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German Evaluation of project proposal E-101

Self regulated atmospheres to prevent fungal damage in moist paddy

by

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1. Research objectives and relevance to developing countries

Paddy is dried in two steps, the first reducing moisture content to 18 %, the second from 18 to 14 %. The proposed method is to replace the second step. Especially during the rainy season, farmers depend on mechanical drying of paddy. This method is not acceptable for small farmers due to high costs. With the proposed method, mechanical drying is partly replaced on the one hand; on the other hand, mechanical drying is a precondition for the proposed method during the rainy season.
After opening of the containers (which are to be developed), the stored goods (if stored well) have to be consumed fast. Otherwise, a second drying is necessary (by sun drying, or, again, mechanical drying).
The work plan shows a number of shortfalls regarding the relevance to small farmers in developing countries; investigations into their paddy storage needs should be continously included in order to produce results useful to them.

2. State of the art

The state of the art is well reflected and knowledge gaps are rightly presented.

3. Work plan

In the Philippines, storage periods of more than four weeks (Israel: up to six months) should be included during the first year. "Ambient temperatures" should be defined.
Evaluation of gas permeability of plastic liners in the Philippines should be done under relevant field conditions under all circumstances. From the first (not the second) year on, locally available plastic materials should be looked at.
Besides construction of 10 to 20 ton stores in the Philippines, investigations on small scale storage structures constructions for 2.5 tons from the first year should be continued in the second year. Apart from durability and permeability of the material, excellent finishing as an important precondition for gastightness of the containers should be included.
In the third year, work is planned to concentrate on 20 ton storage constructions and their acceptability by medium-scale farmers (p.12). In contrary to the objectives (p.1), small farmers are no longer the target group.

3. Methods and materials

In defining evaluation criteria for paddy conservation, growth of Bacillus, Lactobacillus and Pediococcus should be included since these facultatively anaerobic microorganisms which develop within the investigated water activity levels, may via fermentation products influence the quality of stored paddy.
Seed viability and seed vigour should be excluded from evaluation criteria since the proposed method is not foreseen for seed.

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Regarding mycological investigations planned in Germany and Israel, it is questionable whether transport without changes in microbial status can be ensured. The possibility to carry out these experiments (e.g. hyperparasitism, enzymatic activity of strains) at least partly in the Philippines should be looked into.
Regarding lab studies in Israel in the second year, moisture contents should be specified in order to evaluate whether investigations to determine stability of paddy initially stored hermetically followed by storage under aerobic conditions for one, three and six months make sense. Will the aerobic storage take place under Israeli or Philippine humidity conditions?
Regarding the German part, the required PAD-system to complement the required HPLC-system should have been explained.
Producton of mycotoxins by single fungal strains should be investigated not only in liquid culture, but also by extracting stored paddy.

4. Qualification of investigators
All partners are well qualified.

5. Training
Except for one Ph.D. student in Germany, no specific training activities are foreseen.

6. Budget
An HPLC-apparatus is mentioned to be existing in the Berlin lab (p. 11); it is, however, included in the budget (pp. 17, 21).

7. Conclusions and recommendations
Storage technology in developed as well as developing countries may benefit from the proposed research. However, the work plan is not clearly targetted to application of research results to small farmers in developing countries, and therefore, benefit is not expected in the short or medium run. The proposal is not recommended for funding.