SPONSORED BY THE

Federal Ministry of Education and Research

OrganoRice

Minutes of the internal workshop

CTU 14th to 15th of March 2024

Wednesday 13.03.2024 meeting at CTU

Participants: CTU plant protection group, biological plant protection, rice quality, rice selection group, remote sensing group, fertilization group, post harvest & storage group, soil science group, KIAG, UNU, Uni Bonn, FZJ

Presentation on rice quality

Presentation on rice quality by Björn showed that the coloured rice contains more antioxydants which would be great as used as functional food but most antioydoants are found in the unpolished rice. Question for future application: Which variety we are going for as the different rice varieties have different properties. The idea is to provide the results at the end to LotusRice and framers as they have to make a decision based on market options and growth parameters (e.g. yield). We recommend to grow the varieties in Vinh Long province on our experimental sites under conventional and biologic farming to have fair comparison of quality and yields. The pest pressure of the different varieties is also controlled by the pest control group. Currently, it looks like that the coloured rice has slower pest pressure but this needs further evaluation.

There is also rice tasting planned with farmers as the mouth feeling is also important for quality. We recommend to use also conventional rice varieties as a comparison and let them taste blind so that the judges do not known if it is organic or not.

Isotope tracing

Lutz gave a brief update on isotope tracing and based on the few data we have (as we only have the rice also used for the quality measured by Björn). As the rice will be grown in the other 3 provinces we can measure them and provide more details. Here, we have to aware that also 'external' impacts might change the isotopic signature such as mineral or organic fertilization and where the organic fertilizer comes from.

Data availability

Data are available and must be made available. Lutz will discuss with KIAG how to do but prefers a simple file storage system. Same sample identifier can be the use for all samples and it can be the identifier from the sampling App. Lutz will also send out a table where all partners should add in the data they measure along with frequency and spatial coverage. This might help to avoid duplication in measurements and also help to identify data needed for holistic interpretation of finding of the sub-groups.

Biological pest control

Weed Control

The results of the weed control trials showed promising results and need to be validated in next growing season.

Questions raised: Can we estimate how much additional workload will come to the farmers by manual weed control?

Can we based on personal costs versus costs for herbicide application calculate the monetary costs (benefits)? The calculation will be done by the pest control group after analysing all data.

Currently Azolla needs to be purchased which causes high costs. Alternatives need to be explored to produce Azolla on site.

Rice yields increased by Azolla likely because it might act as an additional N source to the rice by the symbiosis with blue algae invading the space between the Azolla. Hereby it wonders that the effect can be already seen, as classically Azolla/blue algae bound N will be made available to the plants via ammonium weeks after mixing into the soil. Therefore, “Azolla fertilization” is classically seen as a long-term fertilization.

Additionally, flattening the field which is a prerequisite for optimal weed management might help to optimally grow rice and therefore increase yields indirectly. This can partly explain the higher yields in the experimental trials compared to the conventional areas, where less effort is made to level the ground before seeding

Golden Apple Snail (GAS) Control

Pest control has an effect on GAS and rice damage which is not significant but there. The GAS abundance is not too high and therefore damage to rice seems not too problematic. Ducks are an efficient way to reduce GAS.

Insect pest

Rice stem borer density is much higher at late growing stages. Question if this a problem or is this too late to harm the plant and impact the yield? Answer: seems not to be problematic at late growing stages

Biological insect control seems to work and yield seems not to be reduced if biological insect control is applied. Insect control seems more complicated as fungi control as insect infestation greatly depend on insect availability and spraying will be triggered by the number of insect detected on the plants. This means that the farmers need to be well trained to identify the right spot in time for intervention as for biological pest control the time window is quite small compared to conventional insect control.

Fungi

Also fungi infestation seems to be not problematic but this should be analysed in the longer run as fungi spores can accumulate in the soil and might show larger infestation and damage after a certain period of organic management.

General question for pest control: Do we plan to train the farmers in pest detection so that they can make decision on pest control management on their own. Might be less problematic for plant hopper but maybe for stem borer and leave folder.

Fertilization trials

In the field trials fishery processing fertilizer does best job followed by organic fertilizer from crop products. All fertilizers are better as control (no fertilization).

In greenhouse, the same experiments as on the field are done but additionally with crop rotation, legumes, Azolla.

All commercial fertilizers need to be analysed on residues. Therefore, Lutz will take back fertilizer samples and Linda and Arne/Bei will measure pesticide and heavy metal contamination of the fertilizers.

Lutz recommended to also search for local available fertilizers (compost etc.) as this will reduce costs for farmers and if those fertilizers are produced on farm low pollution inputs are guaranteed.

In general, there is no standard C/N analysis done regular. We should recommend to the authorities to analyse C/N on regular intervals – maybe annually to check the status and avoid in trapping in N under fertilization. P limitation should note be a problem. If P will be limited one can add rock phosphate (check but should be allowed).

Si-fertilizer from China will be used for the next growing season on the experimental sites. There is currently not enough funding to do Si-fertilization on the 3 times 30 ha but this is also out of scope for the project and we should first concentrate on the results from the field trials in Vinh Long. The Chinese Si-fertilizer will be shipped to Germany to analyse on potential pollution (especially heavy metals). In parallel the Si-greenhouse experiments will start and will be done in close cooperation between Arne/Bei and Minh.

Remote Sensing

The time series analysis of land use for the entire delta has been completed. The chosen approach shows accuracy values around 80% and higher for all relevant classes (overall accuracy: 82.6%), validated using 605 reference data points, which are a compilation of student interviews, own field surveys and data from colleagues at CTU. This is a very promising result for the level of sensor resolution and the dynamics of the study area. The quantile mapping approach turned out to be good at capturing vegetation dynamics, harmonic regression supports the intended determination by contributing detailed temporal characteristics of spectral behavior, particularly rice patterns. Area observations show the dominance of rice classes in the Delta (Double Rice WS-SA, Double Rice SA-AW, Triple Rice, Aquaculture / Rice alternating, Upland Crops / Rice alternating; 44.8% of the total area), of which Triple Rice is by far the largest (38.2% of all rice areas). Followed by aquaculture (12.2%) and orchards / tree crops (11.7%).

Pest control

The screening of soil samples from the rice fields in Vinh Long was completed. The results of the qualitative analysis was presented, whereby 74 different pesticides were detected. Further the findings of the different pesticides were investigated and 45 active compound were chosen to be monitored throughout the next years. Additionally a soil and water sample was send to an accredited laboratory in Germany to analyze for pesticides. In the soil sample, four active compounds and in the water sample, five active compounds were quantified. Due to different and assumable less effective extraction methods, the results of the accredited laboratory showed less findings of pesticides.

Before the start of the different experiments on the experimental fields, soil and water samples were taken for pesticide analysis. Additionally, water samples were collected throughout the cropping season 2023/24 to check for possible pesticide pollution though the irrigation channel. Samples were stored at CTU and will be send to Germany for analysis.

Thursday 14.03.2024 meeting at CTU

Participants: CTU-6 economy group with Tien Dung Khong and his staff, Joachim Spangenberg, Ngan Thi Thuy Nguyen, Jack O'Connor, Khoi and Lutz. Truong Minh Thai (CTU-8) could not attend, but is on board and has been in exchange with Khoi.

The purpose of the meeting was taking stock of the state of the socio-economic work, and to plan the next steps.

Tran Van Ty (CTU-7) has dropped out of the project as their planned work was not funded by the Vietnamese government. The collection and review of documents related to irrigation planning, operation and maintenance (2.1.1.1) remains with UNU.

The market people from CTU-8 have not been actively involved so far. Hence it is urgent to make a shared plan with Vietnamese and German partners involved. Therefore Joachim will set up a Nuudel

to find a date for an online discussion involving CTU-6, Lutz, Khoi and KIAG to develop a 2024 work plan. Tien Dung Khong offered feedback on the questionnaires used; Joachim will send them to him.

The second part of the meeting was dedicated to planning the Vinh Long interviews, starting on the 15th. Ngan has organised the tour, accommodation, transport and staff. Permissions are available, and interviewees have been arranged (participating and non-participating farmer (male and female separate), business (trader and cooperative manager), and a decision maker.