

## STRENGTHENING TIDAL LOWLAND DEVELOPMENT (STLD)

### **Agronomic requirements in Flooding Type B/C** (Tidal flooding only possible during the rainy season)

This information has been collected by the Community Organizers (CO's) of STLD in SumSel who were joined by a Dutch student in August 2007. It appeared that the STLD project needed very much this information when they started to work in KalBar with the farmers in the pilot areas of STLD. Farmers in Tidal Lowlands outside SumSel have usually still low yields of not more than 2 ton/ha. It appeared that proper water management and need for hand tractors and lack of knowledge are the main limitations for improving the yields. The lack of knowledge is the main limitation addressed in this paper together with information on proper water management during the growth of rice and palawija.

#### **First Rotation In Type B/C: Land Preparation**

*Removal of weeds.* From early August the fields are sprayed with herbicides of a quantity of 3-5 liter herbicides per hectare. The more weeds, the more herbicides are used. Sometimes there is up to two times spraying with an interval of 15-20 days. The herbicides are sprayed with a hand sprayer. Sun Up, Best Up, See Top are the usual Trade Marks of the herbicides.



*Hand tractor plowing.* Often the dead weeds are burned by the farmers, but that requires also dry conditions in August. In other cases the farmers plow the dead weeds into the soil. The plowing will be done in early to middle September. The soil will be quite deeply plowed and turned upside down.



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*Hand tractor harrowing.* In the last week of October, early November the plowed fields are harrowed (garu) after the first rains. That means there are about 40 days between plowing in September and harrowing in October. This quite long period of rest to the plowed fields is essential for fermentation of the dead plowed weeds. The water management system should be operated on drainage as much as possible during this rest period. This also will promote leaching of toxic components. During harrowing the fields should have received the first rains. That might include already also flooding by tidal irrigation.

For the flooding types B/C the soil will be during harrowing much wetter than in the C/D area and the harrowing will be in quite wet conditions. See pictures



### **Water Management**

The water management requires the compact planting of all the farmers in one tertiary section. This will promote that farmers will do the land preparation and broadcasting with the proper water levels in the tertiary canals.

In Type B/C area the wetting of the field is caused by rains in combination with tidal flooding. The tertiary structures are operated on supply when harrowing the land, but after the wet conditions during harrowing the farmers need more dry fields when starting the broadcasting of the seeds. On fields with water on the surface, the seeds will not grow. In that case the farmers have to transplant here young seedlings. When the young seedlings start to grow higher also higher water levels on the field will be needed. In this period often the tertiary structures are on one side operated on permanent supply with movable flapgates. On the other side of the tertiary canal, the flapgate of the tertiary structure should be opened, allowing both supply and drainage depending on the tides. After flowering of the rice plants the flapgate structures should be operated on drainage only. The water management system should include an on-farm water management system (TAM) with field ditches and quaternary drains. The tertiary canals should never be dead-ended and connected to secondary canals on both ends of the tertiary canal.

### **Seeding**

The planting/seeding is by way of broadcasting (Tabela) with about 60-70 kg seeds per hectare. The most used variety is Ciherang, but also IR 42 is used in places. The best option is to buy new fresh seeds each year and not use the old ones from the previous harvest. For the Type B/C areas the seed are pre-germinated for 1-2 days before broadcasting. An insecticide is added against orong2 and other pests during the pre-germination. About 80 ml pesticides for 60-70 kg of pre-germinated seeds is used. Trade Mark *Regent* is used for this method. The broadcasting of the pre-germinated seeds happens 2 - 7 days after the land has been harrowed. About 1-2 days after the broadcasting it is recommended that the farmer will make small field ditches with the hand shovel (cangkul) about 10m apart and about 15-20 cm deep



The seeds are carefully broadcasted over the field, so they are equally distributed. Also the first fertilizer application is done carefully.

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## **Fertilizer applications**

### *Start Application*

The start application of fertilizers is during the broadcasting period or during harrowing. This application includes 50 kg of SP36. Many farmers do not follow this fertilizer start application method.

### *First Application (No start application applied)*

When farmers do not apply the SP36 during harrowing/broadcasting period, they will apply 100 kg of Urea and 100 kg of SP36 about 15-20 days after the broadcasting.

### *First Application (When following the start application method)*

About 30 days after the broadcasting there will be applied 100 kg of Urea and 50 kg of SP36.

### *Second Application (No start application applied)*

The second fertilizer application is 35-45 days after broadcasting. Also in this case 100 kg Urea will be applied per hectare. When only 50 kg SP36 is used 15 days after broadcasting, than after 35-45 days again 50 kg SP36 should be applied.

### *Second Application (When following the start application method)*

The second application will be 40-50 days after broadcasted and includes 100 kg Urea.

Some farmers will apply a third application that includes mainly organic/hormone fertilizers that are applied about 55 days after broadcasting. These organic hormones applications includes brands as Folicure with an application of 200 ml/ha. Other brands are Sprint, Plant Catalis, Gandasil.

## **Pesticides**

Pests may change from year to year. Normal are rats, walang sangit, kepik, ulat gerayak, wereng, ulat pengulung batang padi. Brands to be used are: Chix, Matador, Decis, Spontan, Zinc Pospit, The type is also influenced by the kind of pests. Normally about 2 cc/liter water is used. For 1 ha about 100 to 400 cc pesticides are used. That depends very much on the farmer and the severity of the problem.

Mildew problems are quite normal in the Tidal Lowlands. A common one's are neck blast and *Piricularia oryzae*. Also here about 2 cc per liter water is used.

## **Weeds**

In broadcasted fields it is quite normal that after a few years there are quite a lot of weeds that have to be removed by hand. In some cases herbicides can be used but especially with wild rice weeds it is impossible to use the herbicides. In that case farmers for one rotation will not broadcast the seeds but will use the transplanting system that will solve the problem again for a number of years.

## **Problem of bad growth of broadcasted seeds because of flooding**

Within 21 days after broadcasted the bad growth problem should be solved by planting young seedlings.



Spraying pesticides and removing weeds from the growing paddy



Manual harvesting and using a combiner that cut the ears and combines that with threshing. The more land the farmers own the more need there is for this combiner in Tidal Lowlands

### **Harvest**

The harvest of Ciherang variety is about 110-115 days after broadcasting the seeds. For IR-42 the harvest will be 120-125 days after broadcasting the seeds. Harvest should be done as much as possible mechanically when farmers own more than 1 ha. The harvest in Flooding type B/C is between 6-8 tons/ha field dry husked rice in Telang I. A minimum of proper water management is essential.

After harvesting and threshing the ears, the husked rice must be dried. Most of the time this will happen in the sun, but it is strongly recommended to use box-driers. Previously these box-driers were using kerosene to heat the blowing air, but because of its high price and low supply policy of the government of kerosene now the use of box-driers based on the burning of rice husks is recommended.



The use of the power thresher and drying the field dry husked rice during rain-free periods. (Lot of work and use of box-drier is highly recommended instead of sun-drying.)

**Box-drier based on husks used as fuel.**



**Capacity 4 tons/day**



The box-drier using husks is as efficient as the box-drier using kerosene. (No costs and there are not more husks needed than will be dried by the burning.)



A storage room in the village and a small milling unit for making milled rice (beras)

**Successful farmers in flooding Type B/C Telang I , P6 3N**

Information has been collected from these farmers directly by discussion.

**Farmers name: Cipto**

P 6 Telang, 2ha, 1 crop

Juli-August	Spray herbicides Brand = Best Up Doses = 3-4 L/ha
September (when the weeds are dead)	Bajak 20-30 cm
1 week after first rain (not just one rainfall, it has to keep raining)	Garu, followed by tabela Brand = Ciherang Doses = 60-70 kg/ha Preparation: the seed is soaked one day in water
15-20 days after tabela	First fertilizers: Urea 100 kg/ha Sp36: 100 kg/ha
40 days after tabela	Second fertilizers: Urea: 100 kg/ha

**Farmers name: Guntoro**

P 6 Telang, 2ha, 1 crop

August	Spray herbicides Brand = Santarin Doses = 4 L/ha
September	Bajak 20-30 cm
1-2 days after first rain	Garu
Next day	Tabela Brand = Ciherang Doses = 60-65 kg/ha Preparation: the seed is soaked one day in water
7 days after tabela	Start application of fertilizers Sp36: 100 kg/ha
20 days after tabela	Second fertilizers: Urea: 100 kg/ha
45 days after tabela	Third fertilizers: Urea: 100 kg/ha
100-110 days after tabela	Harvest 6-8 tons/ha

## IR42

P 6 telang, Just some farmer who uses ir42 seed (60-65 kg/ha)

30 days after tabela      First fertilizers  
Urea: 100 kg/ha  
Sp36: 50 kg/ha  
(he mixes the fertilizers)

40 days after tabela      Second fertilizers  
Urea: 50 kg/ha  
Sp36 50 kg/ha  
(mix again)

55 days after tabela      Third fertilizers  
Urea: 50 kg/ha

120 – 130 days          Harvest: 6-8 ton/ha

## **Second Rotation in Flooding Type B/C**

Although there is little experience for the second rotation crop for flooding Type B/C, it is still believed that the most likely option is a second rice crop instead of palawija. The soil is most of the time too wet for a palawija crop, or the time with sufficient dry conditions is too short for a palawija crop. Only the construction of raised beds are suitable for palawija crops and vegetables. But this requires too much labour for large areas.

The LWMT project conducted for two years trials with rice as a second crop, but both trials failed and yields were below 1 ton/ha.

There are several reasons for these low yields for the second crop.

1. The fields are not compactly planted and that will increase the hazards for rat attacks that anyhow could be a hazard for the second crop, in comparison with the first rotation crop that does not have that problem usually.
2. Farmers give no time for fermentation of the rice-plant remnants of the first crop and do not apply the plowing upside down method like for the first crop. They will use the rotator instead of the plow for land preparation. That will cover the organic remnants but will not give time for proper fermentation. Also often no herbicide spraying is used properly, like for the first rotation crop. Farmers have little time to plant the second crop because of decreasing rainfall and lower tidal flooding levels in the months March until May/June.
3. Farmers say they are too busy with harvesting and post-harvest management of the first crop to pay sufficient time on the second crop.

### *Solution problem*

Compact planting for the second rotation crop is essential to start with trials.

There is yet no proven method found for the Type B/C to plant the second rotation rice crop. Except when pumping is applied Litbang Pertanian proved that also reasonable high yields could be obtained for the second crop in Type B/C areas. But farmers never followed this method, even after they have been supplied with pumps for trials.

A major problem is the fermentation problem of the organic remnants of the first rotation crop. Too little attention is given to this problem. It will be essential that herbicides will be used: (Like in Type A/B areas in Telang 1-2 liter Gramaxone per hectare, just one day after harvesting.) Then after at least 1 week the soil will be plowed with the rotator and then harrowed and 1 day after the rotator plowing the land will be sprayed with EM4 to promote the fermentation (1 liter/Ha EM4). Then 1 week after applying the EM4 the broadcasting is performed with pre-germinated seeds like for the first rotation crop.

Another possibility is that the rice plant remnants that are sprayed with herbicides will be cut by a flail mower after 1 week in small pieces of not more than 3 cm. Then plowing and adding the EM4 will be even more efficient.

The labour problem for the second crop might be solved by using a combiner that cut and thresh the paddy.

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