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Magazine on Low External Input and Sustainable Agriculture



Healthier farmers, better products

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Organic potatoes cooked in a *huatia* (traditional earthen oven) in Ampay, Cusco, Peru. Photo: Rik Thijssen

The editors have taken every care to ensure that the contents of this magazine are as accurate as possible. The authors have ultimate responsibility, however, for the content of individual articles.

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12 The revival of an ancient crop

Joshua Spetter and Lisa Thompson

Five centuries ago, amaranth was an important crop used in many ways in daily life in Mexico. Today, in contrast, much of the rural population survives on a very limited diet, based primarily on corn. Fortunately, amaranth is making a comeback, becoming more and more popular around the world due to its exceptional nutritional value, and ability to grow easily in hot, semi-arid climates. This article describes how *Puente a la Salud Comunitaria* (Bridge to Community Health), an NGO operating in Oaxaca, is bridging the gap between rural health and agricultural development through an integrated programme of nutrition education, cooking demonstrations, crop diversification, and soil conservation. In this way, they are promoting amaranth as a culturally significant, highly nutritious, and potentially income-generating alternative for crop diversification and food security.

LEISA is about Low External Input and Sustainable Agriculture. It is about the technical and social options open to farmers who seek to improve productivity and income in an ecologically sound way. LEISA is about the optimal use of local resources and natural processes and, if necessary, the safe and efficient use of external inputs. It is about the empowerment of male and female farmers and the communities who seek to build their future on the basis of their own knowledge, skills, values, culture and institutions. LEISA is also about participatory methodologies to strengthen the capacity of farmers and other actors to improve agriculture and adapt it to changing needs and conditions. LEISA seeks to combine indigenous and scientific knowledge, and to influence policy formulation to create an environment conducive for its further development. LEISA is a concept, an approach and a political message.

ILEIA is the Centre for Information on Low External Input and Sustainable Agriculture. ILEIA seeks to promote the adoption of LEISA through the LEISA magazines and other publications. It also maintains a specialised information database and an informative and interactive website on LEISA (www.ileia.info). The website provides access to many other sources of information on the development of sustainable agriculture.

Readers are welcome to photocopy and circulate articles.

Please acknowledge the LEISA Magazine and send us a copy of your publication.

20 Village poultry, food security and HIV/AIDS mitigation

Robyn Alders, Brigitte Bagnol,
Mohamed Harun and Mary Young

In farming households affected by HIV/AIDS, the illness or death of family members often has negative effects on family food security. Village poultry can provide a source of high quality nutrition and income without requiring much in the way of labour or financial inputs. In this article, two examples from communities affected by HIV/AIDS in southern Africa are presented, showing how improving the management of village chickens contributes to HIV/AIDS mitigation, principally through improved household food security and income generation.



24 Reviving local health knowledge for self reliance in primary health care

P.M. Unnikrishnan and G. Hariramamurthi



Although India is endowed with a rich medical knowledge and natural resources, health status is far from satisfactory. The Home Herbal Garden programme, initiated by the

Foundation for Revitalisation of Local Health Traditions in Bangalore in 1998, promotes positively assessed local health practices for self-help in primary health care among rural populations. As part of this programme, a methodology for documentation and participatory assessment to identify safe and effective practices was developed. Communities and households are trained on how to cultivate and use plants selected during this process. The benefits from one Home Herbal Garden can be reaped by not only the family members, but by friends and neighbours as well.



26 Safer options for irrigated urban farming

Bernard Keraita, Pay Drechsel and Flemming Konradsen

Urban vegetable farming is an important means for attaining urban food security, balanced diets, and is now the livelihood of many urban dwellers in Ghana. However, many of the vegetables commonly grown need to be watered on a daily basis. Poor urban sanitation means that water used is often contaminated, and can transmit disease. This article describes an action-research project that has recently been developing appropriate options for reducing health risks from vegetable contamination, while safeguarding productivity and livelihoods. As farmers became more aware of the health risks, they have tried out and modified various irrigation methods. Best practice guidelines will now be developed to share these findings.

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DEAR READERS

When we decided to produce an issue of the *LEISA Magazine* about health, we were unsure as to whether we would be able to find enough positive examples of how LEISA can contribute to the health of those involved in it. However, we received many more good articles than we have space to publish. We recognised that health, sustainable agriculture and poverty reduction are intricately linked, and through your articles, it became clear that these linkages are being recognised and worked on by LEISA practitioners all over the world. So, in this issue we are pleased to present some compelling cases of how projects and communities are addressing a variety of health issues through low external input and sustainable agriculture. We welcome your comments and reactions.

On the back page you will also find a short summary of the results of a survey we carried out earlier this year. We wanted to know more about readers' reactions to the articles, and how often authors are contacted. We found the results interesting and encouraging.

Do take a look at the calls for articles for the upcoming issues; we look forward to reading about your experiences.

The Editors

Healthier farmers, better products

Editorial

More than thirty years ago, before scientists started thinking about possible negative side effects of the Green Revolution, women in Sirikandura, Sri Lanka, claimed that the quality of their breastmilk was decreasing. They believed that this was because they were eating rice grown with chemical fertilisers. Like them, some people have long been aware of the link between the food we eat and the effect it can have on our health, while to many others - be they farmers or scientists, urban or rural inhabitants - the connection is not so obvious. The fact is that our health is influenced by the water we drink, the air we breathe, by many physical and non-physical factors in our environment, and by the quantity and quality of the food we eat every day. The quality of our food is largely determined by the way it is grown or produced.

Health and agriculture, however, have long been considered two separate "sectors". The two different disciplines are studied separately, with separate ministries, policies and budgets. Programmes and projects are implemented separately, with little recognition of the links between them. This may be a missed opportunity for improving living standards, while ignoring the existing links and interactions can have serious consequences. In the last fifty years, there have been many examples of agricultural development programmes that have led to a deterioration of the health of those who were intended to benefit. Food crops have been replaced by cash crops, many of which are water-intensive. This has meant greater competition for water resources between domestic use and cash crops, and often between more powerful larger farmers and poor farmer households. Pesticides and fertilizers, introduced to help increase agricultural production, have contaminated food as well as drinking water. Irrigation schemes have left no space for home gardens. In such situations, farmers have improved their monetary incomes, but the health status of their family has not improved at all, it may even have deteriorated.

There are several factors which may contribute to a deteriorating health situation following agricultural development. Shifting from subsistence farming to cash crops leads to a change in consumption patterns, but not always for the better. There is also the question of access to and control over resources. It is mostly men who control the yields and income from cash crops, whereas women are the ones primarily in charge of food crops, and the family's health. Higher disposable incomes do not automatically result in better health: this depends on how the money is spent, as well as the space available for producing food for home consumption. A family's health, therefore, is not simply a matter of being able to produce enough to eat or sell. Health is also affected by the control of resources and benefits, what is grown, and how.

Links, interactions, and integrated responses

There is a number of major health challenges facing the world today. Some of the bigger issues are linked to the current state of agriculture. For example, HIV/AIDS, malaria and malnutrition are common in many rural areas where agriculture is the basis of the populations' livelihoods, and their effects are felt acutely. The ever-expanding population means an increasing demand for nutritious food and clean water. In many ways, the health of producers and consumers is related to local production systems, to the end product, and also to wider issues such as access to and control over land, water and services. As these issues are inextricably interlinked, the responses will also need to be

integrated, drawing on the expertise of both sectors. By looking at some of the major areas of cross-over, we can see where opportunities exist for succeeding with an integrated approach to addressing health through agriculture.

Diets and nutrition

The most obvious link between health and agriculture is seen in a population's nutritional status. According to FAO (2006), more than 850 million people face acute food insecurity and hunger. Eighty percent of these live in rural areas. Hunger is the most extreme expression of poverty, and is partly the result of the difficulties farmers face in agricultural production - many small-scale farmers are unable to produce sufficient quantities of food, even for self-consumption.

The amount of food we eat is one part of the problem; the quality of food is just as important. Around 2 billion persons suffer from what is called "hidden hunger", characterised by insufficient intake of vitamins and minerals. This can cause various diseases, from blindness to anaemia, and it reduces people's general resistance. Increasing the range of crops, vegetables and fruits, and including underutilised, wild or traditional species, can definitely contribute to improved nutrition.

Everyone confronted with hunger and malnutrition knows that this is not only a production problem but also a distribution problem. At a global level, but also within communities and in households, food is unequally divided. Though the larger distribution issues are far beyond the control of most of us, it is very well possible to address these issues at the level of communities and households. Making more varied food available in larger quantities should go hand in hand with efforts to ensure that it reaches those who need it most - women and children, especially in poor households.

Medicinal plants

While improved nutrition can help prevent us from getting ill, herbal, medicinal and aromatic plants are usually used to treat existing health problems. Throughout history, wild plants have provided the main ingredients for all types of medicines, and knowledge about the use of such plants has helped to sustain populations for millennia. Nowadays, although synthetically produced drugs and medicines have become widely available, it is increasingly acknowledged that locally produced herbal medicines can be a very effective and much cheaper alternative to "modern" medicines. There are many medicinal plants which can easily be grown and used domestically for common complaints at the local level. Medicinal plants can easily be incorporated into the farming system. At the same time, there are also increasing opportunities for farmers to cultivate medicinal products commercially as in recent years the demand for natural remedies has grown considerably - both locally and internationally.

Contamination, pollution and a clean environment

The relationship between health, agriculture and a clean environment can be seen in different ways. Water, for example, is essential for agriculture, while access to clean water is vital for human health. Agricultural production demands vast amounts of water, competing with the people who need it for daily life. Conventional agriculture is one of the major polluters of the available water resources, contaminating drinking water supplies with surplus nutrients and chemicals. At the same time, appropriate use of water in irrigation is also vital: standing water can be a breeding ground for malaria and other vector-borne

diseases such as bilharzia and Japanese encephalitis. Water harvesting and storage, while useful in periods of water scarcity, can also be a health concern if not managed properly. At the same time, the use of wastewater in agriculture is an increasing concern, as it can cause serious health problems for consumers. Keraita *et al.* (p. 26) describe one project addressing this issue, looking at alternative options.

Another link can be seen in the way millions of people cook: using wood, dung and crop residues as fuel every day. The availability of firewood or fuel is a major issue and there have been many agricultural initiatives focusing on the production of firewood and related ecosystem management. But comparatively less attention has been paid to finding alternatives which also address issues such as smoke inhalation. Women who spend hours in enclosed spaces breathing in smoke are at serious risk of respiratory and cardiovascular diseases; in many rural areas, respiratory diseases are one of the biggest causes of death.

Finally, we must consider the enormous health threats related to the use of pesticides, fertilizers, and herbicides in agriculture. This is one area where the shift to low input systems and the use of organic manure and ecological pest management can have an immediate positive effect on health. This is clearly presented by Sherwood, Cole and Murray (p. 33), who make a strong case for banning the most toxic products. As these authors point out, highly toxic pesticides are easily available, even though they are directly associated with nervous system and mental health problems. More alarmingly, health problems are not only seen in those who apply these products, but among the entire family. Having easy access to extremely toxic products is also linked to higher suicide rates.

Coping with HIV/AIDS

Certainly there are many health issues which cannot be traced back to the influence of agriculture. One such issue is the HIV/AIDS pandemic. But many people living with HIV/AIDS depend on agriculture as their main source of livelihood, and the interactions between malnutrition, poverty and HIV/AIDS are becoming increasingly well-known. The World Health Organisation considers poverty to be "the world's most ruthless killer and greatest cause of suffering", recognising that poverty can increase the incidence of, and suffering caused by HIV/AIDS, while HIV/AIDS in turn worsens poverty and increases inequality. Agriculture-focused organisations as well as organisations principally working around health issues are seeing this link very clearly in recent years, working to address food security and nutrition. These initiatives include the promotion of home vegetable gardens, poultry keeping (see Alders *et al.* p. 20), and conservation agriculture; in all cases, initiatives which need little labour.

Growing urban awareness

The link between health and food, and the ways in which food is being produced, has become increasingly noticed in Northern countries, as well as in urban centres in the South with fast growing middle class populations. These areas are witnessing an alarming increase in welfare- and nutrition-related diseases such as diabetes, obesity and heart disease. With increased urbanisation, globalisation and changing lifestyles, consumers are exposed to "fast foods" and to processed, treated or stored foodstuffs of low nutritional value. Increased awareness among urban consumers has brought new opportunities for food producers, leading, for example, to growing markets for organic, green and fair trade. Consumer demand has led to changes in the way crops are grown in Europe and the United States, and also increasingly in the South, as reported by Simmons and Scott (p. 22). As the urban population depends heavily on food brought in, another alternative in the

search for healthy foods is to grow your own. Urban gardening and agriculture is thus becoming popular in many places, as is shown by Unni Krishnan Nair (p. 30).

What can LEISA contribute?

As an integrated approach, LEISA considers the ecological, economic and social aspects of agricultural development. A LEISA system will contribute to securing access to clean water, ensuring a regular, safe and quality food supply, good sanitation, clean fuel and adequate shelter. All these contribute to general well-being and health.

LEISA focuses on increasing on-farm diversity, on mixed systems with animals, annual crops and tree components, and on the use of natural enemies rather than chemical pesticides to control pests and diseases. Extensive knowledge of practices and processes involved in the maintenance of ecosystem services enables farmers to manage the whole farm to produce a wide range of quality, safe products. Establishment of integrated and sustainable farming systems contributes to long term food security and increased productivity, which contributes to health and general well-being.

However, increasing productivity in a safe and sustainable manner is only one part of the picture. Farmers also need to be able to make a living, and the security of having a reliable livelihood or form of income can benefit both physical and mental health. Increased incomes do not necessarily equate to increased intake of healthy food, or increased family health. However, higher incomes may increase access to food or to different types of food, in the same way as the access to related information. In turn, this can improve overall food security.

As health is a central part of a family's well-being, there is an important social dimension to be considered. On a daily basis, meal preparation, feeding the family, cooking, and the division of portions is often done by women. They also have important responsibilities in other health and hygiene related matters. Ensuring that women and men are sensitized about nutrition, health and sanitation, while recognizing their respective roles and responsibilities, is an important step in improving family health and nutrition.

Future challenges

Although many encouraging initiatives are appearing, there are still many questions to be answered. In which ways do farmers, men and women, consider family health and well-being when planning their production system? What are the constraints and opportunities they face? Do agricultural projects consider the health implications of their interventions? In which ways do researchers integrate health and nutrition considerations into agricultural research projects? Getting different sectors and departments to work together will be one of the biggest challenges. While millions of people rely on small scale agriculture for food, fuel, shelter, and fibre, it can be argued that a more integrated approach is not only necessary, but long overdue.

The articles in this issue show how human health is being improved through good natural resource management and maintenance of ecosystem health. On a larger scale, in order to address poverty reduction and achieve the Millennium Development Goals, the synergies between agriculture and health should be taken advantage of. This calls for innovative approaches, integrated processes, inventive thinking and novel partnerships: the challenge for LEISA practitioners everywhere.

Bringing agriculture and health workers together

Linda Jo Stern, Scott Killough, Ross Borja, Stephen Sherwood, Nina Hernidiah, Paul Joicey and Peter R. Berti

World Neighbors traditional focus and expertise are rooted in agricultural development. Recognising that great synergies exist between agriculture and health and looking for ways to improve our work, about ten years ago we sought to interact more with health professionals. We found that while we shared common hopes and aspirations, we often had very different ways of understanding poverty and how to help communities to address it. But we were able to come together around a common priority: good food for good health. In agricultural terms, this means food that is produced in ways that are healthy to both the farm and the farm family; in health terms, this translates into food that is nutritious and contributes to human health.

Once we discovered the importance of working towards good food and focusing on the imperative for adequate quantity and health quality of food to prevent childhood malnutrition, the challenge became learning how to work together. Like many organisations, World Neighbors (WN) and its partners work through two central and interactive programme themes

Enabling local potential

“Positive deviance” (PD) is an approach that looks at local examples of good health and nutrition as local “seeds of change”. PD involves organising women and their children in two week cooking and feeding sessions. The approach actively seeks out the caregivers of children who are “positively deviant” (i.e., well nourished and healthy) and brings them together with the caregivers of children who are under or malnourished to share their caregiving experiences, their tips, and their recipes. During the sessions and home visits the women explore the meanings, conditions, and reasons for health – both “good” and “bad”. This was the basis of our work in Mindanao, one of the Philippine islands.

WN and its local partner, SIKAP, work in villages where livelihoods are dominated by the local oil palm plantations, and where the dominant business is one of natural resource extraction. In the villages of Mate and Bayugon 2, many men and women work from dawn to dusk as day labourers on the plantations, while grandparents and older children stay at home to take care of the young children. Those not working on the plantation weave and sell “amakan” or rattan panels. Some families supplement their income through backyard gardening; others cultivate small, sloping plots of land, with a primary focus on cash crops rather than domestic consumption. Many of the indigenous peoples who live in these villages prefer the more traditional pursuits of foraging for food in the forest and small-scale gold mining.

In this context, the availability of adequate and good quality, nutritious food was a major issue. Primary caregivers are absent for most of the day, while the income earned by working on the plantations is uncertain, provided on a day-to-day basis. Food that is produced locally tends to be produced with chemical inputs and aimed for sale in local markets. To address this issue, World Neighbors, the SIKAP staff and community leaders decided to focus on nutrition as a programme entry point. We opted for the “positive deviance” approach and held a workshop for community volunteers to learn about this approach. For a period of two weeks, selected caregivers came together, cooked together and learned together. The children benefited from extra inputs to their diets, the caregivers benefited from learning new ways to care for the children, while local health workers benefited from learning a new approach to caring for malnourished and vulnerable children. In most cases, the groups agreed to continue to meet on a regular basis, thereby strengthening long-term community capacities in addressing health issues. This was all done with no external inputs – all food cooked together was from local sources and easily available to all participants.

By sharing their experiences, families realised that backyard gardening was something they could do to help improve the health of their children. It became evident that many of the families of those children who were “positively deviant” had home gardens where they were growing fruits and vegetables. Since the PD groups were formed, the number of families with backyard gardens has increased, improving their access to fruits and vegetables. A number of PD group participants have asked to learn about low-external input and sustainable farming. Learning visits have been arranged: training and



Photo: Scott Killough

Farmers take nutritional needs into account when deciding what to grow.

– sustainable agriculture and rural livelihoods, and community health. The concepts and practices of food security and nutrition offer important “linkages” between these distinct, but inter-related areas of action. In addition, tackling hunger and malnutrition goes beyond food production, and includes aspects such as food preparation, access to clean water and sanitation, cultural practices, gender issues, child spacing and child care.

In this article we offer three examples to illustrate how we have worked to strengthen interactive sustainable agriculture and community health efforts. Each of these examples emphasises the vital role of women in improving the nutritional well-being of their families, and the way communities and WN partners are working to ensure that the “linkages” of health and agriculture can be made stronger.

technical support on sustainable agriculture has been provided; information on safe water management and good hygiene practices has been sought. Local families are now encouraged to look at the health of the wider environment and at how this affects the health of their families. This was all stimulated by focusing first on nutrition, on what we eat and on what we feed our children.

Questions, not answers

When solutions can be found through local experience, we view our job not to provide answers to problems but to help people see the opportunities that lie around them. As a result, we focus our energies on asking good questions and facilitating discussions and analysis of problems and possible solutions. With regard to helping rural people better understand nutrition, we found that it can be effective to begin by helping them to critically explore lessons from agriculture. Through experience with soil and plant fertility, for example, people can gain insights into the conditions of their own health status.

As people make "linkages" between new learning and their own practice-based experiences, the lessons are more powerful. More importantly, the critical analysis skills that are sharpened through this process have a longer and more lasting impact on people's lives, even as the problems and contexts change in the future. Our work in West Timor, Indonesia, showed how questions may be more useful than answers.

Since 1997, WN has worked in West Timor in partnership with the local NGO Yayasan Mitra Tani Mandiri (YMTM) in the development of an agro-forestry programme. Over the years, people there have attained a high degree of awareness about the relationship between health and agriculture. As a result, this programme has come to emphasise organic farming. Growers had not taken into full account the nutritional needs of their families, and there was a strong focus on agriculture for sale in the market rather than for family consumption. Nevertheless, rural families recently have come to prioritise their own food security, health and nutritional needs. Consequently, YMTM and farmers groups have begun to approach the issue of farm planning not just from a production point of view but also from a "health needs" point of view. In doing so, they pay particular attention to how farming families can meet their own nutritional needs throughout the year.

The most significant changes that communities express about the YMTM programme are associated with improved capacities and skills in farm planning, as well as changes in social relations within the family – changes that have influenced farming practices. In farm planning, decision-making is now much more equal between husbands and wives, and women have enhanced land ownership rights where previously land ownership was dominated by the men. This has resulted in more balanced production decisions, with vegetable production for domestic consumption now playing a more critical role. Through this increased production of organic vegetables it is now easier to meet family nutritional needs. Women also have more ownership over large family assets, as witnessed by the fact that it is now often the women that manage the family cattle. Many of the women comment that they feel their situation is now more stable, with the availability of a much wider range of food throughout the year.

Linking the technical with the social

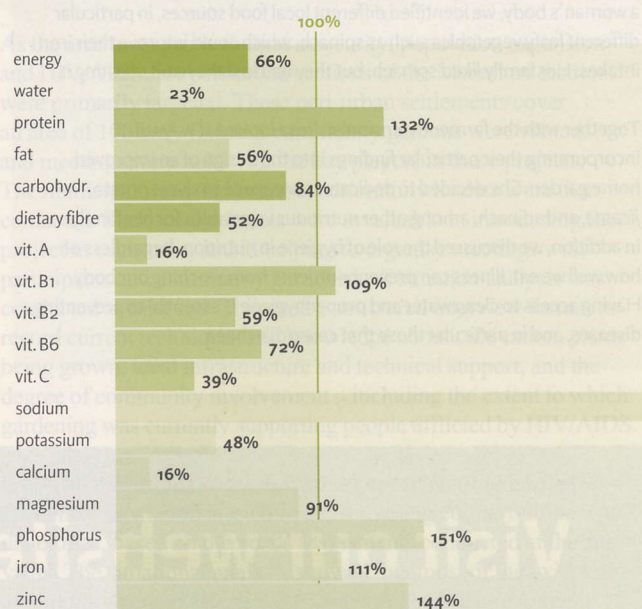
Beyond just helping people to eat well, we feel that it is important that people come to understand why things have ended up being the way they are. For example, when we

compared the nutrient charts of males and females in the Andes, we commonly found that men and boys ate better than women and girls. This led us to new and deeper questions about the social roots: how did this come to be? What can we do about it? Based on our experience with participatory methods and gender analysis, we have learned that information alone usually is not enough for enabling change. How we go about teaching, and in particular facilitating learning and interactions, can produce very different effects on participants. This became clear from our work in Ecuador, where we worked with Andean women to better understand food sources and nutrition

Andean women own much practical knowledge over food. Nevertheless, they are often unclear about the nutrient content of foods. This information is especially important for pregnant women and mothers, as they are highly vulnerable to nutrient deficiencies. We drew on the PD methodology to learn about the women's diets and that of their children, and found out that child health is not simply a function of wealth. A mother's knowledge of diets and hygiene can be particularly important. Greater clarity over such matters can help mothers identify new ways of improving their family's health.

The 24-hour recall is a survey of food and drink consumed over the previous day. Health promoters conducted this activity with mothers to help them better understand the nutrient intake of their children and family. We also worked with groups to chart the general nutrition potential of typical meals and combinations of foods. To convert food intake to daily nutrient requirements, we used a portable computer and a free software programme called Nutri-survey, which automatically translates what one eats to nutrition equivalents. By typing the results from the 24-hour recall into a table, the user-friendly programme produces a bar graph based on standard dietary requirements (by age, sex and biological state, e.g., pregnancy) for different food intake (taking into account quantity and preparation) (see chart). The readouts contain few words, and with a little help, participants learn to understand the bar graphs.

Chart 1. Analysis of one woman's daily intake in the Central Highlands of Ecuador



Percent fulfillment of the recommended nutrient intake.

Working with participants to understand and compare outcomes, we placed special attention on nutrition gaps. Because food intake varies from day-to-day, it is not necessary nor expected that a single day's diet is satisfactory for all nutrients. We discussed how other days may differ and how some of the nutrient gaps would be filled, or not, on other days. We placed special emphasis on those nutrients that are likely to be inadequate even over many days of observation.

Together we explored local food sources by incorporating them into the programme and watched how bars representing particular nutrients moved up or down. People were often surprised by the high nutrient content of traditional foods. Depending on the group's interests, we also discussed how diets differ by gender or how they may have changed over the last few decades. We talked about how non-dietary factors, such as lack of rest, hygiene, and disease may affect nutrition and health. This led to families adjusting their diets and beginning home gardens, as shown in the box. Over time, we came to link these discussions with anthropometric measures and growth charts of children, as well as with agricultural interventions, such as the design of home gardens.

Putting learning into practice

Rosa is a typical rural mother living in Bolivar, Ecuador. She is concerned about the health of her family. Nevertheless, without clear information on the nutrients of different local foods, ensuring her family's nutrition was difficult. By conducting 24-hour recalls and translating them through the Nutri-survey programme into understandable bar graphs of recommended daily allowances, she learned to see the strengths and weakness of her family's diets. In particular, she identified a number of clear "nutrition gaps". For example, her children were not receiving enough vitamin A. Through discussions with the group, she discovered that sweet potato and *jicama* (an Andean root) were local food sources that were high in this vitamin.

We also took time to compare the diets of males and females in each family. Rosa discovered that her diet and that of her daughter were markedly worse, in particular during their menstrual cycles, than that of her husband and two boys. This helped explain why she and her daughter were always so tired. After discussing the effects of the menstrual cycle on a woman's body, we identified different local food sources, in particular different leafy vegetables such as spinach, which could improve their iron intakes. Her family liked spinach, but they had lost the habit of eating it.

Together with the farmer extensionist, Rosa looked at ways of incorporating their particular findings into the design of an improved home garden. She decided to dedicate more space to sweet potato, *jicama*, and spinach, among other nutritious vegetables for her family. In addition, we discussed the role of hygiene in nutrition. Regardless of how well we eat, illness can prevent nutrients from reaching our body. Having access to clean water and proper hygiene is essential to preventing diseases, and in particular those that cause diarrhoea.

Future challenges

Despite progress in helping partner organisations to discover the linkages between health and agriculture, we realise that there is much room for improvement. Often our disciplinary biases – be they in agriculture, health or other fields, blind us to certain realities. As a result, our work is vulnerable to a "disconnection" between having more food available (either through improved production or increased income) and achieving better nutrition. At the very least, we now are aware of this situation and intend to change it.

Many challenges lie ahead. In particular, we feel that special attention needs to be provided to the deep disciplinary biases of our staff and partners, in particular between agriculture and health workers, which continues to create barriers of understanding and action. There is a need for more fundamental change in the way we see, think, and do; this has serious implications for how we engage people and communities in development.

Commonly, development professionals have created an arbitrary line that divides the sexes between agriculture and health. Without deliberate attention to such gender constructions, the benefits of "good food for good health" will continue to be distributed unequally. When women and girls are unhealthy, the entire family and community suffers the consequences. Additionally, we have much to learn in understanding the interactive relationships between our agriculture, degrading environments, technology (such as bio-engineering), market integration and the nutritional value and quality of food. Our partners and WN plan to continue exploring such issues. We hope others will join us in the further exploration of the interactions between health and agriculture.

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Fighting AIDS with traditional foods and organic practices

Sarah Kaschula and Kathy Arbuckle

Since the fall of apartheid in 1994, when restrictions on population flow were relaxed, the Msunduzi district in KwaZulu-Natal, South Africa, has experienced rapid expansion and population growth. The area has agricultural potential, but the landscape is rapidly being transformed, with consequences for local small-scale farming. The land tenure system is complex, household plots are very small or unfenced, and the majority of households in peri-urban areas do not have productive home gardens. Most of the productive agricultural activity is located around tribal or municipally run communal gardens, managed by community co-operatives. However, access to these gardens is usually limited by inadequate community interest, and a poor transport system. Recent municipal surveys show that the majority of households depend on purchased foods. Households spend up to 40 percent of their income buying bulky, low nutrient staples such as maize meal, pulses and cabbage in the neighbouring towns, and a further 8 percent on transport getting there and back.

But population pressures and transforming land practices are not the only threats to productivity. The Msunduzi area has one of the highest HIV prevalence rates in the world. HIV/AIDS poses a threat to agricultural systems unlike any other. Unlike other diseases, AIDS targets the productive household members who are usually contributing most actively to the household's wellbeing. Moreover, AIDS is understood to be a "long wave"

shock. This means that unlike other agricultural upsets, such as drought, labour shortages or sudden economic or political shock, AIDS slowly but steadily erodes at the resilience of rural livelihoods over many decades.

How can agricultural extension officers tackle these issues? This was the question faced by the Children In Distress Network (CINDI), a network of organisations who have worked for over 10 years with AIDS afflicted groups in the region. CINDI recognised that if AIDS is indeed affecting food security in a unique way, then novel agricultural practices are required to help rural communities cope.

Going back to our African Roots

"African Roots" was the initiative proposed by CINDI for coping with the unique flavour that AIDS has lent to food security problems in the Msunduzi district. The project was born out of the recognition that good nutrition and food security is the foundation for good health, particularly for people affected by HIV and AIDS, but that in this context, our food security approach needs to be redefined. The project promoted food gardens, and particularly the use of traditional crops (indigenous and non-indigenous "wild" vegetables) coupled with organic farming techniques, as a way of saving labour, promoting enterprise, optimising nutrition, and encouraging self-sufficiency.

The two-year African Roots Pilot Project began in October 2003, funded by the Rockefeller Brothers Fund. Co-operation between existing government and non-government projects was emphasised: the project was implemented by the Institute of Natural Resources (INR), in partnership with the CINDI Network and the Msunduzi Municipality. At the outset, an advisory committee was established, with representatives of all partners. Local projects that were involved in the propagation and promotion of indigenous and traditional plants were contacted, and a list of all known traditional plants and their botanical attributes, as well as cultivation techniques, was compiled.

As the area most prone to food insecurity, population expansion and HIV/AIDS, the peri-urban sections of the Msunduzi district were primarily targeted. These peri-urban settlements cover an area of 100 km². Existing community gardens were visited, and meetings were held with the key players in these projects. The municipal ward and/or tribal community leaders were then contacted. Such local contacts were invaluable in introducing the project in each zone, and in helping to organise meetings with participants and community gardeners. A situation analysis was conducted at each site. This used a structured interview format to record current techniques and knowledge about cultivation, plants being grown, local infrastructure and technical support, and the degree of community involvement – including the extent to which gardening was currently supporting people afflicted by HIV/AIDS.

Using all this information, the project coordinator identified farmers to be trained in each zone. A training course outline was developed, based on the needs assessments conducted at the site visits. The situational analysis showed that most of the existing community garden efforts were supported by the government agricultural extension officers. The major problem with the existing agricultural support was that techniques taught were



Photo: Kathy Arbuckle

Anacletta Zondi is happy to include traditional leaves, grown at the Mafakathini Clinic demonstration site, in her diet.

generally labour and resource intensive, promoting pest and disease control through chemical insecticides and fungicides. Trainings regarding organic fertilizer methods were often inadequate or not fully realised in a hands-on manner. As a result, farmers in Msunduzi generally focused on expensive chemical products, mainly purchased from local garden centres at great expense.

The project offered an alternative approach that favoured more sustainable, organic agriculture. As part of the training at demonstration sites, hands-on instruction was given around bio-intensive gardening techniques, compost making, insect pest control, rainwater harvesting, and preparation of nutritional dishes. Different methods for improving the soil were demonstrated, using manure-based, legume-based, biomass-based and worm-based organic methods. Recycling of cans into garden drainage points and at the bottom of trenched plots was encouraged. Gardeners were also encouraged to recycle local refuse, through putting a layer of grass, leaves, paper, wood ash and kitchen scraps on the bottom of the trenches. Mixed cropping of exotic vegetables with many of the traditional plant varieties often considered “weeds” (see Table 1) was introduced, not only as a labour-saving method of cultivation useful for those weakened by HIV/AIDS, but also as a method for organic pest control. Diversification of crops and letting wild plants grow around farmland was encouraged, as a means of creating diverse micro-climatic conditions that attract pest predators. Wherever possible, attempts were made to make use of sustainable water-recycling (“grey water”), and project funds were often used to provide materials for doing this.

As seeds of many of the traditional plants are not available commercially, innovative attempts were made to get people to collect, save and exchange them, such as seed bank competitions with prizes of spades, compost and seeds. Wild seeds were collected for propagation in nurseries and distribution in community gardens.

Table 1. Some of the wild and traditional species promoted and used by African Roots

Scientific name	Common name
<i>Amaranthus hybridus</i>	Red amaranth
<i>Amaranthus thunbergii</i>	Common amaranth
<i>Bidens pilosa</i>	Black jack
<i>Chenopodium album</i>	Lambs quarters
<i>Citrullus lanatus</i>	Wild melon
<i>Citrullus vulgaris</i>	Bush melon
<i>Colocasia esculenta</i>	African potato
<i>Momordica foetida</i>	Bush tea
<i>Solanum retroflexum</i>	Nightshade
<i>Sonchus asper</i>	Thistle
<i>Zantedeschia aethiopica</i>	Arum lily
<i>Brassica spp</i>	Wild mustard
<i>Galinsoga parviflora</i>	Gallant soldier

There was at least one demonstration site per municipal zone. Initially, the project established eight demonstration sites, including clinics, crèches, schools and community gardens.

At these demonstration sites, community involvement was encouraged through approximately 50 short workshops and one-day demonstrations held over the course of the project. These

activities proved popular, as facilitators invited community leaders and members, mass media, farmers and youth groups. Traditional food preparation demonstrations were held, and traditional dishes were served. One site even started selling traditional plants. At all times, attempts were made to reduce the stigma attached to traditional plants as “inferior” or “poor people’s plants”. This was mainly achieved through assisting with the compilation of a nutritional poster series. Amongst these, a wild food poster was created where local television and sports celebrities were depicted enthusiastically holding up and endorsing traditional vegetables. Lastly, four nurseries were also established at the project outset for seed and seedling supplies.

All these activities built project momentum, and demonstrators were steadily invited into other community gardens to share African Roots cultivation techniques. By November 2005, thirty-one sites had received training and established pilot gardens.

Lessons and limitations

The project met with many successes at a local level. It succeeded in raising awareness about local indigenous and traditional crops, and promoting skills in organic and food garden techniques. Many local food gardens were established, and community nutrition, skills and overall food security were strengthened. The project received some noteworthy attention in the local press, which succeeded in raising awareness of the benefits of “eating weeds”. Members of the advisory committee were also instrumental in helping the community to set up a farmers’ organisation and tap into new commercial markets. Among the results of this collaboration was the formation of a community-based farmers’ organisation, and an improvement in the amount of food available to the community itself.

Due to the nature of local subsistence agricultural efforts in the area, most of the active work done in African Roots was at the level of community gardens. However, individual members participating in workshops were encouraged to take the ethos and methods home. As most home gardeners have limited labour and money, the African Roots approach clearly has many advantages for individual farmers.

The mainstreaming of traditional foods into existing agricultural projects was not, however, without its challenges. As a case study, African Roots provides useful insights into the challenges of working in food security in the context of HIV/AIDS. At the project outset it was hoped to be true to the idea of “African Roots”, in that indigenous plants historically grown in the region by the indigenous peoples might be re-introduced, to complement other vegetables grown. However, these efforts to improve biodiversity and use less invasive, more traditional indigenous and medicinal foods met with only marginal success. Community seed banks were not always enthusiastically supported by some community members, who did not see the potential of more obscure traditional plants. These traditional plants were also difficult to source; initial seed stock was hard to find, seed collection and storage of mature specimens was difficult. Moreover, there was considerable stigma associated with the cultivation of traditional foods, which were seen as “poor people’s foods” and for the most part “non-progressive”. Many of the demonstration sites resisted using traditional seed preparations, and chose exotic vegetable varieties instead. As a result, the “traditional plants” referred to by African Roots were often non-indigenous species such as amaranthus varieties indigenous to West Africa, and invasive *Asteraceae* such as *Bidens pilosa*. Overall, these varieties were still considered “traditional”, but were certainly not rare or indigenous species.

"Imifino – food for the people!"

At Mafakathini Clinic in Vulindlela, a rural part of the KwaZulu-Natal midlands region in Msunduzi district, a demonstration plot overflows with a variety of edible greens. In February 2005, despite great scepticism from participants, clinic staff and the surrounding community in general, African Roots co-ordinator B.J. Njokwe assisted a group of women from the clinic to plant seeds of amaranthus and wild mustard. When they were able to start harvesting leaves three weeks later, the proud women became enthusiastic champions of the African Roots project. The women expressed great delight that, unlike a cabbage, which is picked only once, these plants keep on giving. Apart from incorporating these plants into their daily diet at home, the women sell bunches of mixed leaves for 2,50 rand (appr. US\$ 0.30) a bunch. African Roots facilitators emphasised the importance of eating a variety of leaves from different plants, in order to include a wide range of micronutrients in the diet. The self-sown gallant soldier plants which sprang up among the amaranthus and wild mustard were allowed to remain – for their nutritional value, but also to covering the ground, preventing water evaporation from the soil by directing soil moisture to leaves and carrying nutrients through the plants instead. Sister V.T. Ndlovu is thankful they had the demonstration plots at the clinic, as she is now able to show clients that conventional vegetables are not the only source of nutrients, and that *imifino* (wild edible plants) are easy to grow. Equally inspired by the success of the demonstration plot, traditional leader Induna Mayisela pledged to make a much larger space available for *imifino* to be grown as crops.

Combining exotic vegetable crops conventionally grown within the region – mainly maize, cabbage, Swiss chard, carrot, beetroot, onion, kale, tomato, potato, green pepper, chillies, peas, green beans and turnip – with these so called "traditional plants" was not always an easy and smooth partnership. Trenched plots used both traditional and exotic crops, and there was at times a conflict between traditional and exotic crop preparations and timing. The project co-ordinators found that sowing traditional seeds in trays did not have good germination rates, but relying on self-seeding was too erratic for most farmers.

Due to the restrictions HIV/AIDS puts on household labour, African Roots was originally conceived as a low-input agricultural project. Traditional plants are hardy, locally acclimatised, non-demanding crops. They can be cultivated using low-labour intercropping techniques. With hindsight, however, perhaps more could have been done to capitalise on the natural appeal a low-input agricultural project should hold to those constrained by HIV/AIDS. Organisations such as FAO, for example, have recommended the use of "labour saving devices" for those afflicted by HIV/AIDS. No attempt was made to incorporate these practices or investigate them further. Additionally, all emphasis was on traditional crops, and no attempt was made to influence the choice of exotic vegetables cultivated. Promoting a switch to crop varieties requiring lower labour, but yielding higher nutrients, would have been a strategic move – such as switching from potato to orange-fleshed sweet potato. Although these types of crop improvements are implicit in many of the nutritional programmes of the partner NGOs in the region, the benefits of such improvements to people living with HIV/AIDS was not always made explicit in the African Roots demonstration sites.

Despite the problems faced, what the African Roots project did show is that people were enthused and liberated by the idea of "going back to their roots" as a way of dealing with HIV and AIDS. Amongst many of the rural community members, there was the perception that AIDS is rampant in the community due to a breakdown of traditional norms and values. This makes agricultural approaches that emphasise traditional practices and knowledge a welcome idea that resonates appropriately with

the cultural context. African Roots' strength comes from its recognition that disease and food security are not just bio-physical phenomena. Community health requires a culture-building approach, to combat a disease that is extremely culture-eroding.

Due to these important features, the African Roots project has recently been taken to another level with new funding from the National Development Association and the Lima Rural Development Foundation, which is building capacity in 10 CINDI members with good food gardening practices incorporating wild edible plants. The project continues to develop its unique approach to using agriculture to approach a health problem like AIDS.

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The revival of an ancient crop

Joshua Spetter and Lisa Thompson

When the Spanish *conquistadores* reached Mexico, almost 500 years ago, they were very impressed by the size of the Aztec capital, its buildings and its infrastructure, and also by its people, their ceremonies and traditions. They were particularly impressed by the diversity of crops grown and which were part of their diet, and by the special relationship which the population had with their environment. The Aztecs revered the animals they hunted, they worshipped the sun and the moon, and they honoured their rain god, *Tlaloc*. This followed a special ceremony which included creating idols made of amaranth paste and eating them, literally becoming one with the god who made things grow.

Amaranth was not only valued as a medium for sculpting figures of the gods. Rulers and high priests were offered tons upon tons of amaranth seed in tribute every year. Warriors were given regimens complemented with amaranth to help increase their strength and endurance. The use of the amaranth seed, both to appease their deities, honour their rulers, and empower their warriors reflected the cultural significance of the grain to the Aztec people. Recognising the importance of amaranth in the daily life of the Aztecs, the *conquistadores* ordered the idols destroyed, the fields burned and the punishment of death upon those who dared to cultivate or eat the “pagan” grain. Not surprisingly, the production and consumption of amaranth declined drastically, gradually being forgotten by most of the population in Mexico. Fortunately, this crop is recently making a comeback, becoming more and more popular around the world due to its exceptional nutritional value, and its ability to grow easily in hot, semi-arid climates. Today more the 60 varieties are cultivated in Asia, Australia, India, North America, South America, Europe, and Africa, and its consumption is being encouraged.

Growing amaranth in Oaxaca

In contrast to five centuries ago, the population of many rural areas in Mexico today survive on a very limited diet, based primarily on corn. The lack of diversity leads to a deficiency of many amino acids and other essential nutrients. Protein malnutrition is common and severe, leading to stunted growth, development, and learning potential. Because of the high demand for energy and essential nutrients from a growing body, infants and children are at a higher risk of malnutrition. The main problem is that the effects of malnutrition are not only severe but also irreversible, often perpetuating the vicious cycle of poverty.

Malnutrition is common in Oaxaca, a state in southern Mexico with a population of approximately 3.3 million. According to the National Nutrition Survey of Rural Mexico, 31.3 percent of the Oaxaca children under five are mildly malnourished, 18.7 percent are moderately malnourished, and 4.6 percent are severely malnourished. In general terms, Oaxaca is the second poorest state in Mexico. Most families in Oaxaca have between one and five hectares of land and mainly grow corn, beans and squash for self consumption. Yields are low, and soil erosion has drastically increased, forcing many farmers to leave agriculture. The average daily income is less than half the Mexican average, and the illiteracy rate more than doubles the

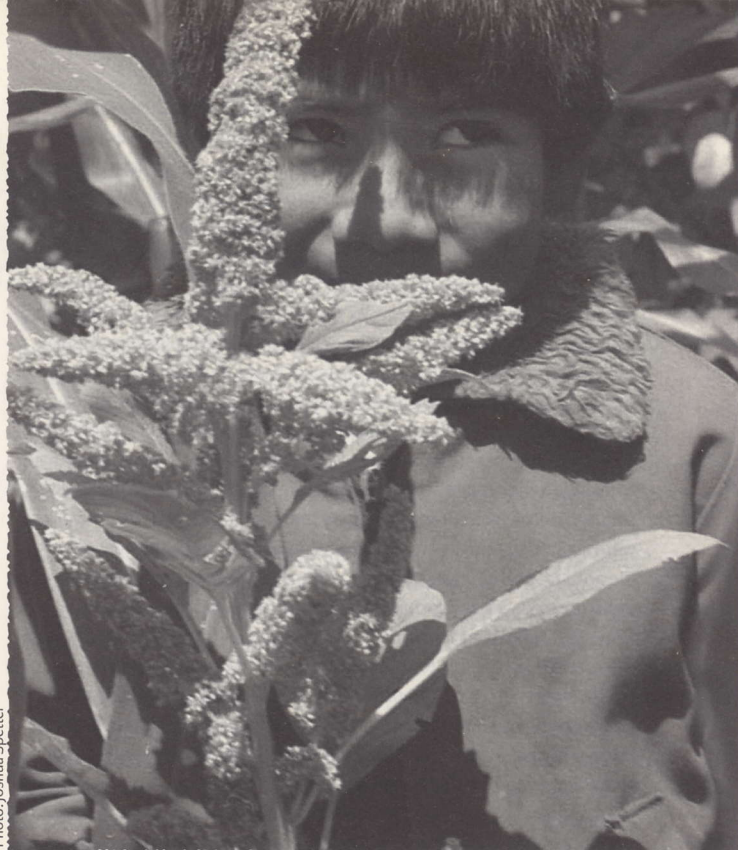


Photo: Joshua Spetter

A drought- and pest-resistant crop, amaranth is an excellent source of protein, iron, calcium, fibre and folate.

average for the rest of the country. As a result, migration has been high during the last decades, leaving a disproportionate number of women and children in rural villages.

Farmers are not familiar with the diverse diet of their ancestors. Some blame the local government and the extension services for not having promoted other crops and for the difficult situation in which agriculture is found (erosion, limited irrigation facilities, lack of markets). But farmers also acknowledge some agronomic difficulties in producing crops such as amaranth, as these can be very time intensive: weeding needs to be done carefully and, being the seeds very small, the harvesting period is short – if you miss it, the seeds fall, leading to a very low harvest. However, amaranth has many advantages: it is a drought-, disease- and pest-resistant crop, with the earliest maturity period among cereals. More important, amaranth is an excellent source of protein, iron, calcium, fibre and folate. Its leaves are consumed as vegetables, while the seed is milled into flour. Both the leaves and the popped seeds can be added to many traditional Mexican dishes without difficulty and without an adverse effect on the flavour of those dishes. A small fistful of popped amaranth seeds every day can prevent stunting, diarrhoea, and other consequences of malnutrition in children under five years of age.

Puente and its programmes

Puente a la Salud Comunitaria (Bridge to Community Health) is a non-governmental organisation operating in Oaxaca. *Puente* is dedicated to raising awareness among the local population about the causes and effects of malnutrition and promoting amaranth as a culturally significant, highly nutritious, and potentially income-generating alternative for crop diversification and food security.

Puente's “Training Farmers” project promotes the cultivation of amaranth as an economically viable alternative. Because of increasing demand, the market value of raw amaranth seed is about 12 pesos per kilo (approx. US\$ 1). A farmer can expect to yield between 1000 and 2000 kilos of amaranth seed per

hectare, so its production can greatly contribute to income generation. But *Puente* does not promote a monocrop, nor aims to replace other crops. Their main objective is to diversify production. Francisco Ramirez Pacheco, for example, attended the first of four Training Farmers workshops in April 2007, in which he learned about the benefits of crop diversification and inter-cropping (pest control, soil fertility, weed control, etc.) and how to plant amaranth. He has planted amaranth with corn, broad beans and potatoes on his farm in La Brujería, in the district of Zaachila. He has applied compost and is thinking of growing green manures. As a result, the difference in the growth and development of his crops and that of the crops of some of his neighbours is notable. Francisco is now convinced that he will have a substantial amaranth harvest.

This year, *Puente* is working directly with more than 100 Oaxacan producers who volunteered for the "Training Farmers" project. Each producer agreed to plant 1/8 hectare of amaranth seed and to attend capacity-building workshops that cover everything from plot selection and soil preparation to harvesting techniques and seed storage. *Puente's* four intense workshops integrate sustainable farming practices with amaranth production for food security and income generation. The workshops are reinforced by one-on-one discussions with the farmers in their amaranth fields. Agricultural extensionists diffuse information that the producers can apply to all of their crops, not just their amaranth plots. Farmers receive hands-on training in inter-cropping, composting, crop rotation, and ecological pest control. As part of the agreement with the producers, *Puente* will serve as a bridge between them and the lone amaranth processing factory in the state of Oaxaca, operated by another non-governmental agency. Farmers will also receive important information about alternative markets should they choose to look elsewhere to sell their harvests.

But *Puente's* activities aim to go beyond agricultural production. Its flagship project is "Healthy Families", through which they work with 1500 women in twenty communities in this region, teaching them about basic nutrition principles and demonstrating how to cultivate and cook with amaranth. Work is carried out in the communities in co-ordination with the local health centre where the workshops take place. Women learn about the benefits of amaranth and how to integrate it into their everyday routines of preparing food for the family. *Puente's* Health Educator, Hitzel Quero, has facilitated many workshops with the producers where they learn to integrate amaranth leaves and seeds into the dishes they prepare every day. For example, *atole* is a corn or oat-based porridge usually drunk in the morning to which popped amaranth seed can easily be added, greatly increasing its nutritional value. Similarly, fresh fruit juices are prepared by adding fresh amaranth leaves, again, adding greatly to the drink's nutritional value. *Puente* also shows families how to add amaranth seed and leaves to the staple of their diet, corn tortillas. The leaves can be diced and added to the tortilla dough along with popped amaranth seed and/or amaranth flour. Many soups are prepared with amaranth leaves as well, and people really enjoy the flavour. When amaranth is added to another cereal or grain, as in the *atole* and tortillas, a complete protein is formed that otherwise would only be consumed through eggs, beef, or other animal products. Project beneficiaries have reacted with much excitement and interest and are very eager to learn how to integrate their new crop into their diets. The cooking demonstrations are very participative, with the producers splitting up into groups to make different recipes and then sharing as a group how each recipe was prepared. Through the production and consumption of amaranth, the diet, and subsequently the health, of each family will improve.

Interaction and integrated programming at Puente

The "Training Farmers" project aims to promote the cultivation of amaranth as a very marketable cash crop. More importantly it aims to reinforce the "Healthy Families" project, promoting the cultivation of amaranth as an excellent foodstuff with a vital role to play in combating malnutrition. *Puente a la Salud Comunitaria* blurs the line between rural health and agricultural development through an integrated programme of nutrition education, cooking demonstrations, crop diversification, and soil conservation. The Aztecs prayed to the rain god *Tlaloc* to make things grow and ate amaranth idols made in his image. Today, it is learning about, cooking with, and cultivating that very grain that empowers Mexican farm families to take their well-being into their own hands.

Fertile soil is the lifeline to a community's well-being. Sustained, diversified production leads to food security and a balanced diet. From an integrated programming perspective, it is very natural for a rural health education project, focused on nutrition, and a crop diversification/soil conservation project to function simultaneously in a community. As *Puente* is a relatively new,



Photo: Joshua Spetter

The agronomist helps the health educators when they give workshops about amaranth cultivation, and the health educators help the agronomist give cooking classes and nutritional information to the farm families.

small organisation, we are looking for ways to optimise our available resources to have the greatest impact in each and every community. Our Community Health Educators (CHEs) and our agronomist travel together to communities. The agronomist helps the CHEs when they give workshops about amaranth cultivation in family gardens, and the CHEs help the agronomist give cooking classes and nutritional information to the farm families. In the long term, for amaranth to really become a part of the daily diet again, we found that it needs to be regarded as one of the crops traditionally cultivated for consumption. It will be interesting to see how this relationship between the two projects continues to grow and move forward.

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Seeking sustainable health improvements using orange-fleshed sweet potato

Jan W. Low, Mary Arimond, Nadia Osman, Benedito Cunguara, Filipe Zano, and David Tschirley

Vitamin A is one of the critical micronutrients needed by all human beings. Vitamin A deficiency limits the ability of the body to defend itself against disease in about 40 percent of children under five years of age in the developing world. Consumption of this essential nutrient is extremely low in many parts of sub-Saharan Africa. In Mozambique, vitamin A deficiency affects more than 70 percent of children under five years of age. This is being tackled in many different ways. Most strategies focus on young children, because achieving adequate vitamin A status has been shown to reduce child mortality. The three most common methods are administering vitamin A capsules every 6 months (supplementation), adding vitamin A to another food such as sugar (fortification), and increasing the consumption of vitamin A-rich foods (food-based approaches). Poor people in rural areas often have limited access to health services and limited amounts of money to spend on food. Easy to produce, vitamin A rich foods could therefore have an important role in improving human health in such settings.

In the past 15 years, the potential of “biofortified” staple crops—varieties bred for increased vitamin or mineral content—has been increasingly recognised. Orange-fleshed sweet potato (OFSP) is particularly promising because its levels of pro-vitamin A carotenoids are high and can easily be absorbed by the body. Sweet potato is considered an excellent food security crop in sub-Saharan Africa because it often survives when other crops (for example, maize) fail. It is also less labour intensive than most other staple crops, is produced using vines instead of seeds, and can be planted over a broad range of time without considerable yield loss. But most varieties in Africa are white-fleshed, lacking in beta-carotene, the precursor of vitamin A. The introduction of OFSP is simplified as knowledge of sweet potato production already exists.

The interest in OFSP in Mozambique came about due to local demand for drought-tolerant crops to address the serious food insecurity problem. In addition, the Ministry of Health considered that it would be better to address the underlying cause of inadequate food intake (both in terms of quality and quantity), rather than distributing capsules every 6 months. In late 2002, the Towards Sustainable Nutrition Improvement Project was launched to explore whether an integrated agriculture-nutrition project could result in improved vitamin A intake among children under five years of age living in drought-prone areas of Zambézia province, Mozambique. The area is characterised by high levels of young child malnutrition, a monotonous diet with cassava as the primary staple, and a very poor resource base. The two and a half year action research project was a joint effort of research institutions (Michigan State University, the National Institute of Agronomic Research of Mozambique, the Southern African Root Crops Research Network) and development agents (the Ministry of Health, World Vision, Helen Keller International).

The integrated approach

This project sought to develop a strategy that would sustainably increase young child intake of vitamin A and energy, and potentially other nutrients as well. OFSP was not seen as

a “magic bullet” but as a nutrient-rich resource that poor households can easily exploit. OFSP provided an entry point for change agents to empower mothers to change how they feed their young children and prepare food for the family as a whole. There were three parts to the approach:

- 1) Introduction of a new source of vitamin A and energy. Farmers received planting material of high-yielding OFSP varieties and were directly involved in their evaluation. Improved agronomic and storage techniques were promoted to maximise the availability of OFSP in the diet throughout the year.
- 2) Demand creation and empowerment through knowledge. At the village level, principal child caregivers participated in interactive group learning sessions, which encouraged and enabled them to improve infant and young child feeding practices, hygiene practices, and to diversify the household diet. Radio and community theatre were used to build awareness among the broader community to create demand for the new OFSP cultivars and products made with OFSP, and to create demand for other vitamin A-rich foods. Raised awareness also promoted a supportive environment to speed up changes in practices within the household.
- 3) Market development for OFSP roots and processed products. This component linked farmers to traders and informed consumers about where they can purchase OFSP. Farmers knowing to whom or where they can sell their crop are more likely to expand area under production. Thus, generated demand combined with market development stimulated production, enhanced producer income and spread the health benefits of OFSP to a wider population, all of which would contribute to farmers’ willingness to retain OFSP and expand production. Earned cash could be spent on foods to improve diet quality or increase use of health services. Demand for OFSP was expected to grow if profitable processed products using OFSP as a major ingredient were developed.

The project aimed to work with families with children in the target age range, and also primarily with women farmers. Approximately 1000 farmers, belonging to 53 farmers groups, participated in the project, 70 percent of whom were women. Both men and women were encouraged to participate in nutrition extension activities, which covered a range of topics including breastfeeding, hygiene, signs and consequences of malnutrition, and what foods, when, and how to feed infants and young children. Farmers received free OFSP vines via farmers’ groups, and were introduced to improved agronomic practices. These included appropriate size and number of vines to plant and their spacing (farmers planted using their methods next to a test method of planting). The life cycle of the sweet potato weevil and how to control it—hilling up soil—was also studied, as were proper harvesting techniques to improve root quality and storability, vine conservation techniques, and improved local drying techniques to ensure adequate beta-carotene retention.

Village-based extension personnel from World Vision Mozambique supported production, storage, processing, commercialisation, and demand creation activities. World Vision had worked in project areas before, which facilitated implementation. These communities receive little government service support beyond emergency food distributions when there is a disaster, so were enthusiastic about the project.

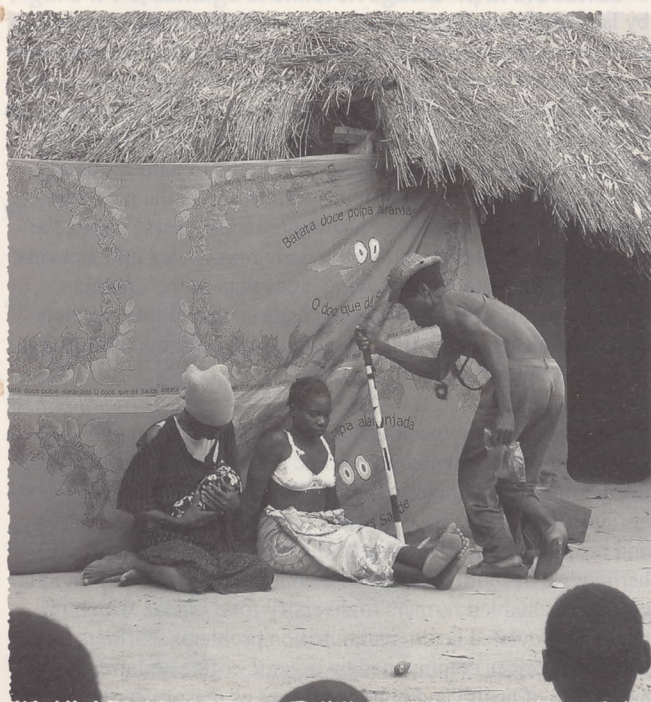
The slogan *O doce que dá saúde* ("The sweet that gives health") was used in all campaigns to link OFSP to better health in people's minds. A grading and pricing scheme was developed in partnership with a trader to reward producing high quality sweet potato roots and ensure that some roots were retained for home consumption. A marketing stall decorated with messages promoting consumption of vitamin A-rich foods was another innovation used to combine demand creation and market development. Several processed products were developed and two, golden bread and doughnuts, marketed.

Key outcomes

Around 70 percent of farmers were producing white-fleshed sweet potato, and so were familiar with sweet potato production. By the end of project, 90 percent of participating households produced OFSP and a third of them sold OFSP. Most farmers did not drop the white-fleshed varieties, but added OFSP to their system.

The average sweet potato plot size increased more than 10 times. Agronomic performance of OFSP was similar to white-fleshed local varieties, and young children in particular loved the taste of the new varieties. Most important, vitamin A intakes among young children in participating households were 8 times higher than in non-participating households. Intakes of energy and several other nutrients were also slightly higher. The frequency of OFSP consumption among children was similar to the pattern found for adults: 2-3 times per week when in season; an average of 314 g eaten on days consumed. In addition to OFSP, families also increased their consumption of papaya and dark green leaves – two other easy-to-grow sources of vitamin A.

The timely availability of vines at planting time and the conservation of vines for the next season emerged as key factors driving the amount of OFSP produced in areas which have a risk of drought. The two most common methods of vine retention by farmers during dry season are planting in valley bottoms using their residual moisture to sustain the vines, and leaving some roots in the ground to re-sprout when the next rains come.



Community theatre can be an effective way of spreading a message – community members gave performances in all participating villages to promote OFSP.

The common practice of free vine distribution may actually discourage farmer investment in vine conservation. Sustained access can only be assured if vine conservation and multiplication systems are improved in drought-prone areas. Consideration should be given to selling vines and improving water control for vine preservation during the dry season using treadle pumps. Pilot experiences in the second year introducing manually operated treadle pumps to support vine multiplication were promising. Willingness to pay for vines exists, but this is likely to occur only if markets for roots are well developed.

The principal use of OFSP was for home consumption. OFSP commercialisation significantly increased where access to markets was greater. The ability to produce a surplus which can be commercialised is difficult in drought-prone environments. Areas with high agro-ecological potential and/or areas within 10 kms of a major road are more likely to produce OFSP for sale. Children's intake of vitamin A increased with increased commercialisation of OFSP. Extension agents also reported that farmers were willing to invest more labour in improved practices as they knew that they could get a good price for the product.

The most popular and profitable OFSP-based product proved to be *golden bread*, in which 38 percent of wheat flour is substituted with boiled and mashed OFSP. Consumers preferred golden bread to white bread because of its heavier texture and golden color. Laboratory analysis found that medium-dark OFSP varieties produce bread that is a good source of vitamin A. Processed product markets provide an outlet for roots produced by rural farmers; the latter are unlikely to become processors themselves. Training efforts on processed products should concentrate on existing bakers and other product producers.

Future considerations

The Mozambican experience shows that OFSP will not be rejected because of its colour when introduction is accompanied by a well-designed demand creation campaign. The intervention package used in this project was intensive. Beginning in 2006, a follow-up action-research project began in Mozambique and Uganda to identify and document similar OFSP-based interventions that can achieve public health impacts in a larger population at a lower cost per beneficiary, through use of community volunteers to spread extension messages more widely.

As sweet potato is produced in a wide range of agro-ecologies throughout sub-Saharan Africa, the potential for widespread impact is significant, given that most young children like the taste of OFSP and, when it is available, consume significant quantities. Areas having two rainy seasons per year or good access to lowland areas during the dry season will find it much easier to maintain planting material than drought-prone areas similar to those in Central Mozambique. Interest in OFSP is spreading. The "Eat Orange" revolution has begun.

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Child nutrition in Mexico under conventional and organic agriculture

Adriana Ríos, Héctor Javier Sánchez-Pérez and Jon Hellin

The La Frailesca region is part of the southern Mexican state of Chiapas, with altitudes between 600 m and 2000 m. Maize is the dominant crop; farmers in the valley also grow vegetables and keep cattle, while those in the highlands grow coffee. Farming activities in Chiapas are both subsistence- and market-oriented, and the region has received strong support from the local and the federal government, particularly for agricultural development (this includes support for the maize sector and also encouraging farmers to diversify into other crops). Partly as a result of this support, levels of poverty in La Frailesca are lower than in other parts of Chiapas, although enormous social inequalities remain.

wished to secure higher coffee prices by reaching niche organic markets in the developed world.

Based on qualitative and quantitative work, we looked at how this switch to organic production has impacted on health and child nutrition. We also looked at the reasons behind farmers' decisions to make the switch in this high-altitude region. We compared the health of 8-14 year olds in the organic coffee region with those in a more highly-intensive tomato-growing area where farmers use large amounts of agricultural chemicals.

Nutritional status of 8-14 year olds

The health and nutritional condition of children aged 8-14 in the coffee-growing region was evaluated and compared to similar-aged children in the tomato-growing areas. Three variables were tested:

- Actual state of nutrition measured by body mass index;
- Severity of anaemia (determined from blood samples); and
- Past state of nutrition or chronic malnutrition assessed by measuring "stunting" (height-for-age index).

A large number of children were assessed for all three variables: 95 in the tomato-growing areas and 62 in the organic coffee zones. In addition, through focus group meetings and semi-structured interviews with coffee and tomato producers, the team was able to explore farmers' perceptions and understandings of changes in health and nutrition over the last five to eight years.

Figure 1 summaries some of the results found. We saw that levels of chronic malnutrition are significantly higher in the organic coffee areas than in the tomato-growing area, but levels of anaemia (a common nutritional condition usually caused by lack of iron in the diet) are lower, as well as the number of children with below normal body mass index. This suggests that 8-14 year old children in the coffee areas suffered from chronic malnutrition in their early years, but that more recently there has been an improvement in their nutritional state. In contrast, the results suggest that 8-14 year olds in the tomato growing area did not suffer from chronic malnutrition in the past, but their diets have become less healthy in recent years. Today, the proportion of children with a low body mass index and anaemia are higher in the tomato-growing areas than in the organic coffee-growing areas. This again suggests that children's diets in the tomato-growing area have got worse in terms of nutrition in the last few years.

During focus group meetings, organic coffee producers confirmed that the switch to organic coffee has had a beneficial impact on farmers' health. Firstly, by changing to organic agriculture, farmers have become more aware of health issues and health risks associated with the use of pesticides and herbicides. Secondly, increased income from the sale of organic coffee has enabled farmers to diversify food intake, which in turn has alleviated health and nutrition problems. Farmers cited the higher prices commanded by organic coffee and greater awareness of health and nutrition issues as reasons for being able to purchase other foods and improve their diets. Farmers also pointed out that the period of chronic malnutrition of the children included in the sample coincided with the period when



Photo: Adriana Ríos

Taking a blood sample to measure haemoglobin levels in the children of tomato producers.

Switching to organic coffee production

Farmers in La Frailesca began growing coffee at the end of the nineteenth century. Over the following decades, the production process was driven by technological changes, including the use of pesticides. In 1990, Mexico's *Instituto de Historia Natural y Ecología* (INHE) declared parts of the higher altitude levels of La Frailesca as a protected natural area. In the mid-1990s, INHE identified coffee-growing areas outside the protected area, but within the same watershed, as a source of chemical pollution. Subsequently, at the end of the 1990s, Conservation International, an international NGO, joined forces with *El Colegio de la Frontera Sur* (a local research centre) to work with coffee producers to switch to organic production.

The team established Farmer Field Schools, modifying the FFS format to help farmers learn about market demand and product requirements. Extension agents assisted coffee producers to make the changes, notably by providing technical advice, assistance in organising and the establishment of links to the buyers of organic coffee. Farmers' motivation to participate was largely economic rather than driven by health concerns: farmers

Silmar and Higinia Velasco

Silmar Velasco lives with his wife, Higinia, and their four children in the village of Plan de la Libertad. In the past he grew maize, beans and conventional coffee. He now receives higher prices for his organic coffee and has been able to invest in improving his house (e.g. putting in a concrete floor). Some of the improvements have been funded through a credit scheme established by the organic producers' organisation that he is a member of. Silmar also says that through the local coffee-growers organisations he has forged contacts with other coffee growers and is learning more about "the wider world".

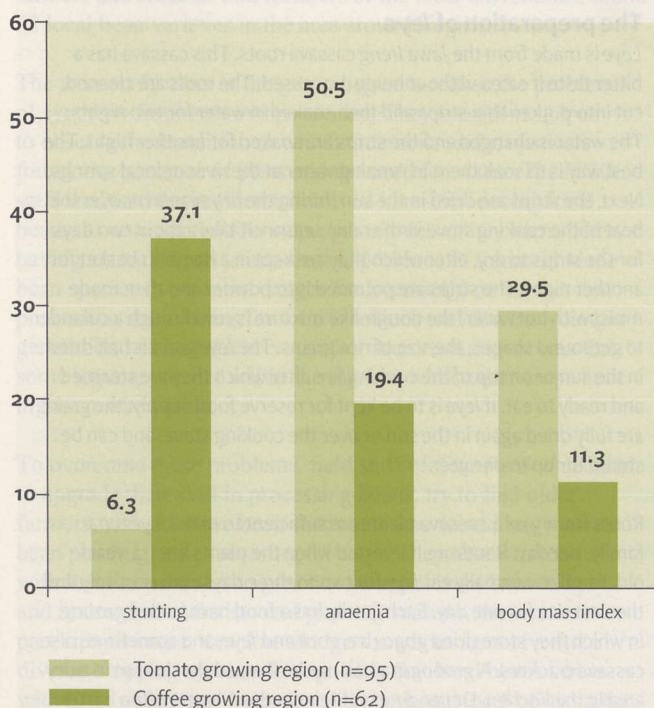
Higinia reports that as soon as her husband started growing and selling organic coffee, she was able to buy food that they had very rarely eaten before. The village is isolated and is only served by a poor road system. In the past she was seldom able to buy cheese and milk, and certainly couldn't store them for any period of time. With a fridge she can now preserve the products for a longer period and her children have a much more varied diet. Higinia comments that if her children want a snack during the day they now have a natural fruit drink, a banana, an egg (all local ingredients) and peanuts that she buys from the market. This contrasts with the snacks that the children in the tomato growing area tend to consume: ice cream and pieces of pork crackling (a popular food in Mexico).

Silmar and Higinia want to share their experience with other farmers and to stress that their involvement in organic agriculture has not only been good for the environment, but it has also enabled them to make positive changes in their lifestyle.

they still produced conventional coffee, and when poverty levels were higher due to the low price paid for their coffee.

Furthermore, coffee producers pointed out that their communities are so isolated compared to villages in the valley that they depend more on home-grown produce than on purchased

Figure 1. Percentage of children aged 8-14 in the coffee-growing region and tomato-growing region suffering from stunting, anaemia and low body mass index



processed foods. They suggested that this also contributes to the low levels of malnutrition now found in the area: many coffee producers have back-yard poultry and grow small amounts of vegetables for local consumption.

The situation among the coffee producers contrasts with the more intensive tomato production in the valleys, where health and nutrition problems are increasing even though farmers are wealthier than in the coffee areas. Children in the tomato-growing areas show low levels of stunting (indicating low levels of chronic malnutrition in the past). However, the data on anaemia and body mass index suggest that their diet is contributing to increasingly poor nutritional levels.

Tomato producers explained that the hot and humid conditions favour pest and disease problems, and that the application of pesticides is the only way to ensure production. They reported that tomatoes are a lucrative crop, and that being close to urban centres and a good road network, they are able to sell their produce in nearby vegetable markets. They subsequently tend to purchase processed food items. High levels of anaemia and low body mass index amongst 8-14 year olds in the tomato-growing areas, however, indicate that their diet is not very nutritious.

Economic versus health concerns

The study of organic coffee production suggests that low external input and sustainable agriculture can contribute to the alleviation of nutritional problems, disease and health related issues, even if the motivation to switch to organic production may be driven by economic rather than health concerns. In the case of La Frailesca, the beneficial health impacts were the indirect consequences of a switch to organic agriculture, a change brought about by the economic benefits from selling organic as opposed to conventional coffee.

This work also shows that those with more income do not necessarily consume more nutritious foods. Tomato producers in the valley use large amounts of pesticides and are able to access relatively lucrative vegetable markets. They use the income from the sale of their crop to purchase other food items. In contrast, organic coffee is produced in much more geographically-isolated areas and producers are much more dependent on home-produced foods such as vegetables and back-yard chickens, which arguably provide a more nutritious and healthy diet.

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Beating malnutrition with local crops and local food systems

Hira Jhamtani, Purnomosidi and Putu Anggia Jenny

As part of the Green Revolution, many villagers throughout Indonesia were encouraged to convert their lands into monoculture rice. Rice production was strongly promoted, leading to impressive results on a national scale. Its consumption has also been encouraged as part of various governmental programmes to tackle malnutrition. Many villagers were introduced to the white, polished grains of different high-yielding rice varieties in 1994 when the national government provided them as part of its "Pre-Welfare Family Programme". This was then replaced by the "Rice for the Poor" programme, through which the government decided to provide subsidised rice to poor families following the economic crisis of 1997-1998. Today, a poor family is entitled to buy 20 kg of rice per month, at Rp. 1000/kg, which means each family would spend Rp. 20 000 per month (approximately US\$ 2.20).

In Giyombong, however, many families prefer not to buy rice but to feed themselves from their land. This is a village in the district of Bruno, in central Java, approximately 65 km west of the city of Yogyakarta. Villagers prefer not to take advantage of the "Rice for the Poor" programme as food habits in Giyombong are different to those in the majority of the Javanese communities. For generations, *leye*, or processed cassava, has been the main staple food, and rice is only eaten during festivals, or served when guests arrive. "If I eat polished white rice for breakfast, I get hungry again by 11 a.m.", says Pak Cipto, a villager. "But if I eat *leye*, I can work in my field until 1 p.m. with a full stomach".

Leye and food self-sufficiency

Giyombong is an excellent example of a community that is self-sufficient in food, thanks to a diversified production system. Local production and consumption relies on local resources, and is not dominated by rice. Villagers plant four varieties of cassava, locally known as *Palengka*, *Randu*, *Lanteng* and *Tela Pait* or *Jawa Ireng*. These are planted all over their lands, in rotation with dryland paddy (*gogo* rice) in the rainy season, and in combination with vegetables and other root crops such as sweet potato, ginger and taro during other seasons. Cassava is planted on almost one quarter of the land owned by each family, and is harvested as and when needed.

Crop rotation is managed in such a way that there is always production when a family needs food or money. Farmers plant perennial and/or annual crops at the beginning of the rainy season (ginger, vegetables and *gogo* rice), after which they grow cassava. In the next season, the cassava can be harvested and the fields replanted with vegetable crops. *Gogo* rice is planted in areas where some trees are grown (making sure that enough sunlight reaches the rice plants), or in combination with cassava crops. Rice is planted at the beginning of the rainy season and harvested after 7 months.

Eating *leye* began during the colonial era as a strategy to survive the forced cultivation policy forced by the Dutch colonial masters on villagers. Each family was obliged to plant crops for export on 2/3 of their lands for the benefit of the colonial rulers. Thus food crops could be planted only on 1/3 of the land of each farmer family. In Giyombong, farmers made sure they had enough

to eat by cultivating rice, cassava and vegetable crops on the limited land. They soon found out that cassava made into *leye* can be a rich source of carbohydrate, and that it can be stored as a guarantee against harvest failures.

The main difference with many other villages has been, however, that the government's irrigation and improved agriculture programmes did not reach Giyombong – probably as a result of its isolated location, and to the general difficulties to reach it (a good access road was only finished in 2002). Not being reached by the conventional development programmes explains the villagers' efforts to achieve food sufficiency. The integrated farming system, the local production of cassava and the technology to process *leye*, and the fact that *gogo* rice is kept in the barn and not sold, all guaranteed local food sufficiency in Giyombong. Villagers say that they faced food shortages during the 1960s, when wild boars destroyed their cassava crops, but since then they have always had food.

Improving the local diet

Improving the nutritional status of the population is the objective of both governmental and NGO programmes. But rather than encouraging the consumption of one crop, promoting a diverse local food supply, accessible to poor households, has proven to be a simple and successful way to tackle malnutrition. The diversity of crops in organic fields, coupled with rotation crops of minor economic value but high micronutrient and protein content, can easily enrich household diets and health. Many sustainable agriculture interventions use underutilised seeds and breeds for their better resistance to pest, diseases and climatic stress. The re-introduction, selection and improvement of locally-adapted varieties makes an invaluable contribution to solving micronutrient deficiencies.

The preparation of leye

Leye is made from the *Jawa Ireng* cassava roots. This cassava has a bitter taste if eaten without being processed. The roots are cleaned, cut into 0.5 cm thin strips and then soaked in water for two nights. The water is changed and the strips are soaked for another night. The best way is to soak them in running water at the river or local springs. Next, the strips are dried in the sun during the dry season or over the heat of the cooking stove in the rainy season. It takes about two days for the strips to dry, after which they are kept in a bamboo basket for another night. The strips are pounded into powder and then made moist with hot water; the dough-like mixture is run through a colander to get round shapes, the size of rice grains. The *leye* grain is half dried in the sun or on top of the cooking fire after which they are steamed and ready to eat. If *leye* is to be kept for reserve food supply, the grains are fully dried again in the sun or over the cooking stove, and can be stored for up to one year.

Roots from 3 or 4 cassava plants are sufficient to make *leye* for a family, per day. Roots are harvested when the plants are 1-2 years old. Families normally eat *leye* for two to three days consecutively and then eat rice for one day. Each family has a food barn, called *grobog*, in which they store dried *gogo* rice, corn and *leye*, and sometimes also cassava crackers. A *grobog* is a box made of wood that is kept in a dry area in the kitchen. Depending on their needs, villagers often barter *leye* with *gogo* rice between each other: two kilograms of *leye* are exchanged with one kg of rice.



Sorting and cleaning beans in Solo.

Such an approach was used by *Gita Pertiwi*, an NGO based in Solo (Central Java) to reintroduce underutilised local beans in the village of Tegiri, and thus diversify production and consumption. Since the 1980s, the Green Revolution approaches introduced by the government changed the integrated, organic agriculture system which was prevalent in this village. Farmers became dependent on high yielding varieties, pesticides and synthetic fertilizers, all of which, in the long term, damaged the soil and decreased productivity. With the monoculture system, farmers cultivated less and less beans or other crops, concentrating only on rice.

Farmers were aware that no organisms such as worms and microorganisms can live in damaged soils. *Gita Pertiwi*'s initial intervention was in the area of soil conservation by reintroducing organic manure to the farmers. It also worked with women farmers group to introduce integrated pest management, making organic manure and natural pesticides. One way of improving soil structure was to reintroduce local legume crops. Identification activities by the *Gita Pertiwi* staff, together with farmers and students and lecturers of the local universities, found 32 local bean varieties in the area around Tegiri.

The women farmers in the group began to realise the problems of synthetic fertilizers and pesticides. They were also helped to observe the condition in which their soils and crops were found, the presence of pests and the need for water. The NGO staff analysed the problems involved in re-introducing local beans, as an essential first step. Among these, they identified not having enough seeds available, the presence of toxins in some bean species (a potential danger for livestock), or the fact that processing some beans for food is tedious and that the younger generation has no patience. Another important aspect was that some legumes do not sell in the market, while other crops have higher market value.

To overcome these problems, field staff of *Gita Pertiwi* decided to upgrade their skill in processing beans, try to find older farmers who still have bean seeds and who would know about bean planting and processing for food. They also worked with local universities to generate other relevant knowledge and innovation. After several planting seasons, the women participants began to acknowledge the advantages of a more diverse cropping system. Recognising that local beans thrive with little water, they began to plant corn and local beans in the

dry season. Local beans were also cultivated on the ridges of the wet rice fields during the rainy season. Experience also showed that beans are also good as green manure, and they can provide protection for corn and rice seedlings.

The integration of beans into the local agriculture had health and economic benefits. Since women were involved, they used the beans to ensure a diverse diet for the family and improve nutrition. The extra beans that they have are sold in the local market once a week, thus increasing the household income. Local underutilised beans (locally known as *koro*) contain proteins that are comparable to the more popular soybean. Many of these beans can be eaten when still young and green, or the dried beans can be made into *tempe* (fermented bean cake) and snacks, even sweet sauce, replacing the conventional sweet soy sauce. An example is the *koro glinding* (*Phaseolus lunatus*), that can be processed into sweet sauce (like soya sauce). Finally, *Gita Pertiwi* also produced and shared cooking recipes using these beans, but based on the local food systems.

An alternative to the conventional approaches

The examples from Central Java show the importance of looking at the local agricultural systems and at the local food cultures when trying to achieve food security and an adequate nutrition. Even though villages may be self-sufficient in terms of food quantities, beating malnutrition depends also on the quality and variety of their food intake.

These two examples show therefore the importance of first looking at the local food systems and at local crops, as they may provide the solution to the problems faced by the rural population. To that end, local knowledge becomes very important and should not be ignored, and local innovation needs to be encouraged.

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Village poultry, food security and HIV/AIDS mitigation

Robyn Alders, Brigitte Bagnol, Mohamed Harun and Mary Young

In farming households affected by HIV/AIDS, the illness or death of family members leads to the loss of valuable labour resources. Consequently the focus of household activity turns to maintaining family food security. Following an HIV/AIDS-related sickness or death, food security is maintained through revising the complex division of labour at the household level in accordance with the possibilities presented by the local farming system.

Village chickens can be found in all developing countries and play a vital role in many poor rural households. They provide a scarce resource - animal protein - in the form of meat and eggs, and can be sold or bartered to meet essential family needs. Village chickens are active in pest control, provide manure, are required for special festivals and are essential for many traditional ceremonies. The output of village chickens is lower than that of intensively raised birds but it is obtained with a minimum input in terms of housing, disease control, management and supplementary feeding. They are generally owned and managed by women and children and are often essential elements of female-headed households. As women are the main carers of sick people, chickens can play an important role as they provide women with additional resources to carry out their task of supporting people living with HIV/AIDS.

The components of village poultry production include: indigenous poultry breeds; feed; shelter; disease control; and community collaboration and group formation. Examples of how these components can be incorporated into HIV/AIDS mitigation programmes are presented here in two case studies. These case studies were implemented in collaboration with the International Rural Poultry Centre (IRPC) of the KYEEMA Foundation. The IRPC aims to improve the livelihood and standard of living of rural families by promoting cost-efficient, sustainable improvements to village poultry production through working with and providing training for government staff, community livestock workers and farmers and their families.

Junior Farmer Field Schools in Zimbabwe

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the Food and Agricultural Organisation of the United Nations (FAO) identified the Junior Farmer Field School (JFFS) concept as a useful way to assist rural youth in HIV/AIDS programmes. The JFFS programme provided technical, business and life skills, while at the same time providing some constructive activities to get junior farmers started in income generating enterprises to help support their families and themselves into the future.

ICRISAT proposed using poultry as a model to develop farming/entrepreneurial skills. Poultry offer several benefits; their high turnover rate allows rapid exposure of JFFS members to the production and marketing process which provides valuable experience in financial management and learning processes. JFFS members learn about extensive and semi-intensive poultry production systems to enable them to choose the production system(s) best suited to their individual situations. As young farmers develop their skills, they can graduate to other forms of agriculture including bee-keeping, pig production and milk production.

The IRPC was invited to assist ICRISAT and partners to develop and test curriculum and training modules on extensive and semi-intensive poultry production for use in both Farmer Field Schools and JFFSs in Chowonekano, Mhototi and Vukuso wards, southern Zimbabwe. Participatory curriculum development activities revealed that JFFS members were generally interested in poultry production. PRA tools were used to gain information on poultry production and poultry farmers' aspirations. JFFS members indicated that they wished to know more about general poultry husbandry (e.g. housing, feeding, watering and disease control) and reproductive cycles (e.g. "I have a four week old chicken, when will it start laying eggs?"). The comparative production trials (looking at different options for housing, health and nutrition) that were developed for the JFFS members to implement during workshops have been modified over time to better suit local conditions. The IRPC worked with workshop participants to develop a manual on village chicken production for use by JFFS facilitators.

The JFFS programme had a significant impact on the lives of the nine JFFS groups during the project (2004-2005), with their chickens contributing both to household food security and generating income. With the lessons learnt through this pilot programme, it is expected that the JFFS programme can be improved and expanded to enable young farmers to not only survive but also actively contribute to their communities.

"We raise chickens for their eggs and so that they increase in number, so that we can sell and get money. If a child fails to get school fees, the chicken can be sold to get money. Money to buy sadza (maize meal) comes from chickens. Chickens give manure that we use in our gardens for green vegetables and tomatoes. When celebrating a birth I can also use a chicken as a gift. When I want someone to work in my fields, I can slaughter a chicken."

Ms. Nomsa Nkomo, JFFS member, Vukuso village, Zimbabwe

Improved village chicken production by people living with HIV/AIDS in Mozambique

Mozambique is among the ten countries in the world most affected by HIV/AIDS. Here, village chickens are generally owned and managed by women and the rural poor, and are usually run under a free-range, low input management system. These village chickens are a very important part of women's livelihoods. Small-scale farmers own over 90 percent of the national flock, which is estimated to be around 25 million birds. In the poorest households, the contribution of chickens is significant, contributing around one quarter of income. These families rarely raise chickens for home consumption - eggs are rarely consumed, as they are more highly valued for reproductive purposes. In contrast, families who are better off will raise chickens for home consumption. Thus if chicken numbers were to increase, the consumption of eggs would become an option and a very good use of resources.

FAO is supporting activities that can mitigate the effects of HIV/AIDS on food security and nutrition in Mozambique in Manica and Tete Provinces. Within a project framework, FAO is currently supporting the IRPC to work with local NGOs and



Celestina Zimbabwe, a widow, received one rooster and three hens in June 2005. At the end of the year, she had 21 birds. Celestina and her children were delighted. Celestina also helped with the training sessions for child-headed households and continues to provide advice to four households in her local area.

the Provincial Livestock Services to improve the management of village chickens and the vaccination of village flocks against Newcastle Disease (ND). ND is one of the major constraints to the production of village chickens in Mozambique. Other constraints include shortage of feed protein especially for chicks and laying hens; and high chick mortality due to cold, heavy rains, and predators. With the introduction of the control of ND in the project area, the secondary constraints are being addressed by focusing on training in and farmer experimentation with low-cost improvements to village poultry husbandry. To ensure that the activities are sustainable in the long term, the project is also working with local health posts and primary schools to promote village poultry production and the consumption of poultry meat and eggs. Activities to improve farmer knowledge about avian nutrition are used to discuss the components of a balanced diet for the farmers' families.

The main activities of this programme are: conducting baseline and annual PRAs; training NGO volunteers as community vaccinators against ND; training NGO technical staff and local government agricultural staff in ND control; implementing ND vaccination campaigns; training farmers to experiment with low-cost improvements to village poultry husbandry; and working with volunteers and staff of the local NGOs, local health posts and primary schools, to promote village poultry production and consumption of poultry meat and eggs.

To promote the sustainability of ND control activities, community vaccinators charge farmers a fee to vaccinate each bird. Recovering the costs of the vaccine and compensating the community vaccinators for their labour are key sustainability issues. However, when HIV/AIDS mitigation is involved, access to chickens and the ND vaccine by vulnerable families must be secured. To ensure that vulnerable families within the community receive assistance, the vaccinators decided that families affected by HIV/AIDS that have five or fewer birds would have their birds vaccinated free of charge during the first two campaigns. The IRPC secured funding from charity groups in Australia to support the distribution of one rooster and four hens and ND vaccination vouchers to child-headed households and families affected by HIV/AIDS in the project area. Following vaccination, the

vaccinators present the vouchers to the NGO to receive payment for their services corresponding to the number of birds vaccinated. A preliminary assessment of chicken numbers in all families that have benefited from the distribution was done in 2006. Despite the severe drought suffered by Mozambique in 2005, the majority of families have managed to continue to raise some poultry.

The pilot project received a positive review as it demonstrated the potential to deliver triple benefits: direct support to the people affected or infected by HIV/AIDS; income generation for the carers and the community based organisations; and an increase in the carrying capacity of the communities in terms of supporting welfare activities. The project has been expanded to more districts in five provinces and is ongoing. One major difficulty has been ensuring the supply and distribution of in-date ND vaccine. This is done via the Provincial Livestock Services to community vaccinators. It is needed to enable vaccination to occur at regular intervals so that flock immunity is maintained.

The value of village chickens in HIV/AIDS mitigation

Improving the management of village chickens by junior farmers and people living with HIV/AIDS contributes to HIV/AIDS mitigation principally through improved household food security and income generation. Village poultry production also provides junior farmers with experience in small-scale business management and improved knowledge about human nutrition.

Village poultry provide a source of high quality nutrition and income without requiring much in the way of labour or financial inputs. Eggs, in particular, offer an important source of nutrition and are one of the best sources of quality protein. Eggs also supply various vitamins and can be stored for several days under village conditions. They require very little energy or time to cook. Once ND is controlled, producers will no longer need to hatch all their eggs to produce replacement stock and so the consumption of eggs becomes a viable option.

Families affected by HIV/AIDS are more likely to make use of the above benefits when veterinary services work in collaboration with the Ministries of Education and Health to improve general knowledge about human nutrition and disease prevention and control.

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Health concerns drive safe vegetable production in Vietnam

Luke Simmons and Steffanie Scott

Vietnam is a long, narrow and mountainous country located in Southeast Asia. The population of Vietnam is over 80 million people but only about one quarter of the land is arable. Very high population densities in the Red River Delta in the north and the Mekong River Delta in the south necessitate an intensive use of the land. Following the economic reforms of the mid 1980s and early 1990s, which allowed individual farmers to produce directly for the market, increasing amounts of chemical fertilizers and pesticides have been used. This is particularly true for vegetable crops. In the search for increased yields, many Vietnamese farmers have embraced chemical-intensive production practices, often applying excessive amounts of chemical fertilizers and using dangerous pesticides.

But things are starting to change. In the past decade there has been a lot of publicity about the large number of food-poisoning cases and attitudes towards Vietnam's food supply have shifted. The emerging middle classes in Hanoi, Ho Chi Minh City and other urban centres have become concerned about the food they eat and are starting to demand vegetables with fewer pesticide residues. Some are even willing to pay a slightly higher price for these products, up to 10 percent more than vegetables that are not certified as safe. Concerned urban consumers are increasingly demanding "safe" vegetables. Rural people are more likely to be able to grow a small patch of vegetables for their own consumption, an option that is not available for many urban people. In Ho Chi Minh City, it is estimated that the current supply of "safe" vegetables can meet only 30 percent of the demand from urban consumers.



Instead of relying on pesticides, safe vegetables are the result of simple pest-control techniques such as this sticky card.

Farmers are responding to this new market opportunity and are beginning to deliver higher quality vegetable products to the market. By adopting integrated pest management principles, applying compost, using crop rotations and creating a favourable growing environment in low-cost shadehouses, farmers are able to reduce their chemical fertilizer and pesticide applications and produce vegetables that are safer for consumers, and better for their own health and that of their farms. When asked why they

choose to grow safe vegetables, the first response from most farmers is about the importance of protecting community health.

"We produce safe vegetables because we want to protect people's health. If we use too much pesticide on our vegetables it is not good for the health of the people who eat our products."

Female farmer, Cu Chi District, Ho Chi Minh City

"If we use as much pesticide and fertilizer as we like when we grow vegetables, then the plant looks very healthy, but if people eat the vegetables they will have a problem, they can get sick. Also, when we use too many fertilizers and pesticides to grow vegetables, our input costs are very high and we do not make a good profit from our work."

Male farmer, Cu Chi District, Ho Chi Minh City

Changing agricultural production

The administrative boundaries of Ho Chi Minh City cover more than 200 000 hectares of land, of which just over half is urban, while the rest is used for agricultural purposes. Rice is grown on 50 000 hectares of land, while on the other 50 000 hectares, vegetables and fruit trees are grown. Rice crop yields around Ho Chi Minh City average only three tons per hectare, among the lowest rice yields in Vietnam. Consequently, there is a strong push for farmers to diversify into higher value crops.

Cu Chi District is found on the rural/urban fringe around Ho Chi Minh City. Demand for land and labour is very high here because of the strong economic growth in the city. The Ho Chi Minh City Agricultural Extension Centre and the Department of Agriculture and Rural Development have been supporting farmers in Cu Chi District to make the transition from growing rice to growing higher value crops such as vegetables and fruit. In particular, the Agricultural Extension Centre has been promoting safe vegetable production by providing training and start-up funds to farmers.

When promoting safe vegetable production, the Agricultural Extension Centre will first organise a meeting with farmers. At this meeting, they raise and discuss various critical issues around growing vegetables which meet specific standards. These issues relate to the management of soil and water resources and to the correct procedures for pesticide application. Next, volunteer farmers are sought who will work with the Agricultural Extension Centre to test out some of the new vegetable growing techniques on their farms. This is an experimental stage where the farmers and Agricultural Extension Centre staff adapt the techniques to the agroecological and climatic conditions of the area. At this stage of the process, the Agricultural Extension Centre pays for all the costs of conducting the trials. When successful techniques have been tested and developed, demonstration plots are established and training of larger numbers of farmers takes place. Farmers who are interested in growing safe vegetables can apply for funding of up to US\$ 1000 per hectare for establishing their vegetable plots and shadehouses. Farmers sign a contract with the Agricultural Extension Centre indicating that they will pay back 80 percent of this initial funding when they have successfully grown safe vegetables on their farm and are returning a profit.



Shadehouses use local and inexpensive materials, contributing to higher yields.

Organisation and diversity

Having successfully grown safe vegetables for over ten years now, farmers in Cu Chi District have started organising themselves into safe vegetable co-operatives. In 2003, 29 farm families in Tan Phu Trung Commune formed a safe vegetable co-operative in order to more effectively supply the market with their produce. The benefits of growing safe vegetables, including better health for farmers due to reduced pesticide exposure and lower production costs, soon became obvious to other farmers in the commune and today up to 300 other farmers are contracted to supply the co-operative with vegetables. The co-operative now has an office that doubles as a vegetable cleaning and packing centre located close to the main highway to Ho Chi Minh City. Orders are phoned in to the office on a fortnightly or monthly basis, and delivery can even be arranged using the cooperative's truck. Presently, most of the co-operative's production is going to supermarkets, school canteens and restaurants.

Currently, many farmers are opting to grow safe vegetables, whether as part of a co-operative or individually. They can be loosely grouped according to the types of vegetables that they grow. Some farmers, usually those with a limited growing area, are specialising in growing many different types of leaf vegetables on a short-rotation. The most common crops are *kang kong* (*Ipomoea aquatica*), Ceylon spinach (*Basella alba*), amaranth (*Amaranthus hybridus*), jute mallow (*Corchorus olitorius*), Chinese cabbage (*Brassica rapa* var. *parachinensis*) and mustard greens (*Brassica juncea*). These leaf vegetables mature in 25-30 days, allowing farmers to grow 8-10 crops per year when land preparation is factored into the equation.

Another group of farmers is specialising in growing vegetables such as bitter melon (*Momordica charantia*), wax gourd (*Benincasa hispida*), cucumber, okra (*Hibiscus esculenta*) and chili. These crops are usually grown and harvested over a period of three months, allowing farmers to grow 3-4 crops per year. Some farmers with low-lying land that is still prone to flooding grow one crop of rice or taro (*Colocasia esculenta*) in the wet season, followed by two vegetable crops in the dry season. Some farmers prefer to have a diversified operation and are growing a mixture of leafy and other vegetables on their land.

When farmers first started growing the more sensitive types of leaf vegetables such as mustard greens and Chinese cabbage, it was thought that they should be grown in metal-framed shadehouses that were covered in a fine-weave mesh. Experience gained over the last five years has shown that cheaper shadehouses can be

constructed using bamboo or wooden poles, supported by wires and covered in a loose-weave mesh. This mesh throws a very light shade but it lasts much longer than the fine-weave mesh. It is also excellent at dispersing the heavy rain drops that fall during the monsoon, thus preventing rain splash from the finely worked soil of the seedbeds. Rice husks are also used as mulch to prevent rain splash, which makes cleaning the vegetables easier, helping to prevent disease problems, and further reducing the need for pesticides. Some farmers are even starting to experiment with smaller "shadehouses" consisting of a net draped over a low wire frame that is large enough to cover one bed. These nets can be put in place if a heavy rainstorm is expected.

Quality standards

Safe vegetables are sometimes confused as organic vegetables in the local newspapers, but the regulations for safe vegetables are not as stringent as organic regulations. The regulations on safe vegetable production allow for the application of chemical fertilizers and certain classes of pesticides, although the most toxic classes of chemicals are banned. To be sold as safe vegetables, farmer's products must meet certain standards as set out by the Ministry of Agriculture and Rural Development. Basically, the regulations on safe vegetables state that pesticide residues, nitrate content, heavy metal content and bacterial pathogens all must be below the specified tolerance levels. The Plant Protection Department of the Ministry of Agriculture is in charge of regulating safe vegetable production and they collect random samples of vegetables from farmers and from the markets for testing to ensure that the pesticide residues are below the allowable limits.

This system of testing is helping to boost consumer confidence in the quality of safe vegetables, although greater effort is required on this front, as many consumers remain sceptical. More rigorous testing of vegetables, labelling of vegetables with recognisable brands and consumer education campaigns are all needed to further improve consumer confidence in the safe vegetable system. As people around the world are becoming more concerned with the quality and safety of their food, opportunities like safe vegetable production are emerging. These opportunities can allow farmers to move towards a more sustainable form of agriculture that is better for the health of their farms, their families and the communities that depend on them for food.

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Reviving local health knowledge for self reliance in primary health care

P.M. Unnikrishnan and G. Hariramamurthi

The Foundation for Revitalisation of Local Health Traditions (FRLHT) is a non-governmental organisation established in 1991, dedicated to revitalising India's rich and diverse health traditions. FRLHT's mission includes the conservation and sustainable use of medicinal plants, building databases on various aspects related to medicinal plants, setting up traditional medicinal clinical centres, and research on selected medical, sociological and epistemological aspects of the Indian medicinal heritage.

Traditional medicines and their relevance to health security

The Indian subcontinent has a rich tradition of indigenous medical knowledge, including written medical systems like Ayurveda, Siddha and Tibetan medicine, and oral or folk traditions. Written or codified systems have formal traditions of training and many written documents. The non-codified or folk traditions, such as those represented by bonesetters, birth attendants, paediatric specialists, and veterinary healers, have been transferred as oral traditions through the generations. These folk traditions are specific to an ethnic community and ecosystem, and embody tremendous geo-cultural diversity. Folk medicine also includes household knowledge about primary healthcare, different health food recipes, seasonal health regimens, customs and rituals. This knowledge is embedded in the lifestyle, diet and health practices of thousands of local communities all over India.

Although India is endowed with such a rich medical knowledge and natural resources, health status is far from satisfactory. Over 80 percent of the need for health care is in rural areas, where only 25 percent of the existing services are located. The rural poor have difficulty obtaining primary health care due to ineffective government health centres and the high cost of private health care facilities. Furthermore, much traditional knowledge and many local health cultures are being lost, due to economic, political and cultural reasons. These traditional health care systems can address the primary health problems frequently encountered by rural communities. They can also complement efforts in poverty alleviation and can be a health and livelihood strategy. As biodiversity and cultural diversity go hand in hand, strengthening of local health cultures will also contribute to the conservation of local biodiversity.

Health security through home remedies

The Home Herbal Garden programme was initiated by FRLHT in 1998 to promote positively assessed local health practices for

self-help in primary health care (PHC) among rural populations. The objectives of the programme were to increase awareness about the value of local health knowledge for managing PHC conditions using medicinal plants, to promote home gardens in rural populations, and to train women village resource persons in the cultivation and use of medicinal plants for common health complaints in the community. The programme started in the south Indian states of Kerala, Karnataka and Tamil Nadu, working through community based organisations (CBOs), non-government organisations, and State Forest Departments, along with many local communities. Key health problems were identified in selected villages as part of this participatory process. Common conditions identified can be seen in Table 1.

Selection of local health practices and medicinal plants

Many local health traditions are sound, some are incomplete and a few may be distorted. One of the major challenges in advocating local health practices is to have clear documentation on the efficacy and safety of these practices. Finding out effective practices through elaborate pharmacological and clinical trials is a colossal task. For example, to validate a single practice would involve 5-8 years of laboratory research with a huge amount of capital investment.

FRLHT developed a methodology for documentation and participatory assessment to identify safe and effective practices and to promote positively assessed local health measures. After prioritisation, a comprehensive documentation is conducted with the healers and elderly women in the selected villages to know the health practices used locally for the prioritised conditions. These practices are assessed through a methodology called Rapid Assessment of Local Health Traditions (RALHT) to confirm their safety and efficacy. Subsequent to the documentation, a panel comprising of community representatives, local healers and "traditional" and "modern" doctors assesses each of the herbal remedies for the specified condition. Each herbal remedy is thus graded and recorded for its safety and efficacy.

In a workshop with the local communities and external experts, communities' experiences regarding the safety and efficacy of a specific practice are recorded. This has to be confirmed by local healers and traditional physicians. Parallel to this, literature evidence from the pharmacopoeias of the Indian systems of medicine and modern pharmacology are collected. Based on these, consensus is achieved through rigorous discussion before selecting any practice. In a typical village, around 15-20 health conditions and medicinal plants are selected through this process.

Table 1. Example of some common complaints and remedies encountered

Complaint	Medicinal plants used	Parts used	Form of home remedy used
Cold and cough	<i>Adhatoda zeylanica</i>	Leaves	Decoction
Fever with indigestion	<i>Tinospora cordifolia</i>	Stem	Decoction
Abdominal pain during menstrual cycle	<i>Aloe vera</i>	Pulp	Fresh pulp consumed internally
	<i>Asparagus racemosus</i>	Tubers	Hot milk decoction
	<i>Hibiscus rosa-sinensis</i>	Flower	Fresh flower without calyx
Joint pain	<i>Vitex negundo</i>	Whole plant	Medicated oil

Establishment of nursery and herbal gardens

Once ailments are prioritised in a particular village, relevant plants are selected. A nursery with these plants is established by a CBO, who also chooses a woman from their group to act as a Village Resource Person. Together, they train households on how to cultivate and use the plants, supplying seedlings to households from the nursery for a nominal fee. The households themselves will then establish their own gardens, cultivating and using medicinal plants.

Fertilizers are very common in these villages. But during trainings, it is made clear that the effects of fertilizers or pesticides on the active ingredients of the medicinal plant are not known. So villagers are expressly told not to use them. Most species used are easy to grow and traditional cultivation practices are followed. Many of these households already have a small vegetable/fruit garden. But this practice is rapidly eroding as people move towards a market culture. FRLHT is consciously bringing back the idea of having a kitchen garden, where children enjoy helping their mothers to take care of these gardens. FRLHT also works with many landless households. In such cases it is difficult to establish household gardens, so the concept of community gardens is promoted.

We have observed that some households have improved the cultivation practices. Water is a real problem in many villages, so plants like *Bacopa*, which need more water, are grown in pots. Many households cultivate plants near where the wastewater flows from the kitchen. This gives really good growth in certain species like *Acorus*. But we are not sure whether this wastewater will have a negative impact on the medicinal plants. These are unexplored areas. From such initiatives we are getting a clearer idea of which medicinal plants can be grown in such places, as agronomic details are available for only a very few medicinal plants in India. Many of the medicinal plants are regarded as common weeds and available on common lands.

Difficulties and impacts

One of the main difficulties was monitoring how much these plants were actually used for health purposes. The programme did not have baseline data, but FRLHT has started to gather some documentation to understand this. We are also monitoring individual plants and their efficacy through what we call a "participatory clinical study".

In some of the locations, we found it difficult to keep up the momentum after the project period, as there is no continuous monitoring system. As more and more healers' associations and self help groups became involved, this was solved to a great extent. At the same time, another challenge has been to get an emotional commitment to the programme. Many drugs for treating common ailments are available in local shops at very low cost, so people tend to use such easier solutions.

In spite of these difficulties, between 1998-2005, FRLHT implemented the Home Herbal Garden (HHG) programme in more than 6000 villages and hamlets across the states of Kerala, Karnataka and Tamil Nadu, promoting 150 000 home herbal gardens. Since 2004, the programme has been extended to other states such as Maharashtra, Andhra Pradesh, Chattisgarh and Orissa. An urban HHG programme has also been initiated in the city of Bangalore at the request of the city dwellers.

The average cost of a HHG package containing 15-20 saplings works out to Rs. 100 (US\$ 2.20). This includes the costs of

raising and supplying plants to the households, trainings, and the administrative costs of the CBO/NGO. On average, the one-time cost of conducting a RALHT exercise in a community is Rs. 30 000 (approx. US \$660), which can be recovered over a period of time through the sale of the HHG package to local households. The Village Resource Persons also earn at least Rs. 500 (US\$ 11) per month through the sale of saplings and by training households, which serves as an incentive.

Several assessments have shown that the HHG programme is adopted by the poorest of the poor, namely the landless (33 percent), marginal landholding (37 percent) and small landholding (21 percent) farmers. At least 85 percent of adopters belong to the socially deprived communities, while 72 percent of the adopters were affiliated to women's self-help groups.

The programme contributes to poverty alleviation by reducing costs and indebtedness due to health expenditure. One study noted that the health expenditure incurred by non-adopters of HHG was around five times more than that by adopters. It can also support local livelihoods through small-scale nurseries and processing of medicinal plants. Network members (NGOs, CBOs and communities) confirm the economic benefits in the form of cost saving of health care related expenses. It is reported that in the areas where HHG programmes have been active, visits to doctors have reduced.

The benefits from one HHG can be reaped by not only the family members but by friends and neighbours as well. Non-adopters of the programme were using the raw materials from their adopter neighbours and were benefiting from it. Another interesting fact is that rural women with gynaecological problems particularly benefited from the programme as they were reluctant to approach male doctors.

Future directions

The HHG programme is becoming integrated into a public health awareness and education programme through primary health centres and sub-centres in some locations. In a programme supported by the National Dairy Development Board, the same methodology to prioritise home remedies is used to prioritise health problems of cattle in areas of need. HHGs can easily be designed to include herbs for veterinary and agriculture care. Quite a lot can be done to improve the programme including refining the validation processes and standardisation of form and dosage of HHG medicines. Since regular clinical trials are prohibitive due to costs involved, novel, culturally contextual and sensitive "clinical trial" methodologies need to be developed to test the HHG solutions and rebuild confidence in traditional medicines. It is suggested that a long-term goal needs to be pursued for collective action by both the government departments, non-governmental organisations at national as well as international levels.

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Photo: Bernard Keraita

Experimenting with irrigating from different heights. As it is the soil which needs to be watered, not the plant, watering closer to the ground reduces chances of contamination and damage to leaves.

Safer options for irrigated urban farming

Bernard Keraita, Pay Drechsel and Flemming Konradsen

There is an increasing demand for food in many cities in developing countries due to rising urban populations. While foods like cereals can be transported from rural areas, perishable crops like vegetables lose their market value during transportation as refrigeration is scarce. Most vegetables are therefore grown in and around cities to maintain their freshness and nutrition value. For instance in Accra, Ghana, about 1000 farmers are involved in market-oriented urban vegetable farming and the vegetables produced are eaten by 200 000 Accra residents daily. Urban vegetable farming is now seen as an important means for attaining urban food security, balanced diets, and is the livelihood of many urban dwellers in Ghana.

Leafy vegetables generally have high water requirements and need to be irrigated on daily basis. Vegetable farming is therefore done near water bodies, where there is a reliable supply of irrigation water. In most cases, these water bodies are heavily polluted with human faecal matter resulting from poor urban sanitation. The use of highly polluted water ("wastewater") in irrigation is known to transmit excreta-related diseases as it has high levels of pathogenic micro-organisms such as bacteria, viruses, parasitic worms and protozoa. This affects farmers and vegetable consumers, especially when vegetables are eaten raw. Vegetables most commonly grown in urban farms in Ghana are lettuce, cabbage, green pepper and spring onions. These are eaten raw as salads which are part of urban fast foods. This has raised serious public health concerns from local authorities, the media and consumers.

In this article, we highlight one component of a broad three-year action research project being implemented in urban vegetable farming sites in Ghana. Assessments are being conducted and management options developed with key stakeholders at all levels of the food chain i.e. production (farm level), marketing (market level) and consumption (households, street food vendors etc). The aim of the specific component of the project described here

is to develop appropriate farm-based measures with farmers, for reducing health risks from vegetable contamination while safeguarding productivity and livelihoods. The International Water Management Institute (IWMI) and the University of Copenhagen are leading this component. The project started in January 2005 and will end in December 2007.

Irrigated urban agriculture and the public health dilemma

Firstly the team reviewed the measures in place in Ghana to address the public health concerns. Wastewater treatment (often seen as the ultimate solution for reducing health risks) is a very unrealistic option in the short-term, as only less than 10 percent of urban wastewater produced undergoes some form of treatment. In large cities, local authorities banned the use of polluted water for vegetable farming. However, this practice still persists as no alternatives are given. With increasing water demand and global fresh water resources shrinking, urban farmers increasingly depend on wastewater.

Relevant literature on health protection measures was then reviewed. The World Health Organization (WHO) has been at the forefront in formulating guidelines for wastewater use in agriculture. Recognising that low-income countries cannot treat wastewater effectively, the WHO has proposed some measures to help reducing risks to tolerable limits. Farm-based measures include crop restrictions, improving how irrigation water is applied, and control of human exposure. However, the WHO guidelines can only describe examples from around the globe. Local adaptation trials and field assessment to quantify the effectiveness of the measures in reducing health risks, as well as adoption studies with farmers, are largely missing.

Farmers' perceptions of health risks

We planned to actively involve farmers and relevant government institutions in the project at all stages. Initially, farmers were not motivated to participate as the local media and authorities had condemned this practice and farmers were also sceptical about any related "research". Thus it was difficult getting committed

farmers for the project. This was overcome by clearly spelling out the objectives of the project and explaining the need for their involvement. This was first done through the leadership of their farmers' associations, who in turn organised meetings to explain it to their members.

Feasibility and perception studies were done at the start and during the project, involving about 400 farmers around Ghana's two largest cities, Accra and Kumasi. Various participatory approaches, most of them visual, were used to understand farming practices and farmers' perceptions of health risks and risk management. The findings showed that farmers were aware that the irrigation water used was contaminated. They could identify that water was polluted from its dark color, foul smell and presence of plastics and other solid materials. Farmers indicated that pollution in water bodies has increased over time and is worsening. They attributed most contamination to the failure of local authorities to treat and safely dispose of wastewater generated in the cities.

Farmers clearly associated polluted water with health risks and identified the affected groups as farmers and vegetable consumers. But, they never saw the risks to be significant. Perhaps this was because of their level of knowledge on invisible risks, as also observed in the food catering sector. Or they may have adopted a defensive mechanism to show that their practice was safe, especially after the condemnation from the media and authorities. On the other hand, these farmers live in poor neighborhoods with poor sanitation and no safe drinking water. So, when infections or health problems occurred, they associated this more with their homes than with their farming practices. But as more awareness was created through discussions between farmers and scientists, they became increasingly aware of the health risks they regularly face, and the need to change to safer practices.

In search of safer irrigation practices

Farmers were first asked to identify safer practices that would reduce risks. This was done in focus group discussions at different farming sites, followed by in-depth interviews with key farmers. With minimal input from researchers, farmers identified the following safer irrigation practices:

- Provision of safer irrigation water like shallow groundwater;
- Protection of water sources from getting polluted;
- Treating of irrigation water before use;
- Use of protective clothing by farmers;
- Better methods for collecting water from irrigation sources;
- Better water application techniques.

Scientists then discussed with farmers other documented health protection measures as stated in the WHO guidelines. Farmers were asked to rate the suitability of these measures in relation to the local context. Table 1 shows the outcome. For example, farmers were not ready to change from planting vegetables to planting other crops as they might lose their competitive edge in urban markets. On the other hand, knowledge sharing and changes in farming practices that need minimal capital investments were perceived as suitable. This corresponded to safer irrigation practices identified by farmers.

Box 1. Field trials on irrigation methods

Setup: Watering cans are usually used for irrigation. This method contaminates vegetables as it applies water directly to the leaves. Applying water to the soil surface could reduce contamination. Trials were conducted to compare furrow irrigation and drip irrigation with watering cans.

Findings I: Laboratory analysis of microbial indicator organisms showed that drip irrigation kits had the highest potential to reduce contamination on vegetables. The kits also saved water and did not damage lettuce leaves as watering cans often did. The main limitations were that the kits would clog up, and fewer lettuces could be planted due to the wide emitter spacing. No significant reduction in vegetable contamination was recorded from furrow irrigation as most vegetables grown were low lying and were in contact with irrigation water in furrows. Farmers also had problems maintaining the furrows. Even with highest contamination rates, watering cans had highest yields and were still most preferred by farmers.

Modifications: Trials on furrow irrigation were stopped since the method had little potential. Drip kits were modified by reducing the emitter spacing and adding lateral lines, which increased cropping densities four-fold. An additional filter was added to reduce clogging. The use of watering cans was also modified. Farmers often use cans with or without caps and raise them to different levels. Caps reduce the speed of water, and lessen the splash of contaminated soil on crop leaves. In the trial, three water lifting levels were tested with and without caps.

Findings II: Production per given area increased without increasing contamination levels for drip kits. However, having many pipes in the plot slightly interfered with other farming practices like weeding. Contamination levels were reduced significantly by watering closer to the soil and using caps on watering cans. This also uses less labour and distributes water evenly. Further modifications are still feasible for more improvements.

Field trials on identified safer practices

Next, an assessment was needed on the effectiveness of the identified practices to reduce risks. Trials were conducted with farmers on their farms. As this needed detailed monitoring and assessments, we restricted ourselves to three farming sites in Kumasi, involving about 70 farmers. Regular feedback was given from farmers and scientists. Some practices were modified and tested further. Assessment was based on laboratory analysis on levels of microbial contamination, perceptions from farmers and socio-economic analysis.

One of the measures proposed was to look for alternative water sources. Findings from geophysical studies showed that in Accra, on the coast, there is groundwater at a depth of 4 m. However, on most sites the water is saline. In inland cities such as Kumasi, groundwater is too deep (more than 15 m) to make it economically feasible to be used by urban vegetable farmers. It became even clearer that farmers had no alternative source but only contaminated water.

Treating irrigation water needs some investment in terms of labour and in some cases also capital. A number of the identified

Table 1. Suitability of specific farm-based health protection measures from WHO guidelines

Not suitable	Suitable	Most suitable
1. Planting non-food crops	1. Using protective clothing	1. Knowledge sharing and awareness creation
2. Planting foods not eaten raw	2. Safer irrigation methods	
3. Full wastewater treatment	3. Stop irrigation before harvesting	
	4. Minimal wastewater treatment	

safer and low-cost practices have been assessed through field trials, including on-farm sedimentation ponds and sand and fabric filters. On-farm sedimentation ponds have shown great potential in removing heavier microorganisms like worm eggs. This could be enhanced by using better designed ponds and training farmers on better water collection practices to reduce suspension of sediments. Farmers could also remove sediments from ponds more regularly. Another practice tested was stopping irrigation a few days before harvest, so that pathogens will die off. Irrigation methods have aimed at minimising contact between vegetable leaves and contaminated irrigation water and soil (see Box 1). These stress the importance of continued dialogue between scientists and farmers in developing best practices. To have a higher cumulative effect, these best practices can be used in combination.

Motivation to adopt safer practices

One limitation that may slow down the adoption of safer practices is the lack of incentives. Currently, there are no marketing channels and institutional frameworks for safer vegetable production in Ghana. While vegetable farming is mostly a domain for men, harvesting and marketing is controlled by women. These gender roles prevent farmers from direct marketing, and "safe" vegetables might end up mixed with unsafe vegetables in markets, making farmers' efforts futile. The net beneficiaries of safe vegetables are the urban dwellers, who perhaps should pay more for safe produce. This may be achieved through streamlining the market channels for safer produce. For example, farmers with safe produce could be linked directly to large consumer establishments like hotels. They can also be allocated selling points in markets and supermarkets for the general public. Other incentives can be institutional support from government agencies like provision of extension services trained in exotic vegetables, loans, awards and land tenure security. Perhaps good media publicity will also encourage farmers to adopt of practices for safer vegetable production.

Risk reduction has to go beyond the farm

A comprehensive health protection programme that extends beyond farms and focuses on post-harvest handling practices needs to be developed. Observations show that some vegetable sellers wash vegetables in irrigation water after harvesting.

Box 2. Changes at Mr. Takyi's farm

Mr. Takyi's farm is located at Karikari farming site in Kumasi, between residential houses. He relies on household effluents, especially during the dry season, which he channels into an earthen pond in his farm, as a source of irrigation water. Mr. Takyi has been involved in the project since its inception. We have conducted several trials on his farm and discussed outcomes of our assessments. As we continue with other trials, we have observed some changes on his farm. The farmer now channels the water from the first large pond through two other ponds before using it for irrigation. This allows for more sedimentation on ponds. The third pond where he collects water from has a blank of wood for stepping on as he collects water, unlike the traditional way where farmers walk into ponds to collect water. The pond is also deeper to allow the water to collect without disturbing the sediment. Even if Mr. Takyi still continues using watering cans, he now consistently uses caps and irrigates from lower heights to lessen splashing of soils to vegetables. The drip kits we left in the farm after the trials have been taken by other farmers who now use them to grow other vegetables like cucumber which need wider spacing. Greater impact is expected after developing comprehensive guidelines and conducting training modules for farmers.



Photo: Bernard Keraita

Discussing the suitability of the different irrigation practices.

Vegetables are transported and sold in markets in very unsanitary conditions. There is little water in markets, and as most vegetables need "freshening water" to look attractive, one bucket is often used for a whole day, causing cross-contamination. Such a programme should also extend to food handling at food selling points. Exotic vegetables like lettuce or cabbage are often eaten raw thus developing better washing methods will be helpful. The new WHO guidelines for safer wastewater use in agriculture support such a multiple approach for comprehensive health protection from wastewater use in urban and peri-urban vegetable farming.

The next step for this project is the knowledge sharing component. First, we are formulating guidelines for best practices developed from field trials. This will be taken up by the extension services division of the Ministry of Agriculture and incorporated in their extension programmes. We are also preparing a training module for farmers on the best practices. There will be an extension of this project through a new WHO-FAO-IDRC project addressing the institutionalisation potential of the new WHO guidelines based on the non-treatment options identified in this project.

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Community pharmacies and the promotion of local health care

Jaqueline Evangelista and Lourdes Laureano

The area known as the Cerrado makes up nearly 25% of land in Brazil, and is characterised by its very high biodiversity. It is home to an invaluable cultural heritage of traditional knowledge and practices related to the use of its natural resources. The medicinal plants of the Cerrado have always been used for treating family health by individuals, and community groups. The work of these hundreds of groups is known for the efficiency of the treatments, and that the services they provide are reliable. Groups also make efforts to ensure that everyone has access to the medicines.

Today the Cerrado and its people face various difficulties from current developments such as the growth of sugar-cane plantations for the production of biodiesel. In this context, community groups have decided to act – participating in environmental networks in order to preserve and be able to pass on their traditional knowledge, to promote good practices in the management and use of medicinal plants and to raise awareness among policy-makers about traditional medicines.

Community pharmacies

Different community groups working with health and the environment from five states came to know of each others' work through various projects and exchanges in the Cerrado in the early 2000s. The Pacari Network was founded in June 2002, currently representing 80 local organisations. It carries out many activities – research, trainings, exchanges, participation in social and environmental movements and policy advocacy.

Many of these local groups produce remedies in household or community pharmacies. The community pharmacy is usually a building in the community which is open to the general public. It will be of a simple structure, adapted for the preparation of medicinal plant remedies. It uses basic equipment such as a table, sink with running water, and an oven, has two rooms, a bathroom and a garden where the medicinal plants are grown. For example, Fernando and Tantina, residents of Alto Vera Cruz, in the city of Belo Horizonte, run a small household pharmacy. They attend to an average of 90 people a month, produce 48 different types of remedies, using more than 80 species of medicinal plants. They can make about R\$ 400 (approximately US\$ 200) a month.

Self-regulation of traditional medicine

Such communities are very concerned about providing an informal health service to the community, without being recognised by the local authorities or laws. They fear that the local health and safety regulators could close the pharmacies, impose fines or even start legal proceedings against them. To overcome this insecurity, Pacari introduced a strategy of self-regulation. The first step was a series of courses for practitioners, with an average duration of 200 hours of teaching time. As a result of these courses, the groups collectively formulated techniques for quality control in the preparation of remedies in community pharmacies. The self-regulation strategy is based on three basic criteria to ensure safety – the quality of the plant used to make the remedy, good practices used during preparation of the remedy, and documented traditional knowledge about which medicinal plants are used in a certain remedy.

Medicinal plants and traditional remedies

To ensure the quality of plants to be used in the preparation of remedies the species must be identified correctly. Agroecological cultivation techniques should be known, plants should be harvested sustainably, and processed, stored and transported without contamination.

As groups use plants from various sources, they are formulating indicators to evaluate the quality of plants from different sources, such as native vegetation, agroforestry systems, domestic production and organic gardens. To this end, management plans for medicinal plants in different environments, and discussion about the creation of reserves for medicinal plants are being developed.

The groups are also working to ensure safety and quality control during the preparation of remedies made from medicinal plants, through researching all the methods used by community pharmacies. The structure and conditions of the pharmacy are especially important – the equipment, utensils used, and procedures related to cleanliness and sterilisation. Documenting information and knowledge generated in a community pharmacy is also a big challenge for self-regulation, such as the number of patients seen, the main ailments treated, the volume of remedies dispensed, average costs per person seen, and the quantity of plants used.

The Cerrado pharmacopeia

To document and preserve traditional knowledge, the *Farmacopeia Popular do Cerrado* has been prepared. This book describes, in simple language, the ecology, management and use of medicinal plants of the Cerrado. The Pharmacopeia is being put together by Regional Commissions, formed by people who work with and collect medicinal plants, representatives of the community pharmacies, as well as technicians. The methodology used to collect the information is known as the “*diálogo de saberes*” – exchange or dialogue of information or knowledge, which gives value to the traditional knowledge as a base for research, and which is complemented with technical and scientific information.

The Pharmacopeia will be registered as a “*Bem Cultural de Natureza Imaterial*” – loosely translated as a “Cultural Treasure of Nature”. This is a type of people’s certification given to something of cultural value which has an everyday use, such as music, festivals or traditional plant use. By registering knowledge in this way, it guarantees that it is conserved for future generations. This request was made to the Institute of Cultural Heritage and National Art, of the Ministry of Culture, which oversees museums and historical sites in Brazil.

The community pharmacies are found in areas which experience social deprivation and exclusion, and are notable for providing basic health care services. The Pacari network is developing a network of information between the communities to highlight the significance of their work. Through activities, such as preparing the Pharmacopeia, which raise social awareness the network is lobbying for and contributing to a national health policy which integrates environmental and cultural concerns.

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“Village in the City”: Healthy vegetables in Trivandrum

G.S. Unni Krishnan Nair

Trivandrum is the densely populated capital city of Kerala, the southernmost state of India. The majority of its inhabitants are employees in the government and private sector offices. The value of land is very high compared to nearby semi-urban and rural areas, so houses in the city have very little or no surrounding area at all for doing any farming. Food consumed in the city comes generally from vegetable farmers in nearby areas, as well as from farmers in the neighbouring state of Tamil Nadu.

Kerala has a very high literacy rate, reaching almost 100 percent in Trivandrum. At the same time, people are very health conscious, so knowing where their food comes from has been, and is, a major concern. These worries increased after the Department of Entomology of the Kerala Agricultural University revealed that high levels of pesticide residues—well above the maximum residue limit—had been found in the vegetable samples tested in the state. Its report presented the results of a study which showed that vegetables such as bitter gourd, cowpea and okra sold in the markets in the city had high levels of pesticide residues. Furthermore, the report clearly outlined the variety of health hazards resulting from the presence of pesticide residues in vegetables. This was well publicised in the media. In 2002, the State Directorate of Health Services issued a public health warning that many of the vegetables and fruits being sold in the market had been found to contain high levels of chemical residues.

The promotion of terrace farming

Just as some farmers near Trivandrum have been producing vegetables organically for some time, some enthusiastic individuals have been growing vegetables in the city for over a decade. However, this has been largely unorganised and isolated. It was after the health warning that some inhabitants and residential associations thought more seriously about cultivating vegetables on their terraces of their houses. They approached the local government for help, and a scheme called “Village in the City” was officially launched at the end of 2002 by the Department of Agriculture of the Government of Kerala. This proved to be a great success as many residential associations and individuals registered and participated. It was popularised

Improving the model

As a simple and straightforward process, making vermicompost is recommended to all urban farmers. This can be done in cement tanks made out of the rings used in wells, in old water tanks or even in old wooden boxes. The most common alternative is using the tanks made by the Department of Agriculture by converting cement well rings, which are sold for only US\$ 6 to any interested producer. As these are 2.5 feet in diameter, they can be used in the backyard, not occupying much space. Farmers only need to protect the worms from ants (something which is easily done by filling a rim made around the base with water), and also be careful and not add plastic, glass, oil or very pungent materials like red pepper. Worms grow well and multiply easily, and also produce good compost.



Photo: Author

Having fresh vegetables is only one of the benefits of the “Village in the City” programme. Participants can also eat species which are not found in the markets.

through the media, which led thousands of people in Trivandrum and other cities in Kerala to adopt terrace farming.

Under this scheme, vegetable seeds, plastic gunny bags or garden pots, together with agricultural implements, are supplied to terrace cultivators at half of their cost. Cement tanks made out of rings used in wells are also supplied at half price, encouraging the new urban producers to solve the lack of organic manure by preparing their own vermicompost in these tanks (see Box). Simultaneously, study classes were organised by the state Department of Agriculture in partnership with the local residents associations (such associations are common in each ward of the city). These classes are offered free of charge once in a season or once every three months. A theory class is frequently supported by a slide show on the general “practices in urban farming”, and in most cases they have been followed by a visit to two or three terrace farms. The Department of Agriculture and the residents associations have also arranged for expert teams to visit new terrace farms, and have encouraged all participants to seek contact and look for additional advice from the “experts”. Articles on terrace farming have appeared in local newspapers, resulting in over 10 000 enquiries.

Urban agriculture

At the moment, approximately 2000 families are practicing terrace farming in Trivandrum as part of this scheme, and many more are doing it on their own. The practice most commonly

Considering the limitations of space, the incorporation of poultry is also an asset, but it requires additional care. Some urban producers raise chickens in wooden sheds which can accommodate up to 10 chickens. They are allowed to go out onto the terrace at feeding times. A serious problem is the heat, but this is effectively solved by stretching a green tarpaulin sheet above the shed and also by erecting the shed below the crown of a coconut tree (most urban homes in Kerala have at least one coconut tree in their house compound). Chickens can be fed with food wastes, azolla, or with the leaves of chekurmanis (*Sauropus androgynus*) or drumstick (*Moringa oleifera*).

adopted requires filling gunny bags or pots with a mixture of two parts of soil, one part of sand and one part of vermicompost (or any other organic manure like dried cow dung, poultry manure or goat manure, depending on its availability). These are placed on bricks put on the terrace to avoid direct contact with terrace surface. Many different vegetables can be planted in the gunny bags, and some families have even planted yam, tapioca, pineapple and bananas. Crop rotation is advised to reduce pest population, and irrigation needs to be done carefully so that water will not drain on to the terraces. If all family members go away, they are recommended to place water-filled plastic bags with pinholes on the plants. Vermicompost, dried cow dung, ordinary compost or neem cake are used for periodical manuring. Some families also grow certain crops under greenhouses.

Mr. K.P. Pillai has been growing crops on his terrace for the last 30 years. He is a model for others involved in this programme. His terrace covers an area of only 800 square feet, and there he cultivates vegetables in cement pots and inside old rubber tyres filled with soil. He collects goat manure from a nearby village, dries it and keeps it in gunny bags. This is the main source of nutrients for his plants, although he also uses dried cow dung powder, bone meal and groundnut cake. Mr. Pillai was one of the first to join the urban farming scheme, and as a result he now produces vermicompost. Pests are controlled using a soap solution (made by dissolving 4-5 spoons of soap powder in one bucket of water). Experience has taught him which vegetable varieties do better, and he prefers to produce his own seeds. Covered trellises are made on the terrace for trailing crops like ash gourd and little gourd (*Coccinia grandis*). Fruit trees like papaya and banana are planted in the ground so that the fruits can be harvested easily from the terrace. Both he and his wife dedicate one hour every morning and every evening to their terrace farming activities, seeing many advantages in it.

Building on Mr. Pillai's example, many families also stretch tarpaulin sheets to provide shade in the terrace, under which chickens can be raised in small sheds. Other households have opted for growing azolla in tanks made using tarpaulin. These blue green algae are used as mulch and manure for the plants, and also as poultry feed. Apart from using soap solutions, pests are also controlled manually or by using botanical pesticides like tobacco decoctions, neem kernel suspensions, neem oil-garlic emulsions, or bait-traps. Many families have observed that pest incidence is not severe as the terraces get a lot of direct sunlight.

Urban-rural links

Farmers in rural areas are aware of the changes in consumption trends and preferences. They know that terrace farming is gaining popularity because of health concerns, but do not consider it an immediate threat to their production activities or livelihoods. Some farmers and farmer groups have, however, started to restrict the use of chemicals and have begun learning about organic farming practices from extension workers from the Department of Agriculture. Some even market their produce as organic, although they are not certified, and certification of vegetables as organic is uncommon in Kerala. Consumers can only judge for themselves whether marketed produce is organic – it is commonly believed that organic produce will not be so plump and may have some insect bite spots, but will be tastier.

Urban producers do not produce all the vegetables and fruits required by their families, so they do still buy from farmers. But urban producers are now much more selective. For example, very plump bananas produced with high doses of chemical fertilizers and pesticides are always avoided, not only by urban producers, but also by most urban consumers.

In addition, urban producers like to buy vegetable seeds and dried cow dung, poultry manure, or goat manure from rural farmers rather than from government agencies. They believe that those cultivars that have been cultivated through generations are better. The rural farmers welcome the chance to sell some of their products.

Benefits

A review of the results of the "Village in the City" programme clearly shows how terrace cultivators get garden-fresh vegetables and eggs, all of which are nutritious and –especially when compared to those sold in the markets– free of chemical residues. Families also acknowledge saving money. Some estimates have put the total production figures at more than 1000 tons of vegetables produced in one year. Others estimate that while production costs may reach up to 5000 rupees per year (approx. US\$ 100) for growing vegetables in a 40 m² terrace, the value of the vegetables produced can easily exceed a total of 40 000 rupees.

Inspired by terrace farming, the local authorities in Trivandrum have launched a new scheme this year. Under this scheme, a free kit consisting of vegetable seeds, dried organic manure powder and two banana suckers will be given to the students of 20 schools in the city. The aim is to involve children in terrace farming in their homes, to use these activities as part of their education and at the same time to inspire their parents.



The terraces of the houses in Trivandrum are full of vegetables, showing how much can be grown in the city in spite of space limitations.

Interviewed officials have also mentioned other benefits. Many middle-aged and older people in the city have health problems like obesity, high blood pressure, diabetes or high cholesterol levels as a result of their busy, yet sedentary lifestyle. By farming in their terraces they get some physical exercise daily, which is a preventive measure against many of these problems. At the same time, house wastes are reduced as they are recycled for the production of vermicompost. Mr. Pillai mentions that by growing his own vegetables, he can eat species which are rarely available in the markets. These, for example, include little gourd (which is believed to have anti-diabetic properties) or ash gourd, known to lower blood pressure levels. Quoting Mr. Pillai, "Above all, the taste and satisfaction of eating something produced with one's own hands cannot be expressed in words".

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It's time to ban highly hazardous pesticides

Stephen Sherwood, Donald Cole and Douglas Murray

Development practitioners face difficulties persuading small holder farmers to reduce their use of extremely and highly hazardous pesticides. The patents on many of these pesticides expired long ago, allowing companies to market them at bargain prices. From an agro-ecological perspective, it is ironic that nearly all are non-specific, broad spectrum insecticides that kill all insects – both harmful and beneficial. From a public health perspective, it is perverse and tragic that they are the most toxic and at the same time normally the most readily available products in the developing world. In small villages in Asia, Africa, and Latin America even children can purchase highly toxics at the local store, and millions of farmers and their families come in contact with them routinely.

Pesticides produce huge health burdens

Highly toxic pesticides are associated with suicides, nervous system and mental health problems, not just among those who spray the products but also among the entire family. Researchers who compared the status of mental health and suicides in China, Sri Lanka, and the United Kingdom found that the high suicide rate in Sri Lanka and China is not due to higher levels of mental illness or rates of self-harm acts. People simply have easier access to pesticides than do the residents of the U.K. Success of a suicide attempt is directly associated with access to these pesticides, accounting for 60 to 90 percent of suicides in Asia, Africa, and Latin America.

Box 1. Discovering the harmful effects of pesticides

When we arrived to Carchi, Ecuador in 1998 pesticides were not seen as a problem, but rather a solution. One farmer told us, "I don't know if I believe in a God, but I do believe in pesticides. Thanks to pesticides, my family eats."

The true costs of pesticides were hidden. To help farmers come to see the harmful effects of pesticides, we employed during workshops a relatively disturbing activity that involved giving baby chicks a small dosage of highly toxic pesticides (usually carbofuran or methamidaphos) and observing them until they died. Participants watched and discussed symptoms as the chicks became wobbly, incoherent and then collapsed over a period of about one hour. Typically, certain participants would complain about the "murdering" of innocent chicks. Admittedly, the exercise was cruel, but it was highly effective at making blindly obvious the health effects that pesticides have on farmers and their families. (To avoid having to repeat the exercise, we came to use videos of the activity.)

During the exercise, participants inevitably would open up and talk about previously hidden experiences. Most admitted to becoming "drunk" while applying pesticides. Many said they had passed out in their fields, but that they did not tell anyone because they did not want to be labelled a *debilucho*, a weakling. We discovered that intoxications were commonplace. We also learned that deaths due to pesticides occurred in each of the communities where we worked, often to young children.

Commonly participants would conclude, "The fact is this is happening every day in our fields. We care more about the chicks than we do about our women and children. Something needs to be done!" This activity never failed to shock people into action.



Photo: Stephen Sherwood

Banning pesticides would not mean losses in production. Farmers are increasingly relying on alternatives such as insect traps. In this case, potato leaves are set under carton boxes around the margins of freshly ploughed fields.

While difficult to demonstrate scientifically, continual exposure to neuro-toxins produces symptoms of depression. Depression often leads people to commit self-harming acts. This has led some medical experts to argue that exposure to highly toxic pesticides may contribute to the climbing number of suicide attempts worldwide. Regardless of whether highly toxics are the cause of wanting to take your life or just an effective means of doing so, where access to extremely and highly hazardous pesticides has been restricted, suicide rates have fallen. Further, research in Northern Ecuador revealed that not just those who applied pesticides were at risk. Women and young children, although not commonly active in field agriculture there, were affected nearly as much.

Further research demonstrated that treatment costs and work days lost impose a significant financial burden on the public health system and the individual. Each human poisoning (not accounting for deaths) cost about six worker days. Chronic exposure to highly toxic pesticides adversely affects farmer thinking and motor performance to a level that would justify worker disability payments in wealthier countries.

Alternatives exist

Through studies of contamination pathways (Box 2), rural families have learned more about how hazardous pesticides regularly enter their homes. When confronted by these realities, the agrochemical industry argued that they cannot be held responsible for farmers' mis-use of pesticides, but this belies the industries' own findings. According to research financed by the Novartis Foundation, the single largest study on pesticide safety concerns anywhere, it is not realistic to expect the people of poor countries to manage these pesticides safely. As a result, the study concluded, "... any pesticide manufacturer that cannot guarantee the safe handling and use of its products should withdraw those products from the market." While industry and governments continue to tout the value of "safe use" training and education programs, these initiatives have been found largely ineffectual in curbing pesticide hazards on a large scale, and they continue to encourage the general use of pesticides. Companies and governments know that the distribution and use of highly toxic pesticides will lead to poisonings and neurological damage of rural families, yet they are steadfast in their resistance to halting their sale.

In cases where access to extremely and highly hazardous pesticides were restricted, no measurable negative effects occurred to rural economies (beyond perhaps, a decline in pesticide sales). Farmers simply found other alternatives, proving that these pesticides can be substituted by switching to non-chemical pest control or less toxic pesticides. The latter are

usually more expensive than highly toxics, but judicious use leads farmers to use them economically. Through knowledge-based methodologies, such as Farmer Field Schools, growers have shown that they can eliminate the use of extremely and highly hazardous pesticides with no losses in production.

Despite the claims of governments and industry, the problem with eliminating highly toxics never has been a lack of alternatives, but rather the political will to place the interest of the public over those of influential private actors.

Policy initiatives

Corporate influence over government policy has resulted in a failure to control pesticide hazards through traditional forms of regulation throughout much of the developing world. This has led the FAO's Director of Plant Production and Protection, to go beyond calls for the implementation of additional modest policy reforms such as the FAO Code of Conduct, and call for the elimination of extremely and highly hazardous pesticides altogether. In a bold public statement, he said, "There is no way to ensure the chemicals involved would be used within acceptable margins of risk in developing countries". A few developing countries, including China, Thailand and Viet Nam, are beginning to prohibit the use of the most toxic pesticides. Other governments are being called upon to follow these examples and speed up their withdrawal from markets the world over.

Despite such examples, however, most politicians have not shown the willingness to confront the pesticide industry over the sale and distribution of these products. As a result, most countries continue to permit their sale and distribution and companies promote them aggressively, including through cut-rate pricing. When publicly questioned about this, industry representatives and government officials typically blame farmers, talk about inadequate monitoring resources or call for more studies. Yet during an informal meeting, a representative from a large pesticide company told one of the authors: "We know the days of highly toxics are numbered. The industry has been planning alternatives for several decades. Nevertheless, it will continue to sell highly toxic pesticides until it becomes either economically or politically unviable to do so."

Taking charge through grassroots action

In order to make extremely and highly hazardous pesticides "politically unviable" greater public pressure is needed. In Ecuador, members of the national agroecology movement have proposed the elimination of these products. In addition to working with growers, they see the need to work with

consumers, to support them in shifting food choices away from that produced with these pesticides. The movement has proposed that by 2010 farmers, women, and children no longer suffer from the sicknesses associated with chronic exposure to highly toxic pesticides.

To achieve this, agroecologists are beginning to champion the following grassroots actions:

- Organize information campaigns based on existing studies that demonstrate the health, economic, and environmental consequences associated with the use of highly toxics.
- Promote the continuous learning on organically based alternatives to pesticides, in particular through farmer-to-farmer exchanges. This should include programs on "ecological literacy" – that is, helping rural people to learn how to manage their farm ecologies for their benefit.
- Protest and boycott the purchase and consumption of foods such as tomatoes, potatoes, and bananas when the seller cannot guarantee that they were produced free of highly toxic pesticides.
- Demand that government regulatory agencies place a label on products that are produced with highly toxic pesticides, informing that the purchase of that product indirectly contributes to the poisoning of men, women, and children of rural communities.
- Demand that government agencies, the Ministry of Education, local governments, the FAO, and other national and international organisations do not accept financing from companies that produce, sell, or distribute highly toxics. Further, public agencies should not collaborate in safe use programmes of highly toxic pesticides, since it is known that they cannot be used safely under the conditions of developing countries. Instead, programmes should focus on the elimination of the use of highly toxics.
- Establish ties with other like-minded international movements in the Americas, Europe, Africa, and Asia to demand greater corporate responsibility.
- Join with NGOs and social movements around the world in promoting private certification and other systems that guarantee the elimination of highly toxic products.

We urge LEISA practitioners and readers from throughout the world to consider similar actions in alliance with other sectors of society.

Box 2. Exposure pathways

To illustrate pesticide exposure pathways, we employed a "tracer" – a non-toxic fluorescent powder that glowed under ultraviolet light. Working with community volunteers, we added the tracer powder to the liquid in backpack sprayers and asked farmers to apply as normally. At night we visited homes with ultraviolet lights and video cameras to identify exposure pathways. During video presentations, community members were astonished to see the tracer not only on the hands and face of applicators, but also on their young children who played in fields. We also found traces on clothing and throughout the house, such as around wash areas, on beds and even on the kitchen table. The tracer study helped people discover how pesticides entered to home and how those who did not apply pesticides, in particular women and children, became exposed.

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The certification of wild plant collection

Heiko Schindler

Wild plant collection refers to the collection of medicinal and aromatic plants from their natural habitats. This activity needs to be carried out carefully as it can put pressure on the local resources. Growing populations, the conversion of land to agriculture and a high international demand for some species, can easily lead to habitat losses and to a complete depletion of these resources. This article presents the current situation of different wild plant collection projects in Bosnia-Herzegovina. These follow the "Organic" and "FairWild" certification schemes of the Institute of Market Ecology (IMO), an international third party certification body.

The main purpose of certifying the collection of wild crops is to show that collection does not endanger the ecosystem, and that the stability of the plant population or the ecosystem is not threatened. Organic wild plants only refer to those which grow naturally (without any agricultural interventions) and which come from a clearly defined collection area. One of the most important aspects of this process is a traceability system which allows the tracking of a product from its collection area to the place where it is consumed. For this to work, all activities, from the collection area to the sale of the products, need to be documented in detail. This guarantees that the organic quality of the product is maintained.

The collection of wild plants in Bosnia-Herzegovina

As a result of the recent war in the former Yugoslavia, the population of Bosnia-Herzegovina faces immense problems. Agriculture is mostly limited to subsistence farming, and faces many challenges: cultivation requires access to farm land. The landless, poorest and economically marginalised sections of the population are unable to practice agriculture, but can collect wild plants.

IMO is working with six wild collection companies in Bosnia-Herzegovina. Some of them collect only medicinal and aromatic plants, others collect these and also forest fruits and mushrooms. The companies are located according to their main collection activities: the companies that mainly concentrate on medicinal and aromatic plants are found closer to the Adriatic coast. This region boasts a vast diversity of plants with medicinal properties; the most important of which are *Helichrysum italicum*, *Salvia officinalis*, *Vitex agnus-castus*, *Satureja montana* and others. The Mediterranean climate and the high intensity of sunlight helps to produce products of very good quality. Collectors can go directly from their villages, such as Tupanari or Udbina, into the surrounding hills and mountains, or they are transported by the companies to the collection areas. They go out in small groups and collect plants, when the temperature is pleasant, and work according to their own schedule.

The collectors who also collect forest fruits, or the plants that grow abundantly in meadows, are organised in a similar way. They collect in groups, because there is plenty to collect. In contrast, the collection of mushrooms can be different, as some of the commercially interesting mushrooms do not grow abundantly. The most valuable mushrooms are the ones that do not grow everywhere, but only in special locations. So there are groups of collectors who collect mushrooms together, but often one collector will not want to share his knowledge with others because they would compete with him.

Advantages

Each collector has a contract with the wild collection company, which guarantees him or her additional security. Altogether, about 3000 collectors and family members currently benefit from the IMO organic certification in Bosnia-Herzegovina. They appreciate the additional security which they get through having the contract, as for some of them this is the only source of income. The main advantage of being certified as organic is that each collector can receive a higher price for his or her efforts. But there are rules concerning the sustainability of the collected plants, and the collectors are trained in these rules and collection methods. They must always, for example, leave a certain percentage of the plants they find in the wild in order to ensure sustainability. No endangered plant species can be collected, while actions that lead to habitat destruction or soil erosion are not allowed.

Collectors also use the wild medicinal plants for themselves. This is especially important in remote villages where there is no doctor. One old woman in the Vlasenica collection area says that she has never seen a doctor in her life. She has always used her own herbal medicine and is able to live from wild collected forest plants and mushrooms. Many collectors of mushrooms eat these mushrooms themselves, because they know about the high quality of this "meat of the forest".

Wild collection also benefits nature conservation, because it means that local people have more respect for their natural resources when these natural resources also generate money for many people. Another positive aspect is the conservation of knowledge: young people get to know the collected plants and their uses, and even if they are not themselves involved in collecting they learn about the traditions of collecting herbs and mushrooms in Bosnia.

A new certification scheme

In 2007, two of the IMO certified wild collection companies in Bosnia-Herzegovina also became certified under the "FairWild" certification programme. "FairWild" introduces a market mechanism which is equal to that of fair traded coffee, tea or chocolate. This concept requires that within one year of certification the collectors set up a democratic structure which represents them. It also guarantees that collectors and workers enjoy exceptional working conditions.

An additional benefit of this certification is that it demonstrates that there is no discrimination against particular groups of society or women in the collection process, and that child labour is avoided. It shows that the customary rights of the local community are recognised and respected. "FairWild" ensures collectors and workers a fair price and allows for social community development through the availability of a FairTrade premium fund. The FairWild certification scheme also obliges the buyers of certified products to establish long-term business relations with their FairTrade suppliers, which include transparent trade agreements, some kind of prepayment, guaranteed purchase of certified goods and payment of fair prices as well as a FairTrade premium. IMO is currently supporting and implementing FairWild in Russia, Kazakhstan and East Africa.

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Farmers in Malawi benefit from organic practices

Rosemary C. Ngoma

In Malawi, our forefathers used traditional methods of farming. They had enough food to feed themselves and the surplus was used for barter. Nowadays, however, hunger and poverty are the orders of the day for a common villager. Things began to change in the early 1960s when the Malawi government introduced fertilizer loans. Farmers were getting fertilizer loans with high interest rates, yet fertilizers were "burning" the soil's fertility. The soils are now so poor that today, if a farmer does not use fertilizer, it will be difficult to get any yield. However, few people can afford to purchase fertilizers because of widespread poverty. When there were many firms giving fertilizer loans, many people began growing tobacco. Trees were cut for the establishment of tobacco farms, and firewood was used during the processing of tobacco. There has been great deforestation as a result of the tobacco industry. This has brought about extensive gully erosion, and the scenery and natural vegetation of beautiful Malawi is now completely lost.

Fertilizer loans added insult to injury for poor local farmers, because firms charged high interest rates, and many people were unable to pay back their loans. This situation brought about acute famine, especially in our area, where many people went to prison for failing to pay back for the loans, and were then unable to work their land.

In the 1999-2000 planting season, Kingston Jeremiah Chidumula Nkhata, a retired Chief Primary School teacher in Mzimba district, in the northern region of Malawi, decided it was time to act. He knew that his forefathers grew crops without chemicals, so he thought it should be possible now. As a teacher is a scavenger for information, he receives international magazines like the *LEISA Magazine*. He collected information about compost from these magazines and soon started making compost. Later on, his entire family joined and supported his efforts and also made compost. The bumper harvest that Mr. Nkhata yielded, attracted many people to come and ask how he had achieved it. After seeing the practical work Mr. Nkhata was doing in his garden, many farmers wanted to learn about organic practices, and they decided to join together voluntarily. The members all agreed to name the initiative with Mr. Nkhata's third name. Thus we created the Chidumula Model Organic Farming Initiative, known as CHIMOORFAI.

Since then, CHIMOORFAI has grown very fast and attracted many members. There is no membership fee, and anyone can attend trainings and demonstrations freely. CHIMOORFAI has a training hall centre and demonstration plots, where members come to learn theory and then practical skills about compost making and its application. There are approximately 4500 members who have undergone such training. About 1500 of these are active members who have taken up organic practices. Members support each other, and trainers visit farmers to see their progress approximately once every two months. People also come from other districts and regions to learn about organic farming. Local and international NGOs also come to visit and learn from our activities.

In our research we have partnered with the University of Mzuzu and the Ministry of Agriculture and Food Security. CHIMOORFAI is committed to transforming the poor social

and economic welfare of its members. We want Malawi to be an organic producing country, rather than relying on the application of chemicals which have burned our soils and have brought other health hazards to our communities. The best thing about organic food is that it has a natural taste and flavour. Organic foodstuffs present no hazards to our health.



Photo: Author

Mr. Nkhata and Mr. Baloyi admire the healthy demonstration crop of maize and beans grown organically.

Objectives

The overall goal of the Chidumula Model Organic Farming Initiative is to improve food security in the rural households creating a sustainable and environmentally friendly approach to agriculture in Malawi. The specific objectives of CHIMOORFAI include:

- the restoration of soil fertility and soil structure by making and applying compost to field crops;
- developing organic farming methodologies for some specific areas, e.g. dryland and irrigated area;
- training farmers in organic farming technologies so that they acquire skills in compost manure making and good crop husbandry;
- training farmers in crop diversification and management of commonly grown crops in Malawi; and
- the promotion of sustainable farming practices such as crop rotation with legumes, the use of crop residues to improve the soil integrated pest management and minimum tillage.

We know that a good farmer never takes leave from making compost manure, as a person never takes leave from eating. However, there are still more challenges we face as an organisation. We have to go on foot to monitor other farmers' progress, there is a need for bicycles to make this work lighter. To make abundant compost manure for a larger cultivation of our gardens, we lack financial resources to purchase various tools. Finally, we recognise that we lack capacity building. We would like to partner with international organisations interested in organic and sustainable farming globally, to share our experiences and learn and develop more.

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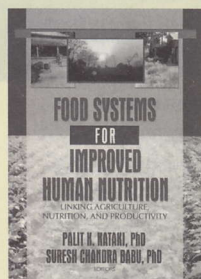
Understanding the links between agriculture and health

by Corinna Hawkes and Marie T. Ruel (eds.), 2006. 2020 Vision Initiative Focus Briefs - Focus No. 13. International Food Policy Research Institute, 2033 K Street, N.W., Washington, D.C. 20006-1002, U.S.A.

E-mail: ifpri@cgiar.org;

<http://www.ifpri.org/2020/focus/focus13.asp>

This is a series of 16 short policy briefs, which draw on a wide body of research conducted within and outside the CGIAR (the Consultative Group on International Agricultural Research). They provide a historical context to the links between agriculture and health, deal with specific health conditions and agricultural systems, and examine the challenges to linking agriculture and health in policy. The growing recognition by some actors of the relationship between health and agriculture suggests that opportunities exist for agriculture to contribute to better health, and for health to contribute to agricultural productivity. However, these experiences show that the linkages between agriculture and health are dynamic and complex, and that working across sectors presents significant institutional challenges.



Food systems for improved human nutrition: Linking agriculture, nutrition, and productivity

by Palit K. Katak and Suresh Chandra Babu (eds.), 2002. ISBN 1-56022-103-8. Food Products Press / Haworth Press, 10 Alice St., Binghamton, New York 13904, U.S.A.

E-mail: getinfo@haworthpress.com

The concept of food systems is presented through various papers in this book. This concept covers the linkages between agriculture, nutrition and malnutrition. Food systems strategies and activities will be specific to a region, but are related to production, acquisition, and utilisation of foods that affect human nutrition and health. It is increasingly recognised that agricultural scientists and human nutritionists should jointly explore options to solve the problem of malnutrition that remains when access to staple food for the poor has improved. This book is meant to stimulate debate and further research on the topic of addressing malnutrition through food systems. By presenting cases from different regions of the world, covering topics such as micronutrient deficiency, the nutrition transition, and improved cropping systems, the book aims to inspire improved programmes and policies for addressing food insecurity and malnutrition.

Ecosystems and human well-being: Health synthesis

by the World Health Organization, 2005. ISBN 92-4-154309-5. WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland. E-mail: bookorders@who.int;

<http://www.millenniumassessment.org/documents/document.357.aspx.pdf>

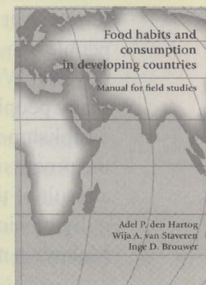
Since 2001, the Millennium Ecosystem Assessment has worked to assess the consequences of

ecosystem change for human well-being, and establish the scientific basis for actions needed to enhance the conservation and sustainable use of those systems, so that they can continue to supply the services that underpin all aspects of human life. The findings provide the strongest evidence so far of the impact of our actions on the natural world. Health risks can be a result of broader pressures on ecosystems, from depletion and degradation of freshwater resources, to the impacts of global climate change on natural disasters and agricultural production. Like more traditional risks, the harmful effects of the degradation of ecosystem services are being borne disproportionately by the poor. This report represents a call to the health sector, not only to cure the diseases that result from environmental degradation, but also to ensure that the benefits that the natural environment provides to human health and well-being are preserved for future generations.

Food habits and consumption in developing countries:

Manual for field studies by Adel P. den Hartog, Wija A. van Staveren and Inge D. Brouwer, 2006. ISBN 978-90-76998-94-7. Wageningen Academic Publishers, P.O. Box 220, 6700 AE Wageningen, the Netherlands. E-mail: sales@wageningenacademic.com

This manual deals with the process of changing food habits and consumption patterns in developing countries. Nutritional implications, together with practical information, are discussed in relationship to conducting field surveys. Part One provides insights into the dynamics of food habits and consumption and its socio-economic and cultural dimensions. Part Two of the manual gives practical information on small scale surveys to be carried out within the framework of a nutrition issue; including data collecting on food habits and the measurement of food intake. This comprehensive and clearly written manual can be used by professionals with practical or academic training and those who are involved in various types of food and nutrition programmes or related activities. It can be used as a handbook in food and nutrition training courses as well.



Tackling hazardous child labour in agriculture: Guidance on policy and practice

ILO, 2006. ISBN 92-2-118939-2. International Labour Organization, ILO-IPEC, 4 route des Morillons, CH-1211 Geneva 22, Switzerland. E-mail: ipcc@ilo.org;

<http://www.ilo.org/chlldlabour>

Agriculture is the sector where over 70 percent of child labour is found. This sector is also under-regulated, and the notion of the "family farm" being so common, a grey area between "helping out" and exploitative child labour exists and is complex. This manual has been produced to help policy-makers ensure that agriculture is a priority sector for the elimination of child labour. The package contains five guidebooks on a CD-ROM, all of which provide information and ideas needed to plan, formulate and implement policies and programmes to tackle hazardous child labour in agriculture. It can provide guidance to a wide audience from policy-makers to practitioners.

Appropriate Technology Vol. 34, No.1, Healthy food from urban gardens

Quarterly magazine. ISSN: 0305 0920. Research Information LTD, Grenville Court, Britwell Road, Burnham, Buckinghamshire SL1 8DF, U.K.

E-mail: info@researchinformation.co.uk ; <http://www.appropriate-technology.org>

This quarterly magazine features constructive innovations, new policies, and technologies which are leading to improved incomes for urban and rural families, to more sustainable production from the land, and to the alleviation of poverty. Vol.34 No.1 focuses on presenting various success stories in urban gardening for health from around the world. Each issue also carries a regular feature called "Health matters" which presents appropriate and agriculture-related health issues and updates.

Health: An ecosystem approach

by Jean Lebel, 2003. ISBN 1-55250-012-8. International Development Research Centre, P.O. Box 8500, Ottawa, Ontario K1G 3H9, Canada. Downloadable from: http://www.idrc.ca/in_focus_health

This easy-to-read book introduces and explains the Ecohealth approach, – the basis of which is the belief that our health closely mirrors the health of our surroundings. It recognises the inextricable links between humans

and their biophysical, social, and economic environments, and that these links are reflected in the population's state of health. Reconciling an ecosystem's health with the health of its human inhabitants is a new area of research, requiring input from scientists, community and interest groups, and decision-makers. This book describes this new approach, providing lessons and recommendations from various IDRC-supported research activities. It demonstrates how decision-makers can use the Ecohealth approach to formulate policies and solutions that are both immediately visible and sustainable over the long term. It is also available in French and Spanish.

Training resource pack on the elimination of hazardous child labour in agriculture

ILO, 2005. ISBN 92-2-117798-X. International Labour Organization, ILO-IPEC, 4 route des Morillons, CH-1211 Geneva 22, Switzerland. E-mail: ipec@ilo.org; <http://www.ilo.org/childlabour>

This extensive training resource pack is designed for farmer trainers to run training courses for their fellow farmers on dangerous child labour. The courses are meant to help farmers to learn about hazardous child labour as a basis for taking action to eliminate such labour on their farms and in their villages and communities. It raises the awareness of farmers about the problem of child labour and why it is an issue to deal with.

Mitigating effects of HIV/AIDS in small-scale farming by Ard Lengkeek, Marian Koster and Mundie Salm, 2007. AGRODOK-Series No. 44. Agromisa, P.O. Box 41, 6700 AA Wageningen, the Netherlands. E-mail: agromisa@agromisa.org; <http://www.agromisa.org>

This Agrodok provides ideas to assist small-scale farmers in sub-Saharan Africa to mitigate problems brought on by HIV/AIDS. Agriculture can be adapted to the specific needs of people living with HIV/AIDS by, for example, changing how the farm is managed and making better use of local resources. Although this Agrodok focuses on HIV/AIDS, the ideas can be useful for households with members affected by other chronic illnesses as well. This Agrodok is new. Some copies of the first restricted edition are already available from Agromisa. The final edition will be available later this year.

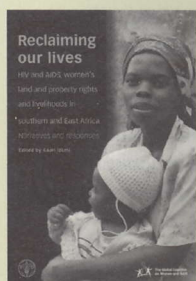
African Journal on Food, Agriculture, Nutrition and Development

2007. Special issue devoted to African leafy vegetables - Volume 7, No. 4. Articles are available as PDF files at the AJFAND website: <http://www.ajfand.net>
Leafy vegetables have a key role to play in providing healthy and sustainable diets for farmers and city dwellers in sub-Saharan Africa. Urbanisation, commercialisation of cuisines, global trade in staple foods, poverty, cultural erosion and environmental degradation are simplifying what is eaten and changing the nature of malnutrition throughout the region. Positive examples from other parts of the world suggest that successful food systems in transition draw on locally-available foods and traditional food culture within increasing market-oriented economies. The papers in this special issue show how the traditional food systems continue to provide the African people with their essential nutritional needs in a rich and culinarily interesting manner.

Reclaiming our lives: HIV and AIDS, women's land and property rights and livelihoods in southern and East Africa

by Kaori Izumi, 2006. ISBN 978-0-7969-2136-9. HSRC Press, Human Science Research Council, Private Bag X9182, Cape Town, 8000 South Africa. E-mail: publishing@hsr.ac.za; <http://www.hsrcpress.ac.za>

This is a collection of narratives from nine countries in the region. There is a short profile of each country, followed by personal stories from HIV-affected women and their children, and also women who have been involved in setting up support organisations in response to the HIV and AIDS crisis. In this way, the book aims to raise awareness not only about the impact of HIV and AIDS on women's property rights and livelihoods, but also about the active steps being taken by many grassroots organisations to respond to the crisis. These personal stories are compelling, often describing hardships but also showing resilience in the face of adversity. The book is meant to support the existing initiatives and to facilitate concrete action



to be taken to prevent land and property disputes and to strengthen women's land and property rights.

Cultivating a healthy enterprise: Developing a sustainable medicinal plant chain in Uttaranchal, India

by John Belt, Ard Lengkeek and Jeroen van der Zant, 2003. ISBN 90-6832-839-5. Bulletin 350. Royal Tropical Institute (KIT), P.O. Box 95001, 1090 HA Amsterdam, the Netherlands. E-mail: publishers@kit.nl

This study formed part of the debate on agricultural diversification in India, and examined opportunities for developing the medicinal plant sector in Uttaranchal, India. Medicinal plants play an increasing role in health care, culture, biodiversity and rural economies, and worldwide demand is growing. The mountains of Uttaranchal have the potential to become a major supplier. The question is how such an opportunity can be transformed into reality. In their commitment to "cultivate healthy enterprise", KIT and its partners developed an approach where stakeholders interact to construct a sustainable and equitable market chain. The authors believe that a sustainable medicinal plant chain can be developed, creating livelihood opportunities for people in remote and marginal areas. This case study provides some insights and can be of interest for similar initiatives in other regions.

The biodiversity of traditional leafy vegetables

by James A. Chweya and Pablo B. Eyzaguirre (eds.), 1999. ISBN 92-9043-404-X. IPGRI (now Bioversity International), Via dei Tre Denari, 472a, 00057 Maccaresse (Rome), Italy. E-mail: bioversity@cgiar.org; <http://www.bioversityinternational.org>

There is an undervalued reservoir of African



leafy vegetables. These vegetables are extremely important for food security, nutrition and poverty alleviation throughout Africa. However, the reservoir is under threat because the vegetables are being displaced in many areas. There is a decline in the production, utilisation

and diversity of these vegetables. The decline will have a significant impact on the nutritional status of households and incomes of women farmers who are the primary producers, transformers and sellers of these plants. In response to this threat to Africa's crop genetic diversity and its food security, IPGRI convened several workshops where national plant genetic resources programmes could identify priority species and carry out actions to stem this threat. The results of those actions are contained in this book. It provides chapters by national scientists on the diversity and uses of leafy traditional vegetables in Botswana, Cameroon, Kenya, Senegal and Zimbabwe. The conclusions outline ways that the great potential of Africa's plant genetic resources can be used to improve the welfare of African communities.

EurSafe

<http://www.eursafe.org>

EurSafe Secretariat, P.O. Box 79, 6700 AB Wageningen, the Netherlands

EurSafe is an independent organisation which provides a focal point for those who have a professional interest in the ethical issues involved in agriculture and food supply. Founded in 1999, this is an interdisciplinary, cross-cultural and non-partisan organisation which aims to encourage academic education, research, and international debate. It strives to achieve its aims through various activities, such as organising a communication network; organising scientific conferences; disseminating information; promoting visiting professorships and initiating special chairs at prominent universities. Their website includes varied information and links to other organisations, as well as access to EurSafe News, their quarterly newsletter.

The COHAB Initiative

<http://www.cohabnet.org>

COHAB Initiative Secretariat, P.O. Box 16, Tuam, Co. Galway, Ireland

The COHAB Initiative, Co-Operation on Health and Biodiversity, is an international programme established to respond to the gaps in awareness and existing policies on issues linking biodiversity with human health and well-being. The Initiative aims to establish an international, inter-disciplinary collaborative framework to support existing activities on biodiversity conservation and population health, and to support the Millennium Development Goals. The COHAB Initiative operates through partnership arrangements with a growing network of organisations worldwide. Its major focus areas include poverty reduction; food security, nutrition and dietary health; emerging diseases; natural products and medicinal resources; disaster prevention, relief and response; livelihood sustainability; and indigenous people's issues.

Ecosystem Approaches to Human Health

<http://www.idrc.ca/ecohealth>

IDRC, P.O. Box 8500, Ottawa, Ontario K1G 3H9, Canada

The vision of the Ecosystem Approaches to Human Health Program Initiative, at Canada's International Development Research Centre (IDRC), is one of improved health and well-being, sustainable ecosystems, more equitable development and less poverty. To achieve this vision, the programme supports research and interventions for improved health and well-being outcomes; strengthens linkages of research to policy; and aims to build capacity for ecohealth research. In seeking to improve human health and well-being while simultaneously maintaining a healthy ecosystem, the emphasis is on the design of solutions based on ecosystem management rather than health sector interventions. The initiative's website provides access to the Global Links newsletter, a five-language bi-annual publication, produced as a forum for all those working on health and environment linkages.

More and Better

<http://www.moreandbetter.org>

International Campaign Secretariat, c/o Terra Nuova, via di Vigna Fabbri, 39 - 00179 Rome, Italy

The More and Better international campaign was established to support and be a part of the fight to eradicate hunger and poverty. It advocates for increases to both the quantity and quality of assistance for agriculture, rural development and food as an important part of eradicating extreme poverty and hunger. More and Better is an independent campaign comprising social movements, civil society and non-governmental organisations from over 40 countries. The campaign lobbies for vital changes in national and international policies geared towards a substantial decrease in the number of hungry and undernourished people; a major increase in development aid for agriculture, rural development and food in the developing countries; and significant improvements in the quality of aid for agriculture, rural development and food.

Building a Better World

<http://devdata.worldbank.org/atlas-mdg/large.html>

In September 2000, leaders from 189 nations agreed on a vision for the future, now known as the eight Millennium Development Goals. These are time-bound targets for a world with less hunger, poverty and disease. The Building a Better World website is an online atlas with data per country for each of the eight MDGs. A key feature is that countries can be "resized" according to different criteria (such as the number of people with access to an improved water source, or its CO₂ emissions), showing how far each country is from meeting these criteria, and the MDGs. This very clearly shows the differences between countries and how much still needs to be achieved.

International Water Management Institute, IWMI

<http://www.iwmi.cgiar.org>

127, Sunil Mawatha, Pelawatte, Battaramulla, Sri Lanka

The International Water Management Institute is a nonprofit scientific research organisation focusing on the sustainable use of water and land resources in agriculture and on the water needs of developing countries. IWMI works with partners in the South to develop tools and methods to help these countries eradicate poverty through more effective management of their water and land resources. At the moment, IWMI has research projects running in 21 countries in Asia and Africa. Work is coordinated through regional offices located in India, Pakistan, South Africa, Sri Lanka and Thailand.

The Systemwide Initiative on Malaria and Agriculture, SIMA

<http://www.iwmi.cgiar.org/sima/index.asp>

c/o IWMI, Private Bag X813, Silverton 0127, Pretoria, South Africa

The Systemwide Initiative on Malaria and Agriculture (SIMA) was proposed in October 2000 during the annual CGIAR meeting in Washington DC, U.S.A. Today, it is a fully operational initiative based at the IWMI Regional Office for Africa, in Pretoria, South Africa. The Initiative has a number of projects that are being implemented in different countries in sub-Saharan Africa. The research is focused on the characterisation of a representative range of agroecosystems with the view of minimising malaria transmission risks through improved water, livestock and general environmental management. In addition to these ongoing research projects, SIMA has organised a number of "Agriculture and Malaria" related scientific meetings (e.g., seminars, workshops) and published a significant number of scientific papers.

The Global Horticulture Initiative

<http://www.globalhort.org>

This is a virtual international centre of excellence dedicated to research for development in horticulture. It was launched in March 2006 in Montpellier, France, under the auspices of the World Vegetable Center, the *Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement* (CIRAD), and the International Society for Horticulture Science (ISHS). Its funds are used to promote research projects, organise training and other forms of capacity building, and to invest in horticulture science information and communication technologies in the developing world.

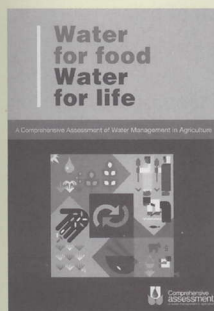
Water for food, water for life: A comprehensive assessment of water management in agriculture

by David Molden (ed.), 2007.

ISBN 978-1-84407-396-2. IWMI, Earthscan, 8-12 Camden High Street,

London NW1 0JH, U.K. E-mail: earthinfo@earthscan.co.uk

Managing water resources is one of the most pressing challenges in today's agriculture. It is fundamental to how we will feed the growing population in coming decades and to how we eliminate poverty and reverse ecosystem degradation. This assessment is written by many leading specialists and has chapters covering rainfed agriculture, irrigation, groundwater, fisheries, livestock, rice, land and river basins. It is attractively presented in colour with figures and graphs, with a special section at the beginning for decision makers. This includes eight key Policy Actions, aiming to inform investors and policymakers about water and food choices in light of poverty, ecosystems, governance, and productivity. The book is meant for practitioners, academics, researchers, and policymakers in water management, agriculture, conservation, and development.



Managing biodiversity in agricultural ecosystems

by Devra I. Jarvis, Christine Padoch and H. David Cooper, 2006. ISBN 978-0-231-13648-8. Bioversity International / Columbia University Press, New York, U.S.A.

With chapters contributed by a vast array of experts, this book looks at how farmers manage, maintain, and benefit from biodiversity in agricultural production systems. It presents the most recent research and developments in the maintenance of local diversity at the genetic, species, and ecosystem levels. The chapters are detailed and well-referenced, covering farmer management practices for crop, livestock, aquatic, and associated diversity (such as pollinators and soil micro-organisms) in agricultural ecosystems. Combining the thinking of social and biological scientists, the potential role of diversity in minimising pests and diseases is examined. Case studies are presented to show the potential nutritional, ecosystem-service, and financial values of this diversity under changing economic and environmental conditions. Many case studies show how farmers have used alternative approaches to managing biodiversity to enhance the stability, resilience, and productivity of their farms, pointing the way towards improved biodiversity on a global scale.

Recognising local innovation: Experiences of PROLINNOVA partners

by Chesha Wettasinha, Mariana Wongtschowski and Ann Waters-Bayer (eds.), 2006.

ISBN 1-930261-16-0. Series on Promoting Local Innovation. IIRR and PROLINNOVA.

Y.C. James Yen Center, Silang, Cavite, the Philippines. PDF file downloadable from <http://www.prolinnova.net>

This booklet compiles experiences of partners in the PROLINNOVA programme (Promoting Local Innovation) who are joining hands to enhance local processes of innovation in rural areas. Innovative experiences in ecological agriculture and natural resource management from around the world are described. These include field-applied approaches, methods to identify innovation processes and to recognise the innovations that emerge from such processes. The booklet includes short examples and some case studies of documenting these processes and giving value to local innovation.

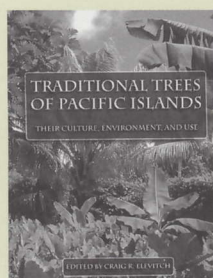
Traditional trees of Pacific Islands: Their culture, environment, and use

by Craig R. Elevitch (ed.), 2006. ISBN 0-9702544-5-8. Permanent

Agriculture Resources, (PAR), P.O. Box 428, Holualoa, Hawaii 96725, U.S.A.

E-mail: par@agroforestry.net; <http://www.traditionaltree.org>

The 80 Pacific Island traditional tree species described in this large book are representative of the many tropical trees that have had a long relationship with local people. These trees have become "traditional" by being intertwined with the culture and the day-to-day lives of indigenous peoples, for whom they provide edible fruits, nuts, leaves, and oils and serve as sources of medicine, fibre, fuel, gum,



resin, aromatics, timber and wood for numerous products of everyday importance. The authors of this book have assembled what is known about each tree, including information about the ethnobotany, biology, ecology, horticulture, agriculture, forestry, and agroforestry uses of each tree. The book is a well-designed reference material and is full of pictures. Some well-known trees such as coconut are clearly described, as are other lesser known species such as *malili*.

Transforming knowledge and ways of knowing for food sovereignty

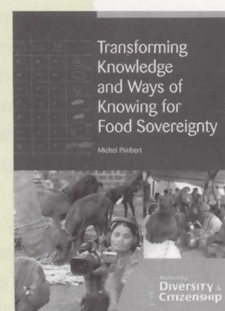
by Michel Pimbert, 2007. ISBN 978-1-84369-655-1. Part of the Reclaiming

Diversity and Citizenship Series. IIED, Endsleigh Street,

London WC1H 0DD, U.K. E-mail: info@iied.org ;

<http://www.iied.org>

Peoples' right to define their own food and agriculture –the concept of "food sovereignty"– is becoming increasingly known and accepted. A global grassroots movement is growing based around claiming rights to food sovereignty. This movement is faced with many challenges from big business and global politics. In this book, the author focuses on only one of these challenges: the need to transform knowledge and ways of knowing to regenerate locally controlled food systems. Critical reflections and proposals for action are presented "in a spirit of solidarity..." and as a contribution to our 'learning our way out' of the current impasse of industrial food and farming". The author recognises that "systemic" change is needed, and calls for an approach to the production of knowledge which devolves more decision-making power to farmers, indigenous peoples, food workers, consumers and citizens.



Rural development and poverty reduction: Is agriculture still the key?

by Gustavo Anríquez and Kostas Stamoulis, 2007. ESA Working Paper no. 07-02.

Agricultural development Economics Division (ESA), FAO, Rome, Italy. Downloadable from <http://www.fao.org/es/esa>

The principal objective of this paper is to present some of the conceptual issues regarding the role of agriculture in both rural and overall development, emphasising its role in poverty reduction. The authors also explore if agricultural development can be an engine of growth and poverty reduction in developing countries, and under what conditions. The historical views regarding the role of the primary sector in development are presented, and then, using original data, the paper argues that there was an historical misjudgement against the primary sector that served as a foundation for anti-agricultural bias in public policy until the late 80s. Finally, this paper explains how, under certain conditions, territorial/regional development strategies may prosper, but in other conditions, particularly in the least-developed countries' rural space, agriculture is still necessarily the starting point for rural development.

Positive feedback

The *LEISA Magazine* aims to “increase the exchange of high quality information on low external input and sustainable agriculture concepts and experiences”. In order to measure the results of our work we carry out various surveys and detailed studies. Having often heard that authors are frequently contacted by readers, we were keen to know more about what sort of contact this is, and if there are any interesting developments as a result of an article being published. So we designed a short questionnaire and sent it to all lead and second authors who had had articles published in issues 21.4, 22.1, 22.2 and 22.3. By mid-March 2007 we had a very healthy total response rate of 54 percent.

Readers' enquiries

The majority of authors are contacted by up to five people after their article is published. There were no authors reporting that they were not contacted at all. Authors are contacted by a broad range of people, with queries coming from NGO staff and researchers, colleagues and farmers. Just over half of these contacts are made through e-mail – a considerable number of readers prefer to contact authors by letter. ILEIA believes that, even in this increasingly digital age, it is still important to continue printing and distributing the *LEISA Magazine* in order to reach readers who do not have access to computers, as well as those who simply prefer not to read from a screen. The use of letters to contact authors seems to back this up.

The survey showed that the majority of enquiries are asking for further information or for assistance. However, a substantial number of contacts were made in order to offer information, contacts, references or comment on the content. This shows that information exchange, not simply dissemination, is indeed happening amongst the authors and readers.

The benefits of writing an article for the *LEISA Magazine*

Our authors' survey revealed some positive developments coming out of the contacts made through the *LEISA Magazine*. Fifteen enquiries resulted in a wide exchange of information and in the

establishment of new contacts. This is encouraging, as it shows that ILEIA is playing a vital role in raising awareness of the work going on in sustainable agricultural development, between and among actors. For example, eleven of these enquiries resulted in concrete activities, such as giving presentations, attending workshops or being invited to visit a particular project. These type of exchange activities and further outreach are very valuable and show the wider impact of the *LEISA Magazine*. It was also interesting to see that having an article in the magazine acted as a motivating factor, encouraging some authors to continue putting effort into their work. Many mentioned the satisfaction of being part of the wider LEISA network.

Authors also told us about other ways they have used their own articles. The most common use is as a teaching tool, but a small number also translate the article, put it on their website or in a library. A few also said that the process of writing the article helps them to analyse the experience they are describing, giving them a chance to reflect on their own work. This is an unexpected effect which may have far-reaching impacts, as the learnings are described in the article, shared with others, and may also feed into future workplans.

The responses provided by authors were, on the whole, positive. This short survey confirmed and clarified anecdotal evidence that information is exchanged between authors and the readership, to varying degrees and in different ways. It showed that authors play an active role in the exchange of LEISA information, even after their article has been written and published. We would like to thank them for this, while encouraging all readers to continue contributing articles and enjoy reading the *LEISA Magazine*.

The Editors

Call for articles

Issue 24.1, March 2008
Fair and green trade

Since the early 1990's “fairly traded” products have become well known and widely available. Realising that consumers' buying power can make a difference, various groups set up fair trade schemes whereby produce, initially coffee, was bought directly from farmers. By giving them a better price and a guaranteed market, farmers would benefit, and consumers could buy products which were bought on the basis of a fair trade.

Today, there is a robust and growing international market for “fair” and “green” products, ranging from coffee, tea, chocolate, fruits and spices to textiles and various other bulk commodities. As markets for fair and green trade products are expanding, we would like to look at some of the issues faced by LEISA farmers. While these products are becoming more mainstream, what challenges and opportunities does this pose for small-

scale producers? What strategies can be used to access international markets? What have been the strengths and weaknesses of farmers' organisations in meeting the growing demands, both in terms of quality and quantity of produce? How are the opportunities managed in terms of production, as well as accessing market information and market chains?

Quality control is a big issue with green and fair trade products. Certification is often necessary but can be prohibitively expensive for small-scale producers. Have any effective solutions have been found, such as community guarantee schemes or other ‘alternative’ certification mechanisms? And what about short supply chains, where consumers buy directly from producers? We would like to hear examples of the benefits of fair trade as well as the disadvantages, or difficulties encountered. As green and fair trade initiatives take off around the world, it is time to look at local as well as global opportunities, and

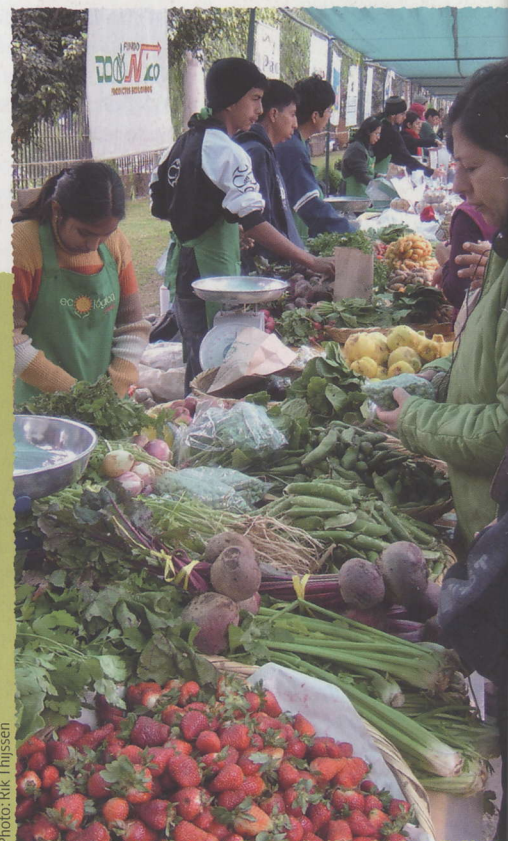


Photo: Rik Thijssen

Green and fair trade at the Bio Feria, the weekly organic market in Lima, Peru.

explore some current debates around this theme. Send us your experiences!

**Deadline for submission of draft articles:
1st December 2007**