

Reference 7 Field water management

Summary

Each stage of rice development stage has its specific water needs. Not respecting these needs may lead to substantial high yield losses. Therefore adequately managing water at the field level is essential to good yields. Being able to manage water in a rice field depends on the quality of land-leveling, and irrigation and drainage infrastructure. Good water management is based on good leveling and on the possibility to get water into and out of the field according to the plant's needs. This reference gives guidelines on field water management in transplanted rice. The crop-establishment mode usually encountered in inland-valley lowlands presents the optimal water management at field level for transplanted rice plots.

Field water management in transplanted rice plots

The guidelines presented here were originally designed for irrigated rice cropping, but they can also be used for well-leveled inland-valley lowlands with good irrigation and drainage infrastructure. Substantial yield losses can be expected if these guidelines are not followed or if they cannot be followed because of poor land-leveling or absence of adequate irrigation or drainage facilities. When water management devices and leveling allow good water management. However this calendar can also be used when these conditions cannot be met. The essential point here is to demonstrate that, during the rice cycle, there are some critical stages when rice requires a lot, a little or no water. Taking into account these requirements will help the rice to express its potential. The paddy field should not be submerged throughout the cycle as this would be neither agriculturally nor economically beneficial. More generally:

- rice needs water during the vegetative phase (from germination to panicle initiation, PI).
- rice needs a lot of water during the reproductive phase and during the first half of the maturation phase (from PI to the moment when grain ripening has reached the dough stage; during ripening, the texture of the grains changes from a milky, semi-fluid stage to a hard and solid stage, the intermediate stage is called the dough stage).
- rice needs no water during the last half of the maturity phase (from dough stage to maturity).

Guidelines for good optimal water management in a transplanted rice field: may be summarized as follows :

- Transplant in floodwater with a 5 cm water level.
- Drain immediately after transplanting and leave to dry for two to three days.
- Irrigate, maintaining the floodwater level at about 5 cm until the end of the second or third week (according to the planning for herbicide¹ and fertilizer applications).
- Drain completely prior to herbicide application, then leave to dry for two days.

1. Some herbicides are applied in the floodwater; be sure to follow the manufacturers' recommendations.

- Irrigate again, while maintaining the floodwater level at a strict minimum for 4 to 5 days to allow for fertilizer application.
- Raise the floodwater level up to 5 cm, until panicle initiation (PI).
- Lower the floodwater level to a strict minimum for 4 to 5 days for fertilizer urea application.
- Raise the floodwater level up to 10 cm (4 to 5 days after PI) until dough stage.
- Drain the plot completely and stop irrigating (15 days after flowering).

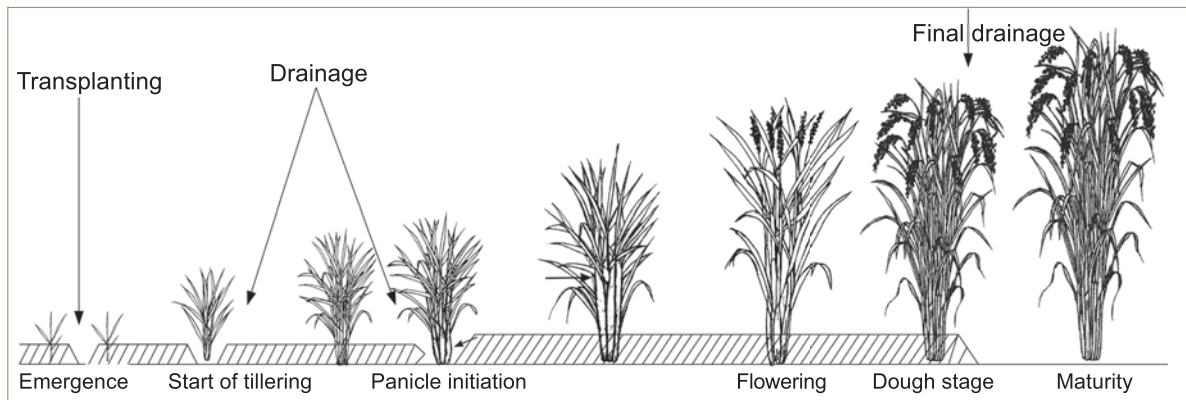
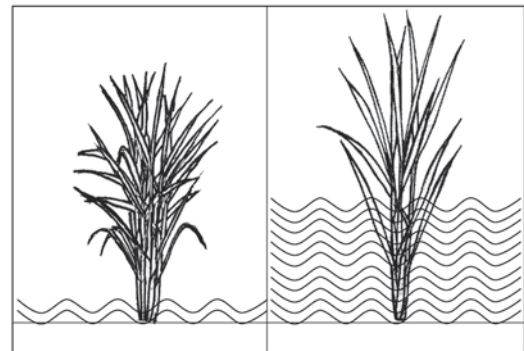


Figure 7.1. Water management in a transplanted rice field

Consequences of inappropriate water management

Too much water during the vegetative phase hinders tillering; too little water leads to thin tufts with few tillers whereas the absence of water during this phase favors weed growth development and may lead to a significant decrease in yield. Urea application should be applied in shallow water (3 to 5 cm) so as to increase its efficiency. A lack of water during the reproductive phase may lead to spikelet grain sterility and a corresponding drop in yield. Fields that are kept flooded beyond the dough stage will mature in a non-homogenous way and harvest will be delayed.

Figure 7.2. Excess water reduces tillering



Bibliography

- Dingkuhn M., LeGal P.Y., 1996. Effect of drainage date on yield and assimilate partitioning in irrigated rice. *Field Crops Research* 46: 117–126.
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