



ECHO Asia Notes

A Regional Supplement to ECHO Development Notes

ECHO Asia Notes

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**ECHO is a Christian
non-profit
organization whose
vision is to bring
glory to God and a
blessing to
mankind by using
science and
technology to help
the poor.**

[ECHO Website](#)

ECHO Comes to Southeast Asia

By Stan Doerr, President/CEO, ECHO International



It is my honor to introduce you to the first edition of ECHO Asia Notes (EAN).

ECHO has been providing valid and appropriate tropical agriculture technical support for over 28 years. We are currently working with over 3,000 organizations in 180 countries. We have recently realized the need to be more proactive about making sure that ECHO's resources are easily accessible to those working with the poor around the world. We also realize that there are amazing success stories of how lives have been improved significantly by work being done around the world in tropical agriculture. If we can find those successes and share them with the rest of the world, many more lives can be improved.

To fulfill this goal and to make sure you have easy access to ECHO resources in relevant languages, ECHO has established a regional office in Chiang Mai, Thailand, which will serve the needs of Southeast Asia in the areas of tropical agriculture and appropriate technologies. This regional office will provide all ECHO services, including technical support; seeds of valuable tropical fruits, vegetables, and agroforestry

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species; training opportunities; and networking venues.

As we grow, EAN (along with EDN) issues will provide you with detailed agricultural options that you can use to help improve the quality of life of those you serve in your community. We will also be expanding the number of languages into which we translate these documents.

If this EAN helps you, please share it with your friends and have them contact our Asia Office at echoasia@echonet.org to make sure they get their own copy. Should you have any questions or comments, contact Rick Burnette, Regional Director for ECHO Asia at rburnette@echonet.org or echoasia@echonet.org.

God bless you in your work. Our desire is to help you do your work better by providing you with the agricultural resources you need.

The World Food Situation:

Will this "Perfect Storm" move on to become a mere passing cloud?

By Dr. Jim Goerring

Foreword

By Rick Burnette

Jim Goering, an ECHO board member, holds a PhD in Agricultural Economics and has professional work experience at the University of California/Berkeley, Harvard University, the World Bank and World Vision. In a paper presented at the 2008 ECHO Agricultural Conference in Ft. Myers, Florida, Dr. Goering explored causes that led to a sharp rise in global food prices between 2006 and 2008, following more than four decades of either declining or stable food prices.

Factors that contributed to decreased food supplies included high fuel prices; grains and oilseeds being diverted to biofuel production; adverse global weather patterns; and sharp cutbacks in public sector investment in agriculture in developing countries. Simultaneously, the

growth of per capita income in India and China, higher meat consumption in those countries, and continued world population growth increased overall food demand.

According to Dr. Goering, although this "perfect storm" culminated in sharp world-wide rises in grain and food prices, a deteriorating world economy resulted in such prices beginning to dip during the last half of 2008. In light of recent food price volatility, what might the future hold?

The Outlook

What is the outlook for world food prices? In the immediate future (the next few months), some moderation in global food prices seems likely in response to very recent (since mid-2008) declines in world grain and energy prices. In the short-term (next 2 to 3 years) world food prices are likely to remain relatively high, as depleted grain stocks are rebuilt; more rapid economic growth resumes in countries such as China and India; and prices of key farm inputs such as fertilizer remain high. Over the medium-term (beyond about 2010), the outlook becomes more cloudy. In that time frame the world's farmers seem likely to respond with increased production in response to attractive grain prices. However, we are also likely to see continued income growth and associated dietary changes world-wide; continued high energy and farm input prices; and steady population growth. In light of these realities, world grain and food prices are likely to remain significantly above the levels of the past two decades.

Arguably, society is best served if food prices are moderated from the high levels of 2006 and 2007. If this is to occur, an appropriate response from the international community will be required. In the immediate near term, there will be need for increased food supplies for humanitarian relief in critically food-short situations such as Darfur and drought-prone countries such as Ethiopia. Looking forward, there is need to re-emphasize and increase investment in developing country agriculture, with a focus on small-scale farmers and good agricultural research to strengthen agriculture's technological base for the longer-term. The Food and Agriculture Organization of the United

Nations (FAO) has estimated that the annual cost of a comprehensive program of this nature would be in the range of about \$30 billion per year—a manageable figure if there is global political commitment to the effort.

In terms of ECHO's ministry, these emerging circumstances suggest several programmatic considerations, namely (i) letting ECHO's vision drive our efforts "...to bring glory to God and blessing to mankind by using science and technology to help the poor"; (ii) a continued focus on the poor, including the landless, those with few economic assets, minorities, etc.; (iii), emphasis on "pro-poor" development activities for small farmers in marginal agricultural areas; (iv) the continued search for technologies that lead to increased local-level food production and marketable surpluses with minimal use of purchased production inputs; (v) emphasis on cost-effective opportunities for program expansion in chronically food-deficient areas such as Sub-Saharan Africa; and, (vi) the continued search for synergistic program links with NGOs and organizations such as World Vision, the Gates Foundation, the CGIAR centers and the US Peace Corps.

In conclusion, and with reference to the original question of whether the recent "perfect storm" will morph into a mere passing cloud, the views of knowledgeable international organizations seem realistic. The World Bank suggests that, "Food crop prices are likely to remain well above 2004 levels through 2015 for most food crops." The International Food Policy Research Institute notes that, "World agriculture has entered a new, unsustainable and politically risky period," while The Economist magazine states simply that, "The era of cheap food is over."

Amaranth Potential for the Highlands of Southeast Asia in View of Lessons Learned in East Africa

*By Dr. Thomas Post
Asia Ministry Team Leader*



Potential of Amaranth in the Highlands of Southeast Asia

Based on the experiences of CRWRC and its collaborating partnering organizations in East Africa, the introduction of grain and vegetable amaranths shows real potential for the highlands of Southeast Asia. Grain

amaranth should be seen and managed as a high protein nutritional supplementary crop to compliment the Southeast Asian staple crop of rice. Given the high incidence of malnutrition in some of the upland rice-dominant areas of Southeast Asia (e.g., close to 50% stunting among children in northeastern Laos), having the nutritional supplement of even a small amount of grain amaranth in the daily diet could be a great help. For example, a study in Mexico found that as little as 20 grams of ground amaranth flour per day per child (approximately 2 $\frac{20}{g}$ tablespoons) made a significant difference in child growth.

The fact that grain amaranth is highly drought resistant, once established, means that it has potential as a relay or sole crop that could be grown towards the end of the rainy season in Southeast Asia and thereby extend the productivity of the growing season. However, successful adoption for self consumption by farmers will likely require methodical training and support to both men and women in the farm family. This is due to its photoperiodic sensitivity (i.e. flowering is triggered by shortening day lengths), the fact that the tastes/cooking methods of the leaves (but not of the grain) are known to people, and to farmers' lack of knowledge about the best methods for growing the grain types. On the other hand, a big advantage for grain amaranth adoption is that the taste of the grain is fairly neutral, slightly nutty, and mixes well with other grains, including rice. At the same time the

consumption of amaranth leaves—from either grain varieties or vegetable varieties is likely to occur more rapidly than grain consumption. Although this will have a favorable nutritional impact it will not be as great as the consumption of the grain.

Grain amaranth's nutritional impact derives from its high protein content (about 12 to 16% total protein), a superior balance of essential amino acids within the protein (especially a high level of lysine, which is low in cereal crops) and its high content of vitamins, calcium and fat. Maximum nutritional benefit from eating the grain comes when it is first popped and then cooked simultaneously with a staple grain such as rice or maize at ratios between 1 part grain amaranth to 3 to 5 parts of the staple grain. Most families in East Africa have simply been grinding the grain amaranth and then cooking it with maize flour using the above ratios.

[Editor: Ray Heinecke, a retired food scientist who has studied grain amaranth, explains that popping amaranth is preferred over using whole grains for mixing with lower nutritional quality grains (e.g., rice, maize). This is because popping results in a more complete protein mixture as the grain's starch becomes completely gelatinized. Dr. Heinecke explains, "Because amaranth is such a small and tightly bound seed, complete gelatinization of raw seeds may take longer than the normal cooking process would allow. Without complete gelatinization the starch is less digestible and may cause faster transit times in the GI (gastrointestinal) track rendering everything else less digestible."

Dr. Heinecke adds that if popping is not possible, using ground amaranth is almost as good since the grinding process greatly increases the surface area of the starch particles. In some cases grinding can also break the starch particles down. Therefore, starch could be completely gelatinized after the ground grain amaranth has been cooked for 30 minutes or longer.]

Leaves can be prepared according to local cooking customs for other leaves. However, it is better to grow one plot of amaranth for leaves

and another for grain, so that the grain yield is not harmed by the removal of leaves.

Southeast Asian planting dates for grain amaranth must take several factors into account:

- The grain amaranth varieties flower and seed in response to the shortening days preceding December 21 in regions north of the equator-this includes most of SE Asia. The grain types take about 75 days to harvest.
- Grain amaranth seeds germinate best in warm soil (requiring fairly warm night temperatures) and grow best in warm dry air with sufficient soil moisture.
- Once the tap roots are established (after about 3 weeks), the plants are very drought resistant.
- The monsoonal rains in Southeast Asia (i.e., Northern Hemisphere) diminish during November and December and generally cease by January, with day and night temperatures also cooling.

Planting Date Recommendation

Aim to plant grain amaranth about one month before the ending of reliable rains, so that the harvest will occur at least 2 to 4 weeks after the rains have stopped.

Generally, north of the equator, this will mean planting sometime during the months of September or October for the highland areas of Southeast Asia. However, plantings for producing amaranth leaves can occur at any time that there is sufficient soil moisture.



Other Considerations

Small seeds, thinning and row width: Grain amaranth seeds are very small. This means that when a farmer directly plants the seeds, he will probably end up with too many plants. He will have to thin the plants usually twice (but his family can eat the leaves of these plants) in order to have about one plant per 15 cm in the rows. If the plants are too crowded, they will all be small and skinny and will produce very little seed. A row width of 60 cm seems to help keep the plants from growing too tall and then falling over in strong winds. To reduce the amount of thinning that is needed, at planting time grain amaranth seed can be mixed with dry sand at a ratio of 1:15.

Insect pests: Trials in Chiang Mai, Thailand, showed that lygus bugs attacked grain amaranth flowering heads. However, lygus bugs can be controlled with low-toxicity pesticides and possibly with botanically derived insecticide. Stem borers were also a problem in some trials.

Seed availability: Dr. Chuckree Senthong, at Chiang Mai University, selected best-adapted types of grain amaranth during trials in the 1980s. He is beginning to multiply the most promising of these varieties. Limited seed availability will restrain grain amaranth trials by farmers at this point, unless seed is imported from East Africa.

Lessons from CRWRC's Experiences in East Africa

Development workers who are considering the promotion of amaranth as a new crop in Asia might be interested in the following lessons learned from 10 years of CRWRC efforts in East Africa:

- A crop that is not known by farmers requires much teaching and follow up time. CRWRC learned that using a volunteer farmer-nutritionist couple helped a lot!
- Start the teaching by letting people taste the new crop first! (1 part to 3 parts, 1:4 or 1:5 mix ratio of grain amaranth to the local staple). Teach people to use 2 to 3 tablespoons per day per child and about 4 tablespoons per day per adult if they are using the ground grain amaranth flour.
- Organizing "demonstration eating days" has increased home amaranth consumption.

- Amaranth mixes well with many traditional foods, which helps acceptance.
- Start by growing grain amaranth for food; don't promise that you will provide a cash crop market.
- Don't assume you already have the best varieties. Varieties differ in photoperiod response, taste and production.
- Often HIV+ adults report improvements in their health when they eat amaranth. Frequently malnourished children show weight gains, too.
- People eat and sell both leaves and grain.
- Amaranth's drought resistance has been demonstrated by farmers.
- Semi-arid farmers can achieve harvests of amaranth even when maize fails.

Nutritional, Health and Farm Benefits Reported From Amaranth in East Africa

- Mothers report that children are brighter in school, i.e., they are more alert after nutritious meals.
- Sequential visits show children having shinier skin and less dryness and flaking on their arms.
- Children under 5 years of age grow normally once they eat amaranth every day. Because of the tremendous results in the communities, nurses in the clinics advise mothers with malnourished, underweight children to feed them amaranth.
- Health workers and mothers have told us on several occasions that there is less anemia among mothers (amaranth is high in iron).
- We also heard from mothers who did not have enough breast milk that milk production increased tremendously.
- HIV+ people say that now the ARV drugs don't make them feel ill.
- We have heard on many occasions that HIV+ people who consume grain amaranth have an increase by several hundred points in their CD-4 count. They are able to start the ARV drugs after the CD count is up to at least 600.
- We heard that people suffering with arthritis and hip problems

felt much better after consuming amaranth.

- Children are brighter in school! Adults are stronger.
- Grain amaranth is also helpful for diabetics where dietary balance is key.
- People have told us that cows who consume the amaranth stalks give more milk.
- People have told us on numerous occasions that when chickens eat the amaranth chaff, egg production doubles and the shells are harder.
- Amaranth is now in demand in the market, with millers buying. In Kampala, Uganda, amaranth is substituted for the soy-derived lysine supplement in refined maize meal that was formerly imported from South Africa. In Kenya, three millers are now buying grain amaranth, and amaranth flour is available in supermarkets.
- Many families are adopting amaranth cultivation and use.

Extension Steps Used in East Africa

- **Show the video:** The CRWRC grain amaranth video is shown on a laptop computer to the staff of partnering organizations in their regional offices.
- **Give a nutritional talk:** Nutritional talks are given in villages, during which amaranth stories are shared by other villagers. If possible, facilitate exchange visits between new villages and experienced villages. Also, if possible, invite Ministry of Agriculture staff.
- **Make sure women are invited:** Learning to cook amaranth is crucial!
- **Stress these points:**
 - *Nutritional benefits should be stressed first (e.g.,*



brighter children, dietary balance for diabetics).

- *Benefits for those living with AIDs should be stressed secondly: we learned that if this benefit was mentioned first, it caused a stigma against growing grain amaranth.*
- *Stress proper mixing ratio for whole grain amaranth with staple grain.*
- **Plant two demonstration plots**, one for eating leaves and one for eating grain.
- **Make sure plots are visible:** Choose a demonstration spot at a clinic, school, or church, where people can easily watch and learn.
- **Homestead plots:** Choose a spot within the 10 meters of the home site where the fertility is high and the family can easily observe.
- **Be timely about planting:** For East Africa, planting was encouraged as soon as rains started, as the region has short rainy seasons (very different from Southeast Asia). Timely thinning and weeding also bring best results.
- **Multiply seed:** Teach farmers how to harvest the strongest and healthiest plants first and save the seed for future planting.
- **Eat Amaranth food together!**

Follow Up is Crucial!

- In East Africa, two follow up visits per growing season were needed. The first occurred approximately four weeks into the growing season. We encouraged the partner organization's field workers to revisit at the first and second thinning and then again at harvest.
- Farmer-to-farmer and staff-to-staff exchange visits have proven effective.
- Hospital demonstrations and gardens have proven effective; hospital staff members have become promoters as a result.

[Editor: In addition to extensive experience in promoting grain amaranth in East Africa, Tom Post has also conducted informal grain amaranth field trials in Chiang Mai, Thailand. For questions related to the promotion of grain amaranth, Tom can be contacted at postt@crcna.org. Additionally, Dr. Chuckree Senthong is continuing

grain amaranth variety trials at Chiang Mai University. He can be reached at agicsnth@chiangmai.ac.th.

For more information about grain amaranth, readers may refer to EDN Issue 91 (April 2006) [EDN Issue 91](#)

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Ray Heinicke, e-mail message to the editor, March 27, 2009.

Grown in Asia

Lesser Known Crops of Significance

Marian Plum

When ripe, the yellow and apricot-colored fruit of the marian plum (*Bouea macrophylla* Griff.) seem to glow among the tree's glossy green leaves. The



ripe fruit of marian plum offers an edible, crisp skin and juicy flesh. Besides being eaten raw as a dessert fruit, marian plum is also cooked, preserved and included as an ingredient in chili paste condiments. Like mango, young leaf shoots are also consumed.

The marian plum is native to peninsular Malaysia, north Sumatra and parts of Java. According to the World Agroforestry Centre, the species is known as *gandaria* in the Philippines and Indonesia and *rembungia* in Malaysia. In Thailand it is called *maprang*. Being a member of the Anacardiaceae family, the appearance and flavor of marian plum is quite similar to mango.

Marian plum is generally grown from seed. However, to maintain characteristics of desired varieties seedlings can be easily propagated

by marcotting or grafting. The plant thrives in light, fertile soil. Vegetatively propagated trees may bear fruit after 5-6 years, while seed-grown trees may fruit within 8-10 years (ICRAF).

In Indonesia, marian plum trees flower between June and November and fruit from March to June. However, in Thailand, flowering occurs in November and December with fruiting between March and May (Food and Agriculture Organization of the United Nations).

Varieties are basically divided between sweet and sour types; the sweeter selections have been developed for the market. Older, less sweet varieties are sometimes described as having a slight "turpentine" taste. Another Thai type of marian plum, known as *mayong*, is similar to the sweet varieties but with a degree of sourness in the ripe fruit.

Marian plum is often planted as both a fruit and shade tree in home gardens. But the FAO reports that in the early 1990s, commercial development of marian plum could be found in several provinces in Thailand, with an average productivity of 7 metric tons per hectare. Sold in village market stalls as well as supermarkets, the Thai government is also reportedly promoting marian plum exports.

Widely cultivated and appreciated wherever it is grown, marian plum seems poised to gain a higher profile in Southeast Asia.

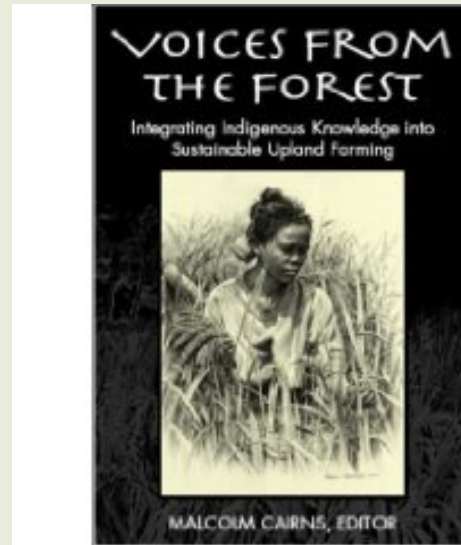
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Books, Websites and Other Resources



Voices From the Forest: Integrating Indigenous Knowledge Into Sustainable Upland Farming

Edited by Malcolm Cairns.

Copyright 2007 by Resources For the Future (Washington, DC). 826 pages.

Reviewed by Rick Burnette

Shifting cultivation has an image problem. Dismissed and even criminalized, traditional rotational farming is misunderstood to say

the least. In response to challenges faced by millions of people in the Asia-Pacific region who still depend upon one form of rotational farming or another, *Voices from the Forest* is a compilation of papers that focus on indigenous fallow management. The work grew out of a 1997 regional workshop titled "Indigenous Strategies for Intensification of Shifting Agriculture in Southeast Asia," organized by the World Agroforestry Centre (ICRAF) Regional Office in Bogor, Indonesia.

A total of 65 case studies from across the Asia-Pacific region are included in this work. Titles reflect varied topics and locations: for example, "Wild Food Plants as Alternative Fallow Species in the Cordillera Region, the Philippines"; "Management of *Mimosa diplotricha* var. *inermis* as a Simultaneous Fallow in Northern Thailand"; and "Indigenous Fallow Management on Yap Island." Though written by regional and international scholars, the papers are not daunting academic reads. With an ambitious target audience of researchers, development practitioners and farmers, the authors' goal is "to make

indigenous practices and experience more widely accessible and better understood."

An agenda of *Voices from the Forest* is to help change the negative perception of shifting cultivation. However, the book also covers a rich store of practical agricultural techniques including green manure cover cropping and the management of *Imperata* grasslands. As Malcolm Cairns states in the preface, *Voices* provides "a rich menu of farmer-tested innovations that we believe need to be shared with the wider community of shifting cultivators still searching for ways to cope with rising land-use pressures and market economies."

Practitioners of rotational farming will not be the only beneficiaries of this impressive collection of case studies. Potentially, anyone working with shifting cultivators in the Asia-Pacific region, or possibly other groups of indigenous farmers, would benefit from this publication.

Voices From the Forest is available from Amazon.com. Follow the link under "Quick Links" (top left) to order the book.

2nd ECHO Asia Agricultural Conference

**Chiang Mai, Thailand
September 21-25, 2009**

We are busy making preparations for the upcoming ECHO Asia Agricultural Conference. An interesting slate of speakers will address topics such as

- SRI
- Earthen homes
- Alternative energy for remote communities
- Water purification

Additionally, many in the ECHO network have already offered to lead workshops related to a diverse selection of development and hunger

alleviation activities.

Spaces are filling up fast. Register now for this exciting conference! Follow the link under "Quick Links" (top left) for more information, online registration and payment.

See you in September!

The ECHO Asia Regional Office operates under ECHO, a non-profit, Christian organization that helps you help the poor to produce food in the developing world .

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