), 24% Medium Salinity (EC1-3), 71% High Salinity (EC>3)

pH Levels - Comparison Between July 05 and May 06

- July 05: 29% Acidic, 47% Neutral, 24% Toward Alkalinity
- May 06: 24% Acidic, 65% Neutral, 12% Toward Alkalinity

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International Workshop on Post Tsunami Soil Management, 1-2 July 2008 in Bogor, Indonesia
1.7. Constraints:

- The government’s own reclamation plans were limited in terms of activities. Among others, the on-farm reclamation activity included only the supply of green manure and saline tolerant crop seeds besides gypsum (calcium sulphate). The crop seeds supplied is also insufficient in terms of quantity and hence the NGOs have to supply the remaining quantum demanded. The Department of Agriculture has announced a reclamation package with a cost of Rs. 12,500/- per hectare (one hectare is 10,000 square metres) for the affected lands spread over a period of three years. This was later changed to Rs. 15,000/- per hectare.

- Some NGOs have their own ideologies and methodologies. In a disaster management situation like this, they are unable to be flexible even though this issue has been addressed in many meetings. Though some have favourably changed, this resulted in unnecessary comparison between two or more NGOs working in the same village by the farming community which further affected the process of implementation.

- Some donors wanted the individual NGOs to work only with particular clientele group. In a situation where NGOs are supposed to work in a contiguous area in a village, this affected the implementation process.

- The community’s demands are very high in certain villages and for NGOs, living up to these expectations is a challenging task. Participation of the farming community during the process of field implementation was rather poor.

1.8. Significant achievements / Short-comings

1.8.1. Achievements:

- Creating interest in non-technical (non-agricultural) NGOs to come forward to implement agricultural reclamation plans.
- Evolving the comprehensive package in a participatory way and making NGOs to comply with it.
- Participatory allocation of area (revenue-village wise) for the NGOs
- Sorting out issues between NGOs
- Linking NGOs with donor organizations
- Linking NGOs with the Department of Agriculture (and Department of Horticulture) and the Farming Community.
Co-ordination of implementation of activities by the NGOs
Dissemination of information to the Community.

1.8.2. Shortcomings:

1.8.2.1. Monitoring: NCRC in the capacity of a coordinating and facilitating agency cannot strictly monitor officially the progress of work by the NGOs in the villages. This has only been done to some extent through need-based extensive field visits and data collection process from the fields by VICs.

1.8.2.2. Long-term activities: Conviction on the part of NGO staff and farmers is required to take up biomass seedling plantation around the farms. Similarly, conviction as well as skill development is necessary to take up on-farm production of compost/vermi-compost. Though these two activities could sustain the soil fertility status of the farm in the long-run, ensuring implementation by NGOs and adoption of these activities by all farmers is a challenging task.

1.8.2.3. Common activities: Many NGOs did not budget separately for the common works (clearing common ponds, irrigation/drainage channels) to be taken up in the villages initially. Though it has been agreed in the meetings that NGOs working in a particular village (singly or together) would take the responsibility of completing the common works, there were still uncompleted works at the end of the season.

1.9. Learnings:

Approach for long-term sustainability needs to be comprehensive
All stakeholders need to be involved
Comprehensive coverage of damaged land ensures comprehensive coverage of communities
Communication and co-ordination is critical for successful rehabilitation and development
Building common understanding improves effectiveness and quality of processes
Constant monitoring of implementation is necessary for efficient implementation
Capacity building should also be comprehensive
The successful first year’s reclamation effort is the result of joint efforts with the government complementing their work and package and reclamation of all tsunami affected lands and farmers (irrespective of type and category) through an effective participative co-ordination mechanism.

2. II YEAR (2006-2007): FROM CROP MANAGEMENT TO FARMING SYSTEMS MANAGEMENT

Soil salinity, being a persistent problem of this area (through seepage, back water intrusion) needed a long-term management strategy. There were also fears of capillary rise of temporarily percolated salts during the following summer once the surface soils dried up. One of the most significant factors which can favourably change soil salinity considerably in the longer run is improved soil fertility status. Besides changing the salinity, the increased soil fertility also means improvement in the physical, chemical and biological properties of soil as well as crop productivity and farm income. Hence there was a definite need to continue the reclamation efforts to a limited extent in the second year simultaneously addressing the soil fertility.

In the second season, it was envisaged that a set of simple farming systems should emerge in each of the farm. This means that the predominantly existing ‘crop’ system (field crops) should further be diversified, and the ‘tree’ system (biomass/horticulture/forestry) should be developed and the ‘livestock’ system should be strengthened and enlarged. Apart from these three systems proposed, other relevant site-specific farming systems (enterprises) were added upon need-based. Hence in the 2nd season broad-basing the interventions on the farm took place keeping productivity and sustainability of the farm in the mind. Capacity building of the farming community and ensuring their participation in all the interventions taken up were the thrust areas. In a nutshell, the reclamation measures were integrated into the regular crop management practices along with further diversification of the farm leading to sustainability.

Simultaneously, a four month study on ‘Understanding Vulnerabilities of Agricultural Communities to Frequent Disasters and their coping mechanisms’ was taken up and the findings of this study were presented in the ‘National Workshop on Disaster Preparedness in Agriculture’ organized by NCRC. This workshop helped not only to share experiences and learning about tsunamis, but also on managing floods, droughts and cyclone from elsewhere in India. Following this workshop, a six month ‘Study on coastal water bodies in Nagapattinam’ was completed to take stock off-farm drainage related problems related to salinity and floods.

A 14-month pilot implementation project on ‘Participatory Water Resource Management’ has been initiated in three river systems out of 14 rivers studied through Water User Associations formed. The objectives are safe disposal of flood water, containing back water salinity, improving water harvesting in water bodies and increasing the irrigation intensity and crop productivity.

In the first season, management of soils for desalination and soil fertility enhancement was the focus and the object was to bring back tsunami affected lands into cultivation. In the second season (year) it was the management of farming systems integrating soil management and reclamation measures within with the object of ensuring sustainability of farms in the longer run. Disaster proofing of agriculture working on off-farm things addressing salinity, floods as well as drought was the key in the third season (year).

REFERENCE