After the Tsunami: A First Rice Harvest: The Approach, Methodology and Results of a first rice crop on tsunami affected land in Meulaboh, West Aceh.

Bradbury, H; Afrizal, J; Stewart T.P, & Hasibuan, E.

Introduction

In the wake of the tsunami emergency of 26th December 2005, Mercy Corps[1] established a livelihoods program in Sumatra in the areas around Banda Aceh and Meulaboh. This paper will focus on the rice production element of the program in Meulaboh, why it was successful and some soil salinity research that was carried out.

1. Background

The scale of the devastation wrecked by the December 26th 2004 tsunami was unprecedented in the disasters of living memory. West Aceh was one of the worst affected areas with significant damage to the agricultural sector. Land was swept away, deposits of sand, silt and debris were left by the wave, fencing, bunds and irrigation ditches and assets such as tools and seed stores were destroyed. Estimates varied but early figures suggested that 30,981Ha[2] of rice paddy had been heavily damaged. Concerns about soil salinity and its effect on future crop production were prevalent. Initial aid efforts focussed on disease prevention, shelter and the distribution of food and non-food items to those who survived. Preliminary on the ground technical capacity was insufficient to practically assess the ramifications of soil salinity in a local context and to progress with rice and crop production.

1.1 Rice and The Mercy Corps Livelihoods Program

The Mercy Corps Livelihoods Program focussed on crops, livestock, diverse artisan and producer's livelihoods, fisheries, aquaculture and forestry as well as rice. The program was however aware of the value of rice production above its economic and nutritional value. Integral to the social and cultural life of Aceh the resumption of rice production was an important indicator of recovery. The tsunami struck at a crucial point in the farming year (see Figure 1). Rice crops were awaiting harvest, some stores already contained harvested crop and nurseries were planted for the early irrigated rice crop. This made it essential to attempt to capture the next irrigated rice season beginning in April 2005.

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Rainy Season												
Dry Season												
Irrigated Rice								N	T			H
				N	T			H				
	T			H								N
Rain-fed Rice								N	T			H
Palaweja[3] (following RF rice)												
Palaweja (cash crops)												

Figure 1: Seasonal Cropping Calendar Meulaboh N=Nursery , T=Transplanting, H=Harvesting

[1] Mercy Corps is a humanitarian aid organization working around the world in developing countries see www.mercycorps.org .

[2] FAO Agency Report February 2005.

[3] Crops other than rice.

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1.2 The Approach

The Mercy Corps Livelihoods Team in Meulaboh relied and built upon the organizational, motivational and agricultural expertise of the six farming communities involved. The whole process was determined by expediency whilst at the same time ensuring that careful checks were in place. Information forwarded by the communities was utilized in tandem with community meetings and collaboration with key informants. Trained team members carried out technical assessments to triangulate this information and to make a preliminary assessment of the land, its requirements for rehabilitation and to identify the tsunami effects upon the sites (i.e. the types of tsunami deposit). 'Cash for Work' was employed for debris removal and clean up of the selected sites. Cash grants were utilized for the purchase of fencing, fertilizer and tools. Rice seed was procured by Mercy Corps as the large amounts required were difficult to purchase at the time in local markets. Rotavators were purchased and loaned to the communities until an appropriate ownership model could be established. Labour for all communal operations was organized by the communities.

1.3 Enabling Factors

The following factors enabled and furthered the approach outlined above:

- Local markets functioning almost immediately.
- High pre-existing level of community organisation.
- Agriculture pre tsunami at a high level of sustainable productivity.
- Supportive local government.
- High calibre, technically minded local staff.
- Functioning banking system (to facilitate dissemination of cash grants).
- Highly motivated farmers.

2. Soil Sampling Methodology

Six tsunami-affected sites and 1 control site were chosen for the study, all of which were irrigated rice paddies. Six nurseries for each site were also chosen. Sampling began on April 4th 2005.

Uniform Tsunami Effect Types (UTETs) were selected at approximately 1/10 ha at no more than 20mx20m/UTET[4]. The UTET created a way of characterizing and defining sampling areas according to the depth and texture of the tsunami deposit on top of the previous agricultural soil; e.g. Sand 10cm, Clay 2cm. This allowed for future analysis of any variation between UTETS[5]. Each UTET was sampled 5 times in a zigzag pattern across each UTET at 0-20cm and 50-70 cm depth using a coring tube. Each sample was labelled and taken to the laboratory where saturated soil paste samples were prepared according to the Hanna instruction manual, and analyzed for electro-conductivity (EC) using a Hanna HI 993310 portable water conductivity meter (with automatic temperature compensation). Each sampling site was georeferenced using a GPS; spatial analysis was carried out using ArcView 9. Correlation coefficients were calculated using Excel. The UTETs were sampled before cultivation (April), after cultivation (June) and after fertilizer application (July). The nurseries for each site were also sampled and growth observations made of the seedlings over a three-week time period including observations on leaf length and plant health.

[4] The average rice paddy is approximately 17mx17m. Baily, J.S. (2005)
[5] To date this has not been undertaken.

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3. Results and Discussion

At EC levels of less than 4 yield loss will be less than 10%. An EC level of less than 4 is also desirous for root formation (FAO, March 2005). In the six sites sampled the highest EC value recorded was 1.96 mS/cm with levels showing a rapidly declining trend over time[6] (see fig 3). The mean EC levels of the nurseries ranged from 0 to 0.41 mS/cm and they appeared to have no effect on the growth of the seedlings. Plant growth observations highlighted no perceivable difference between the tsunami affected nurseries and the control site.

	Before cultivation	After cultivation	After Fertilizer
0-20cm			
Mean (mS/cm)	0.95	0.52	0.19
Range (mS/cm)	0.03-1.96	0.13-1.35	0.08-0.34
50-70cm			
Mean (mS/cm)	0.11	0.10	0.10
Range (mS/cm)	0.004-0.25	0.05-0.12	0.05-0.18

Figure 2: Summary of Salinity Results Data

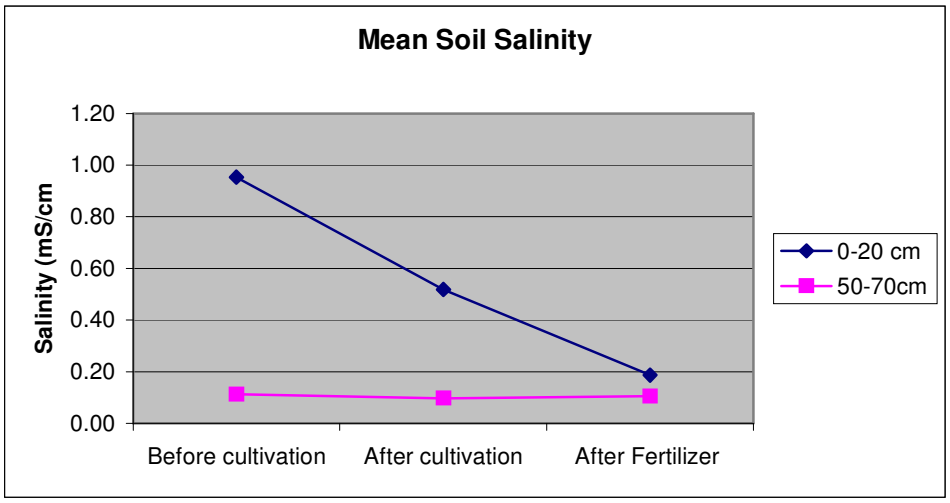

Figure 3: Mean Soil Salinity

[6] The data has only undergone basic statistical transformations such as averaging and regression for the purposes of this summary paper.

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3.1 The Tsunami 'Bonus'

Anecdotal reports appear to indicate that the tsunami affected sites and nurseries have benefited from what has been termed the tsunami 'bonus'. The higher yield recorded at an average of 4.2t/ha compared with 2.6t/ha[7] previously, and faster reported growth rates requiring less fertilizer has been attributed by farmers to the 'bonus'. Factors contributing to this effect may have included, the silt clay deposit, flooding with water rich in soluble nutrients, the deposition of organic matter, a fallow period or more thorough cultivation arising from intensive cash-for-work labour. Further research is necessary to substantiate these reports.

3.2 Economic Outcomes

Overall, the production of approximately 1,104 tonnes of rice on 263ha represents a contribution to the local economy of $36,670[8], or a sufficient quantity to feed 8,305 people[9].

4. Conclusion and Recommendations

The scale of the negative impact arising from the saltwater inundation following the tsunami was in many respects, overestimated. Rainfall in the humid tropics often exceeds 1600mm per annum and leads to the ameliorating effects of leaching and runoff. This and the enabling factors listed in 1.3 should have allowed for a more widespread and rapid re-establishment of rice/crop production in West Aceh. The following are therefore recommended:

- Speedy recovery governed by an expedient approach should be rapidly implemented to avoid dependencies developing. This should reflect the aim of recovery and replacement (in this instance) rather than development.
- Where strengths or enabling factors exist they should be exploited. Potential constraints traditionally identified in rural environments (e.g. land tenure) should not hamper project implementation by being accorded undue consideration where they are circumvented by the local populations in order to achieve higher objectives.
- Agencies dealing with livelihoods in areas dependent on rural production should have technically appropriate staff with pertinent grass roots experience.

[7] Average yield quoted by Meulaboh Ministry of Agriculture.
[8] Based on a market value of $332/t
[9] Based on a per capita annual consumption figure of 133kg

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Biographical Notes on Authors

Helen Bradbury is an agriculturalist specializing in sustainable mixed agricultural systems, livelihoods and training. She is an associate of the Centre for Arid Zone Studies, University of Wales and has worked as a consultant for UK charities, as well as being Livelihoods project manager for Mercy Corps in Aceh. She has worked in Ethiopia, Mexico, Eastern Europe, Indonesia and Afghanistan.

helenobradbury@hotmail.com

Juni Afrizal is the Agricultural Program Supervisor for the Mercy Corps Livelihoods Team in Meulaboh. He is a forester and agriculturalist specializing in agroforestry systems and conservation in Indonesia.

Tim Stewart is an agriculturalist specializing in sustainable mixed agricultural systems in developing countries. He has a broad experience of temperate and tropical agriculture in the UK, Argentina, Ghana, Afghanistan, Ethiopia and Indonesia. He has worked as a project manager and consultant for various international NGO's including being Capacity Building Officer for Mercy Corps in Aceh.

tpstewart@bigfoot.com

Erna Hasibuan is the Agricultural Program Officer for the Mercy Corps Livelihoods team in Meulaboh. She is a trained soil scientist.