EDN Writer's Blog: Additional and Behind-the-Scenes Information Regarding EDN 102.

These postings by Martin Price, January 2009

Note: Click on a word or phrase that is underlined and colored blue to go directly to the article being discussed. It will be elsewhere on the web, so be sure to come back to this site when you are finished.

Lead Article: *Can a Consensus be Reached on the Benefits of SRI (System for Rice Intensification)?*

We were especially proud of Ryan Haden, one of the keynote speakers at our 15th ECHO Agriculture Conference this December. We say "proud" because he is a past ECHO intern, www.echonet.org/ag_internship.htm now returning as an expert in a subject of great interest to those working with small-holder rice farmers. His talk and his article in this issue of EDN reflect his experience in community development and his doctoral studies at Cornell University and field research at the International Rice Research Institute (IRRI) in the Philippines.

We asked Ryan "Concerning rice varieties and seed sources to refer people to, would the International Rice Research Institute (IRRI) in the Philippines have links to seed sources? How about NERICA?" We had to cut a bit from his comments in EDN 102. Here is what we had to leave out:

"Regarding rice varieties and seed sources, I would recommend that people in ECHO's network start by contacting the agricultural extension department in the country they are working in. IRRI generally provides "unfinished lines" to partner countries that are then adapted (2-3 generations) by national plant breeders to local

conditions. I would talk directly to the [in-country] breeders if you want to get good info regarding tillering capacity, weed tolerance, drought tolerance and other traits that would be compatible with SRI.

"NERICA lines that have been developed specifically for the constraints faced in Africa would also be worth looking into. However I'm really not too sure about the availability of NERICA seeds at this point. On this issue, again I would talk to the local extension people in each country or WARDA (Africa Rice Center)."

We wrote Ryan a follow-up question. "From your experience, how realistic is it that there will be local extension people, that the reader can find them, and that they will know how to help? Is this available in most SE Asian countries?"

Ryan replied, "I've never had too much trouble locating the extension officials in Indonesia, Philippines, and Bangladesh. I would recommend that development workers at least make the efforts to establish these connections. Most Asian and many African countries have rice breeding programs with well-informed individuals that development workers can seek out and talk to directly. Whether it be a regional government office or a research/breeding institute, I recommend going straight to the top and letting the established officials direct you where to go next. I've been very pleased at the good advice and fruitful leads these people have given me."

If you work in Latin America, ECHO would suggest you contact CIAT (International Center for Tropical Agriculture) in Colombia. Historically I think of CIAT working primarily with beans and cassava, but during a week I spent there in 2007 I discovered that they also have rice scientists on their staff.

Isn't WARDA a peculiar acronym for Africa Rice Center?

Their annual report for 2002-2003 says that WARDA stands for West African Rice Development Association. It has now expanded its scope to all of Africa. It seems that they kept the acronym but changed the name to simply "Africa Rice Center."

What is NERICA—A Technology from Africa for Africa

The following is taken directly from their website.

"Since its creation in the mid-1990s, the New Rice for Africa (NERICA) has carved a special niche for itself among upland rice farmers in sub-Saharan Africa (SSA). Today, it is a symbol of hope for food security in SSA—the most impoverished region in the world, where a staggering one-third of the people are undernourished, and half the population struggle to survive on US$1 a day or less.

This hope stems from:

• **NERICA's unique combined assets**: higher yield, shorter growth duration, resistance to local stresses and higher protein content than traditional rice varieties.

• **NERICA's relevance**: Responds to the real needs of millions of upland or dryland rice farmers of SSA.

• **NERICA's promise**: Potential to alleviate the desperate food situation in the region and fuel SSA's economy.

NERICA is a technology from Africa for Africa. It is perfectly adapted to the harsh growing environment and low-input conditions of upland rice ecologies in sub-Saharan Africa (SSA), where smallholder farmers lack the means to irrigate and apply chemical fertilizers or pesticides. It responds even better to higher inputs.

We asked Ryan if he could clarify what was meant by "net returns" in this quote, "adoption of SRI practices by farmers in West Bengal, India, improved yields by 32% and increased net returns by 67%." He was quoting from an article, "Productivity impacts of the system of rice intensification (SRI): A case study in West Bengal, India."

Ryan replied, "In the paper cited, net returns were calculated from the following formula (Net Returns = Value of harvested rice + Value of harvested straw – Cost of Labor - Cost of Seed - Cost of Fertilizer). Put succinctly net returns = profits. In this case the value of the outputs (rice and straw) were higher for SRI and the expense of labor and seed was markedly lower, which would explain the observation that the profit margins were larger than the yield differences alone."

What is Aerobic Rice?

Ryan suggested we should keep an eye out for developments in what is called "aerobic rice." We found this on the web *Aerobic rice (Han Dao): a new way of growing rice in water-short areas.* By Bouman et al. Click here to read the article. The abstract follows.

Abstract

Traditional lowland rice with continuous flooding in Asia has relatively high water inputs. Because of increasing water scarcity, there is a need to develop alternative systems that require less water. "Aerobic rice" is a new concept of growing rice: it is high-yielding rice grown in non-puddled, aerobic soils under irrigation and high external inputs. To make aerobic rice successful, new varieties and management practices must be developed. Results are reported of field experiments and farmer-participatory research in the Huang-Huai-Hai plain, northern China, where newly developed aerobic rice varieties are compared with lowland rice. Highest recorded aerobic rice yields were 4.7-6.6 t ha^{-1}, compared with 8-8.8 of lowland rice. The variety Han Dao 502 is most promising because of its relatively high yield under both aerobic and flooded conditions and because of its good quality fetching a high market price. Compared with lowland rice, water inputs in aerobic rice were more than 50% lower (only 470-650 mm), water productivities 64-88% higher, gross returns 28-44% lower (345-633 \$ ha^{-1}) and labor use 55% lower. Pilot farmers were satisfied with these first results. Because of its low water use, aerobic rice can be produced in areas where lowland rice can not (anymore) be grown. Since aerobic rice is targeted at water-short areas, socio-economic comparisons must include water-short lowland rice and other upland crops. The development of high-

yielding aerobic rice is still in its infancy and germplasm still needs to be improved and appropriate management technologies developed.

Article on Malted Barley Flour for Malnourished Infants

In searching the web to fill in some gaps for this article I came across an interesting website: Practically Edible: the world's biggest food encyclopedia. This is an impressive resource for many things related to food, including recipes, discussions of various national cuisines, industrial production, etc.

I was searching for more detail on how malt with active enzymes is used commercially. I quote briefly, "Malt is used commercially a great deal in bread, pizza crusts, crackers, rolls, pretzels etc as a dough conditioner -- because of its lower gluten, it causes the dough to be softer, more relaxed and gives a softer crumb texture."

An interesting use of diastatic malt by bakers is to speed up bread making. The malt causes the dough to rise more quickly. They had much more malt than is used for the hot porridges because splitting down the starch goes more slowly at room temperature. Yeast organisms themselves can break down starch, but they first have to secrete the necessary enzymes. By adding malt, the concentration of sugars rises quickly. The sugars are what the yeast organisms actually use, converting some of it to carbon dioxide that causes the air bubbles in the bread dough.

Another very helpful book I discovered is The Chemistry and Technology of Cereals as Food and Feed. Much of this 700+ page book can be read on the web (click above on the title of the book.)

On a personal note, I often make a quick porridge in the microwave from a commercial oat bran cereal that is sold in grocery stores in the United States. One night it was so thick that I was on my way to get some milk to dilute it. Then it occurred to me to just add a bit of malting enzymes. Within a minute the porridge became so thin that I had to use a soup spoon to eat it. I could have drunk it from a cup. A nurse working in Africa took a workshop at ECHO this fall (Agricultural and Nutritional Options for People Living with HIV/AIDS) saw this demonstrated. She commented that it is common in parts of Africa to make a cereal based drink. Each spoonful of this very thin porridge still had all the nutrients of the original thick material. This more dramatic thinning may be true of other porridges made from very finely ground grains.

A biology professor who saw my demonstration commented that it would make a dramatic demonstration to accompany a lesson about enzymes for almost any age group.

Another person who saw the demonstration is ready to try it in Africa, but could not recall the "recipe." It is important to remember that the enzymes are not used up, though

they will eventually lose their activity as their three-dimensional structure is damaged. If you put different amounts of powder in each of several bowls, the bowl with the most powder will become thinner more quickly, but probably all will eventually reach the same texture. During the demonstration I just mentioned, the untreated bowl was as usual dramatically different. I could hold it totally on its side and the porridge would not fall out, while the treated one had become very runny. It occurred to me that if I took just 2-3 teaspoonfuls of the thin porridge and added it to the untreated porridge, eventually the small amount of enzymes should be able to make it thin too. And so it did, though as predicted, it took much longer to do so.

Jicama

Day-length makes a big difference with jicama. We planted jicama for the first time at ECHO around February in 1982. The plants grew vigorously, spreading like pumpkin vines. Nine months later, in November, we could still find no tubers. I decided it was not suited to our location.

In early January a cold front came through and the vines froze. Not many days later my wife, Bonnie, and I were walking around observing the damage. I commented that there was a large rock now exposed where the leaves had shriveled up. Then we noticed there was a row of rocks. The days had finally gotten short enough in late November that the plants began forming tubers. Because they had been in the ground so long and grown so large they had an enormous amount of stored energy. They had so much energy that they produced tubers a foot or more in diameter, pushing them partially out of the ground and cracking into misshapen spheres. They still tasted great, but would not have been marketable.

We have found that seeds planted in May or June get to be ideal size for harvest the next February. Seeds planted much before that gave misshaped tubers. Seeds planted in August did not grow much larger than an apple. Seeds planted later than August gave no useful harvest.