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august 2001

The hunger hypocrisy

More than 800 million people are suffering from malnutrition and starvation today. A considerable amount of malnutrition even exists in “developed countries” due to poor diet. This situation exists in spite of global food supply growing faster than population in the past decades. It shows that the notion of “feeding the world” following the Northern industrialised model of agriculture is a simplistic, misleading cliché. What matters is access to food or to the means to produce or buy it. Achieving food security, therefore, means to eradicate poverty, which hinges also on the economic and political environment.

Claims that the world's hungry could be fed if only the agribusiness giants of the North were allowed to provide genetically engineered crops are hypocritical, because they are still “pies in the sky”, far away from practical implementation and cynical, given that resource poor farmers will not be in a position to buy expensive seeds and that developing countries do not have the institutional means to deal with the considerable risks involved.

The World Food Summit in 1996 plead to halve the number of the hungry and starving by 2015. The disappointing results so far indicate how low the commitment for radical improvement is on an international political level. The challenge to achieve food security without damaging the environment and depleting and polluting soils, water and biodiversity will have to be met largely by the affected people themselves.

Real hope is coming from initiatives that involve farmers in the South directly: A study commissioned jointly by Greenpeace and Bread for the World found more than 200 examples of sustainable, productive agriculture resulting in genuine improvements in people's livelihoods.

The four documented examples in this brochure from Latin America, Africa and Asia show how creativity and ecological understanding lead to an agriculture that fosters biological and cultural diversity. They stand for alternatives that are productive and adapted to their respective ecosystems. But they also carry a strong message for political decision-making both nationally and internationally: Do not delegate the responsibility for 800 million starving and malnourished people to a handful of agribusiness companies. Get serious about the commitments made five years ago in Rome. Create the enabling political environment for the poor to feed themselves and support the large number of successful approaches to produce sustainably. We must not allow the ongoing erosion of interest and support for the South to continue, denying the poor the most fundamental human right – the right to food.

Dr. Lorenz Petersen
Greenpeace International



Farida Akhter, a woman with visions – for the rural people in Bangladesh



New thinking in Kenya: good maize harvests without pesticides and genetic engineering

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A world of difference

The sun has long risen, and an ink-blue sky arcs over the mountains. But it is bitterly cold at the little experimental field 10,500 feet above sea level. Despite the cold, Prudencia Aduviri and her husband Gabriel Crisp'n have only thong sandals with soles made from old tyres on their feet. Shivering, they pull their hats down to warm their necks as they wait for the other peasant farmers to join them on the dusty plateau in the Bolivian highlands.

Today is an important day for the 21 families from the tiny village of Wenqaylla: it is the day they will decide which varieties of potatoes to plant in their fields during the autumn; the day that will determine how bounteous next year's crops will be and, therefore, how well – or poorly – the families will fare.

“Without potatoes we cannot exist”, the Ketchua Indian Prudencia says solemnly. “The potato is our life, which Pachamama, our Mother Earth, gives to us.” When she too finally catches sight of the consultants from “World Neighbors”, she resolutely takes her basket of raffia, presses the hoe into Gabriel's hand, and makes her way toward the small communal field. Below its topsoil lie the tubers on which everything depends.

Five years before, the “gringos” from Oklahoma had come to the former silver-mining region of Potosí, where to this day most of the highland Indians must wrest their crops laboriously from a barren earth. Leached-out, badly eroded soils and a dearth of fertilizer have the mountain farmers trapped in an all-but hopeless vicious circle of poverty.

Gabriel Crisp'n was one of the first people willing to listen to the ideas of the North Americans and their Bolivian colleagues. Even so, the initial efforts were anything but promising: “They proposed to us that we should scatter a portion of our bean and pea harvest as fertilizer onto the potato fields”, the 51-year-old Ketchua recalls. “Crazy! How can we do something like that to Pachamama! The harvest is her gift to us!”

That this age-old veneration of the Earth Mother could become a problem was something the “Neighbors” had not considered. They were not daunted, however, but began to search for other types of plants growing at altitudes between ten and thirteen thousand feet that would be suitable as fertilizer. They discovered Tarwi, a species of lupine.

“Tarwi was worthless for us. Its beans are so spicy that it takes a lot of work to make them edible”, Gabriel Crisp'n explains. “We couldn't believe that these lupines made such good fertilizer.” For hundreds of families from some



A farmer from Wenqaylla gets potatoes out of the soil.

thirty communities in the provinces Charcas and Ibáñez, the leguminous plant has meanwhile become a key element of organic, close-to-nature farming.

The “green fertilizer”, with its soft stems and leaves, makes for an outstanding compost. When the lupines begin to open their purple blossoms soon after Mardi Gras, the farmers pull them from the soil and plough them into the earth for the potato planting in October. The organism's secret ingredient is the tiny pink nodules on the white roots: highly concentrated nitrogen deposits, which can easily compete with any chemical fertilizer. One thorough weeding and turning over of the soil is all the extra work the lupine method requires. And that investment more than pays off: fertilizing with Tarwi has doubled and tripled the harvest compared with the past.

The potato foliage on the inconspicuous experimental field is rich and green too. Seven months ago the farmers planted different varieties as on the squares of a chessboard – Waych'a, Runa Nativa, Runa Toralapa, Alpha and several others – to see which would grow best under the local conditions.

Gabriel and his neighbours thrust their hoes into the rows of plants. Blow by blow the dusty soil

yields up its tubers. Prudencia and the other women gather the earthy fruit up, keeping the various sorts carefully separated. While they do so, the elders erect the “Wath’ia” - the igloo-shaped clay oven - at the edge of the field. Harvesting and the communal potato meal have gone hand-in-hand since the times of the Incas.

The farmers scrutinize the potatoes, weighing them in their hands, squeezing them and sniffing them. Gabriel is satisfied with the experiment. And he has made his choice. “The Alpha is useless here. I will plant the Runa Toralpa, and some Waych’a as well, though that didn’t grow quite as well. But the Waych’a is more flavourful and will fetch a better price if I have any left over to sell.”

Humberto Beingolea, an agrarian engineer and project director at “World Neighbors”, is also happy with the outcome of the seed tests: “Potatoes of every kind are the staple diet here, along with beans, noodles, and vegetables. If we succeed in persuading more highland Indians to employ our method, we can fight back against the poverty and hunger that otherwise drive people into the cities.”

But the 35-year-old Beingolea also knows that he cannot work miracles. The manifest climate change, the extreme geography, and the advancing erosion curb the potential. In some communities,

both large landowners and landless tenant farmers refuse to comply. The infrastructure is effectively non-existent: on the generally disastrous roads, it takes trucks eight hours to reach Cochabamba..

For this reason the “Neighbors” not only discuss new potato varieties and planting techniques with the farmers, but also improved storage methods. The organisation proposes soil regeneration, terracing, and the reforestation of the erosion-scarred Ketchua mountains. But it also promotes health and education, while lending special support to the women. These are frequently more receptive than the men – particularly towards family planning, without which eluding the grip of poverty remains very difficult.

“Milaujata Pachamama!” – Give us a miracle, Mother Earth! Burning twigs from the clay oven are glowing on a flat stone. Under the spellbound eyes of the neighbours, Prudencia casts incense stones into the coals and places an offering on the potato mound. The harvest will be good, the Indian woman is now quite sure of that. Prudencia had often prayed for just such a miracle when she placed the incense on the potatoes: Milaujata Pachamama.

Max Zeimet (text) and Sophia Evans (photos)



Gabriel Crispin and his son Esteban are proud of their high-quality potatoes.

A global revolution against hunger

The authors of a study published in the US magazine "Science" in April were feeling gloomy. "Most ecologists on this planet should be suffering from post-traumatic stress syndrome," said David Schindler from the University of Alberta. Himself included: he and nine colleagues from various American institutes had worked out what it would happen if the world's farmers persisted in their established ways. Ten million square kilometres of intact nature, an area bigger than the USA, would have to be turned into fields and meadows by the year 2050, and during the same time environmental pollution caused by nitrogen, phosphorus and pesticides would double or treble, numerous animals and plants would be threatened with extinction. "It's a good thing I'll be long gone by then," was Schindler's dry comment.

This kind of apocalyptic vision, however, guarantees good spirits in the boardrooms of food and biotechnology concerns. After all, it finally gives them an excuse to whet people's appetites for genetically engineered plants and animals. "The world needs to treble its food production by the year 2050," says Peter Brabeck-Letmathe, head of the food giant Nestlé. "How is that going to happen without genetic engineering?" According to Brabeck-Letmathe, it would be immoral of a company like Nestlé to renounce genetically engineered ingredients "due to pressure from a few privileged Europeans."

The bioengineering lobby skilfully exploits hunger in the southern hemisphere to spruce up its image. Until now, European consumers have strictly rejected genetically engineered food. After all, this designer cuisine doesn't taste any better nor does it bring any other benefits for the consumer – only risks. Even in the USA, where people love progress, the industry has recently had cause of concern about its image – not least because of the scandal surrounding taco shells baked from unauthorized, genetically engineered corn. The corporations reckon that, even if a detour via the third world countries is required, this currently scorned techno-food will one day become socially acceptable in the western world.

The United Nations Development Programme (UNDP) recently supported the genetics lobby: "Genetically engineered useful plants could be used to fight malnutrition and would be especially valuable for poor farmers south of the Sahara," is the conclusion reached in its Development Report this year. UNDP Director Mark Malloch Brown sees genetically engineered strains of rice acquiring previously undisclosed magical powers: "They bring 50 percent more yield, contain more protein, are more resistant to disease or drought, and grow

without the help of artificial fertilizers or pesticides."

And these are the plants that environmentalists want banned from the fields, although there are still over 800 million hungry people in the world? "There isn't a single genetically engineered organism on the market that can fulfil such promises," is the response given by Von Hernandez of Greenpeace in south-east Asia, "and the UNDP should know that the complex problems of hunger and agricultural development cannot be solved with some kind of miracle cure."

Nearly all genetically engineered crops currently on the market are either resistant to one particular kind of weed killer or they contain a hereditary disposition for the natural insect poison known as Bt-Toxin. The goal of genetic manipulation is not a better harvest, but simply more rational work in the fields. However, the only people who can benefit from this potential are those with machines, lots of land and enough money. Genetic engineering as performed today is of absolutely no use to poor farmers - who cannot even afford to buy artificial fertilizer or pesticides. Quite the opposite – in their poor soil the turbo plants would yield even less without chemical aids than the traditional, robust strains.

Even in industrialized countries, genetically engineered plants don't always deliver what their designers promise: a study by the US Department of Agriculture showed that when genetically engineered soy is planted, eleven percent more weed killer ends up in the fields than with conventional plants – and not less, as Monsanto & Co. insist.

Even if – hypothetically – benefactors were to genetically improve useful plants that had been adapted to the needs of the poorer farmers, and distribute them free of charge, planting them would still not be the solution. Natural relatives of specific cultures are especially endemic in tropical countries, with their abundance of varieties. By crossing them, their genetically engineered qualities can be passed on to indigenous plants and severely disrupt natural ecological systems.

'The complex problems of hunger and agricultural development cannot be solved with some kind of miracle cure.'

This risk is unnecessary, as the same can be achieved without resorting to genetic engineering. A study by the University of Essex shows that sustainable agriculture using fewer chemicals can put an end to hunger in the developing countries. Jules Pretty and Rachel Hine have evaluated 208 ecologically orientated agricultural projects in 52 countries for Greenpeace, “Brot für die Welt” and the British Department for International Development. Nine million farmers were involved in the projects under review, extending over an area of almost 300,000 square kilometres. Most of the projects do not meet western criteria for ecological farming but, according to the authors, they do protect natural resources such as water, the soil and biological diversity on a lasting basis.

Most important of all, they generate high yields: on average the fields produced 50 to 100 percent more crops once the environmental-friendly methods were introduced; the potential proved lower with artificially irrigated fields, but even here sustainable agriculture produced five to ten percent higher harvests. Of course there can be no comparison with central Europe, where organic farmers produce thirty percent less than their competitors using conventional methods.

This only seems paradoxical at first sight. Unlike in industrial countries, most farmers in southern countries don't use machines, expensive pesticides or much artificial fertilizer. There are, of course, huge plantations cultivating export goods such as coffee or oranges; these are spread out over the most fertile regions and make intensive use of chemicals. But two thirds of the farmers till their fields the way they have been doing it for centuries. Even though conventional agriculture is based on the knowledge experience brings, it is often poorly adjusted to today's environmental conditions and habits – and offers relatively little scope for improvement.

For centuries the tribes in Latin America and south-east Asia were able to burn out small fields in the jungle without doing any permanent damage to nature. After a few growing seasons, when the ground was exhausted, the people simply moved on. Now the population pressure on the world's last remaining tropical rain forests has increased to such an extent that slash-and-burn farming is no longer viable. During colonial times, many small farmers were forced to vacate the plantations and move to poorer areas - often at higher elevations more susceptible to erosion - where their traditional farming techniques failed to work.

Where the soil cultivated by the farmers is fairly fertile, the western style of intensive farming would probably bring a better short-term yield than the sustainable methods studied by Jules Pretty and Rachel Hine. In the long run, however, farmers would have to pay the same price as demanded by the “green revolution” in many regions: while food

production in developing countries has almost doubled since the Sixties through the use of high-yield crops, artificial fertilizer and pesticides, there has been a heavy price to pay – in the form of degraded soils, dwindling wildlife populations, disappearing plants, and serious damage to farmer's and farm workers' health as a result of pesticides.

'It is this very diversity in agricultural production that helps improve the rural population's income.'

Based on educating farmers, agricultural projects in India illustrate how traditional growing methods can be enhanced ecologically: numerous initiatives such as the Government of Rajasthan Watershed Development Programme teach the local population ways to increase the fertility of the land by simple and inexpensive means. These include skilled water retention and irrigation techniques; and planting trees, hedges or crops along the contour line to halt erosion. While these methods may not sound very spectacular, their impact is sensational: in villages that employ these methods, the yield of rice, wheat or sorghum has often more than doubled, while degraded earth has become fertile again and ground-water levels in dry areas have risen.

Experience shows that involving the local people from the very outset is the key to success for such projects. Instead of just following orders, the Indian villagers formed self-help groups and assumed joint responsibility for improving their living conditions. As the harvests grew, so did farmers' self-confidence and independence – the very opposite of what would happen if patented genetically engineered seed from western laboratories were distributed.

In India particularly, the rural population's fear of genetic engineering is repeatedly vented in protests that sometime erupt into violence. People are especially wary of what is known as “terminator technology” being spread. This prevents manipulated plants from forming seedlings, driving farmers into the suffocating embrace of the seed manufacturers.

Since time immemorial, the women have above all been responsible for collecting and managing the seed. Their position in society deteriorated still further when the men started buying new seed from salesmen every year. An unfortunate development, for the experts all agree that a better social status for women would form the platform for more prosperity and less distress in third world countries.

If farmers in the developing countries opt for genetic engineering, there would be even greater uniformity in the fields – fewer, genetically engineered plant types would drive out a variety of proven cultured strains. As the Essex study shows, it is this very diversity in agricultural production that helps improve the rural population's income. The “rice-fish” programme in the Chinese province of Jiangshu offers one impressive example: since farmers there have been using their flooded rice paddies for aquaculture at the same time, the profits per parcel have trebled. The fish bred there supply protein for the rural population's diet and simultaneously eat the eggs of young mosquitoes that transmit malaria. Similar successful attempts have been reported by villages in Bangladesh, where fish are not only bred in the rice paddies, but vegetables are also planted on the dykes between them. And farmers in the Vietnamese Mekong Delta use their land seasonally, alternating between breeding prawns and growing rice - without reducing the fertility of the land.

Sustainable agriculture often produces the same yield as intensive farming performed the western way. There is hardly another part of the world where as much pesticide was sprayed as over the rice paddies of eastern Asia, which moreover has proven ineffectual. For many years farmers in the Vietnamese province of Long Am had used chemicals more than once every season to attack larvae that were devouring their seedlings' leaves. Then researchers discovered that the insects had no impact on the size of the rice harvest. A media campaign using fliers and radio spots finally managed to reduce the use of poisonous chemicals by more than two thirds – the yield either remained the same or even increased.

Sheer poverty was what forced Cuba to shift to ecological farming. After the collapse of the Soviet Union – once one of the Caribbean state's most important trading partners - the farmers were

suddenly left with no artificial fertilizers, no pesticides and even no petrol for their tractors. People began to starve and the daily calorie intake fell from 2600 to below 1500. Fidel Castro's government declared an “alternative model”: oxen took over from tractors, chemical pesticides were replaced by biological pest control, ingenious crop rotation was used in lieu of monocultures. With success: at the end of the Nineties Cubans had an average daily intake of 2700 calories.

There are more than enough promising attempts at environmentally acceptable and yet productive forms of farming. However, there is no single solution that works everywhere: the ecological system, especially in the tropics, is so complex and varied that a made-to-measure agricultural strategy is needed for every different region, if not for each village. The climate and laws of nature need to be taken into consideration, along with the traditions and the social structures of the peoples. This opens up an almost inexhaustible field of activity for scientists and farmers willing to experiment. Whereas in 1989, seven billion US dollars of development aid went into agriculture, forest and fishing projects worldwide, in 1999 the sum was a mere three billion US dollars. “The heart of the problem,” says Hernandez of Greenpeace, “is the fact that investments in further developing sustainable farming methods are so obviously being neglected.”

Alexandra Rigos

The study "Reducing Food Poverty with Sustainable Agriculture: A Summary of New Evidence" by Jules Pretty and Rachel Hine can be found on the internet at <http://www2.essex.ac.uk/ces/ResearchProgrammes/CESOccasionalPapers/SAFErepSUBHEADS.htm>

More than Coffee – Help for Brazil's Smallholders

Organic fertiliser made of milk, sugar beets, bone meal and cows manure; banana plants giving shade and providing the soil with nutrients after their leaves have been converted into compost – these are the tricks of sustainable agriculture that make APTA, a Brazilian NGO popular among farmers in the Brazilian state of Espirito Santo. There are more than 70,000 smallholders along this part of the Atlantic coast

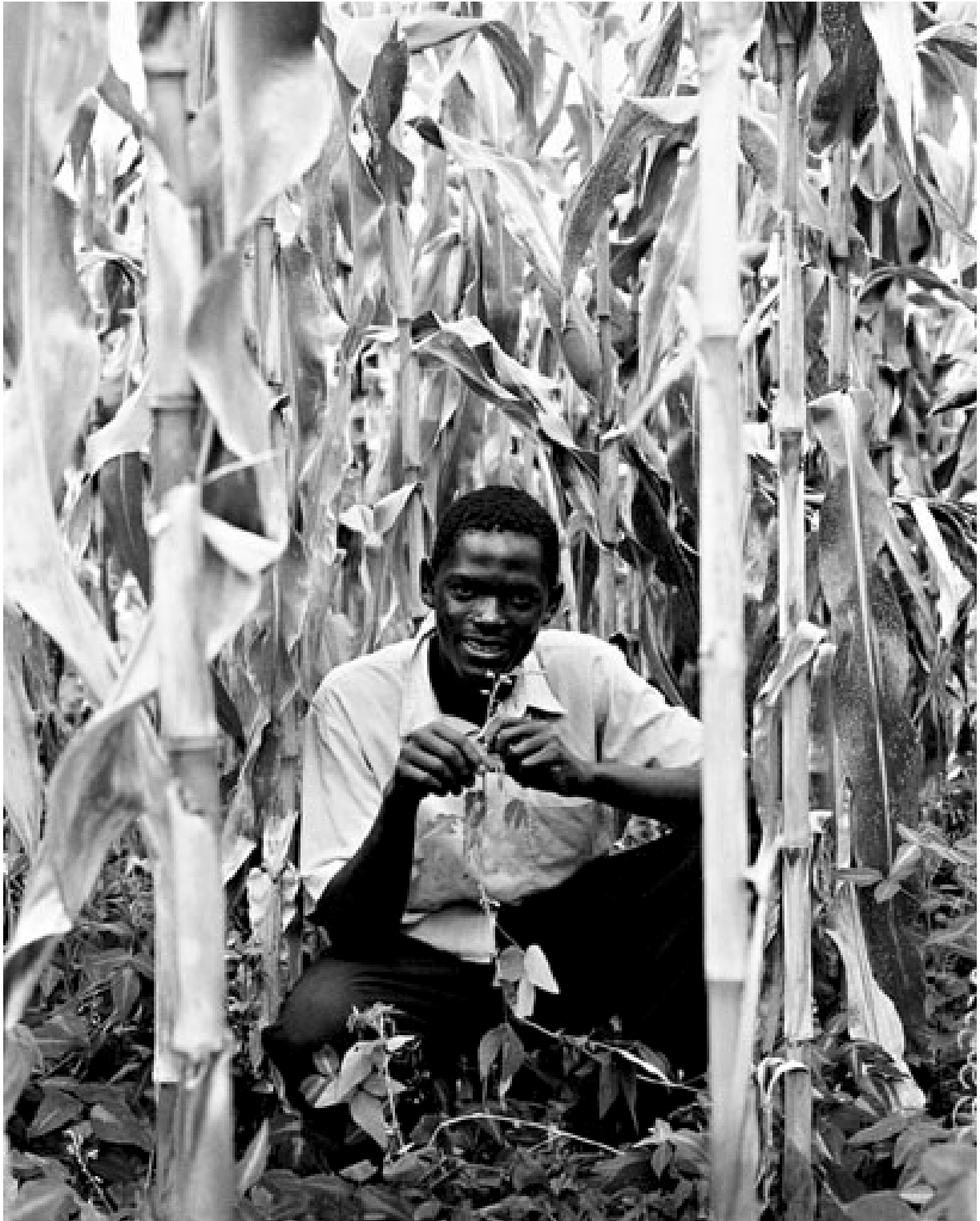
whose main source of income is coffee. Because world market prices are extremely low farmers do not even reach a third of their already low average income. They are not even able to ask for better prices for organic coffee. Because poverty and hunger are not only the result of bad harvests, APTA helps to increase harvests sustainably. New sources of income like growing fruit and vegetable are proposed and the way the produce is marketed is being changed: Rather than share the profit with middlemen, the

smallholders from the region sell onions, fruit and vegetables on the market and earn double the income.



High coffee yields in the shadow of trees

Herbs against moths and genetic engineering



Aman Rabilo is one of the pioneers using the "push – pull" method that delivers good harvests without agro-chemical input. Healthy maize like on his field is a rarity in Kenya. Most fields are moth-eaten and weakened by parasitic St. John's Wort.

The only question facing Lawrence Odek now is: should he build a stable for dairy animals, take another wife, or buy a draught ox? The farmers from the vicinity are not short of good advice. One after another, the men rise to their feet from the benches Odek has brought from the nearby church

to provide a proper setting for the "Field Day" - the agricultural information day being held at his farm. They praise their host's pioneering spirit and gladly reveal what other improvements, in their view, the 48-year-old farmer might be able to make. And if jests, derision, or envy should mingle with the

miscellaneous praise, Lawrence Odek knows how to respond: “It’s better to invite all the neighbours to the Field Day”, he explains, “much better than being pestered by people every day when they come to gape at my maize plantations - and trample down my harvest in the process.”

Two fields the size of tennis courts have turned the Odek farm into an agricultural attraction. One of them resembles the majority of maize-growing plots in the sun-scorched Lambwe Valley at the Kenyan shores of equatorial Lake Victoria: a square of barely hip-high, moth-eaten plants with ears as shrivelled as dried prunes. Purple St. John's Wort sprouts amid the tangle of yellowing growth, a parasite that feeds on the roots of the already sickly plants. And in direct proximity to this agronomic disaster, a crop rises in unblemished green, healthy, and so high that not even the tallest of the Field Day visitors can reach the tops of the plants with outstretched arms. As the farmers stand assembled between the two plantations, no jokes or teasing interrupts Lawrence Odek’s explanation of this incredible contrast.



Pupated moths.

When, roughly a century ago, colonial farmers set up the first maize plantations, the crop imported from America soon outstripped sorghum, the traditional staple. Corn was easier to grow, produced higher yields, and was tastier to boot. Unfortunately, it was also more susceptible to parasites from the alien African fauna and flora. For St. John's Wort, in particular, it proved the ideal host - as it was for a half-inch, mud-brown moth called *chilo partellus*, which was imported accidentally from India in the Twenties, and whose

caterpillars have been voraciously eating their way through East African corn fields ever since. Together the weeds and moths now destroy half of Kenya’s corn crop, at an annual cost of millions of dollars.

For the subsistence farmers of the Lambwe Valley, the damage is even more devastating. They lack the funds needed to buy the imported agrochemicals used by the big farms to curb their losses. They don't even have money to finance their children’s education, so most of them pay school tuition in kind, that is, with maize. If the harvest is bad, the children have to drop out of school or else the family will go hungry; sometimes both these things happen at once. At the end of a semi-annual growing season, Lawrence Odek used to have a yield of rarely more than three sacks of corn, some 400 pounds—hardly sufficient for a family of ten to manage.

Then, two years ago, Lawrence and his brother travelled to the nearby provincial capital of Mbita. They had heard that a Doctor Khan there had devised a means of controlling the corn pests and was now looking for farmers willing to try it out in practice. After some deliberation they agreed to plant one of their fields according to Khan’s new “Push-Pull” method.

Zeyaur Khan, a scientist from India, is a research director at the “International Centre for Insect Physiology and Ecology” (ICIPE), an organisation whose fame spread even beyond scientific circles in 1995, when its director - Hans Herren - was awarded the World Food Prize. Herren had been able to stop the African manioc harvest from being wiped out by the mealybug - not with sprays, as others had vainly tried, but by populating the fields with the pest’s natural enemies: ichneumon flies and ladybugs. Khan hoped to apply a comparable method to maize. If anything, the hurdles were even greater, since he had to contend not only with an insect but also with the St. John's Wort. While rigorous scientific methods conquered the moth, a lucky break did the same for the plant.

Khan’s team of scientists tested more than 400 different kinds of grass to ascertain where the imported *chilo partellus* moth and its only slightly less voracious African cousins deposited their eggs most frequently. The finding: moths love Napier. Given a choice between maize and this reed-like plant, 80 to 90 per cent of moths opt for the wild grass. That discovery gave Khan the “pull” element in his method. When planted all around a cornfield, Napier “pulls” the moths away from the useful plants. For the “pushing” he sought an herb that, sown directly between the maize, would repel the moths. This role was finally allocated to a South American legume called desmodium. Experiments revealed, however, that this silvery plant offered even more: it prevents rain from washing away the

topsoil, fertilises the ground by storing nitrogen, and – what no one had expected – suppresses parasitic plants. It emerged that the roots of the desmodium secrete chemical substances that keep St. John's Wort at a safe distance. The "Push-Pull" strategy created more work for the Odek brothers at first. But their efforts have been rewarded: they now reap 15 sacks of corn from a single field – five times the previous yield from their total acreage!

No wonder the other farmers are stepping up to introduce the method in their own fields. There are, however, two retarding factors. For one thing, the desmodium seed needs to be purchased (which is expensive) or grown (which takes a long time). Moreover, for "Push-Pull" to work properly, the farmers need precise instructions on how to lay out the plantation. At Lake Victoria, they have made a virtue of necessity: at "Field Days", the corn growers instruct each other in the method, an arrangement that proves much more effective than having outside experts tell the farmers how to work. Khan is convinced, however, that his method invented will not only work in Kenya. In 1999 Ethiopian and Tanzanian agricultural instructors were due to be trained in Mbita. Acute shortages of funds delayed the programme; both countries suffered poor corn harvests at the same time. To help solve these problems, Hans Herren used money from his World Food Prize to found the organisation "Biovision" - whose task is to spread the gospel of the "Push-Pull" method.

Stephen Mugo has no financial difficulties to contend with, although his research field is the same as that of Zeyaur Khan. The seven-figure budget for his project "Insect-Resistant Maize for Africa" (IRMA) is paid from Switzerland – by the "Novartis Foundation for Sustainable Development" established by the genetic engineering combine of the same name. Mugo views the involvement of the multinational organisation as "a humanitarian contribution to the war against world hunger". It scarcely needs mentioning that this contribution is to be made with the aid of an ecologically hazardous genetic technology.

The project opened its office in Kenya because of the "advantageous political situation", as Mugo concedes. Although the release of genetically modified organisms is not permitted officially, anyone knowing how to pull the right political strings can receive special authorization. Last year, the agrarian multi Monsanto started planting its genetically manipulated sweet potatoes there. Nor are the IRMA people expecting difficulties once their outdoor experiments with genetic maize commence in early or mid-2002. After all, as a harassed expert charges, the committee of scientists advising the government has been cleansed of critical voices. And the minister for agriculture,

when asked about his former opposition to genetic engineering, now feels grievously misquoted.

"These people know which side their bread is buttered on", says a journalist from a Kenyan trade magazine who asked that her name remain undisclosed for fear of reprisals. According to her information, the big corporations keep in the decision-makers' good books by means of carefully-targeted donations, sponsoring, and footing expenses – everyday occurrences in a country whose corrupt government is even pilloried by the World Bank and the International Monetary Fund. When Hans Herren addressed a convention organised by Novartis in Nairobi to demand equal funding opportunities for non-genetic methods, he was denounced by high-ranking government officials as a "racist" – on the outrageous grounds that the Swiss scientist presumably thought black Africans too stupid to manage the technology. The denunciation patently stems from self-interest. Insiders report that these same government officials have already launched a company that will manage sales of the seed once the development of the genetic maize is completed.



The Indian scientist Zeyaur Khan developed the "push-pull" method to fight the maize-demolishing moth larvae.

To IRMA coordinator Mugo, such mud-slinging is an embarrassment. The political and commercial aspects of the project are none of his concern; he emphasises, "I concentrate on the scientific work." And in that context, he claims, he can show dazzling results. His team, he says, was working on the "bacillus thuringiensis" which occurs as a natural insecticide in the soil, and has identified an active substance variant that is

especially effective against moth larvae. The technique of transplanting bacterial genes is well-known; in the USA, Bt-maize has been in the fields for years. All Mugo needs to find now is a variety of corn suitable for Kenya.

The scientist intends to tackle any impending environmental risks with the help of a group of specialists charged with investigating interaction between industrial products and the biological realm. He is unconcerned by the fact that independent experts regard the timeframe envisaged as downright negligent. The sole problem Mugo recognises is that the moth larvae will eventually become Bt resistant, not least as a rigorous resistance management program like that implemented in the United States is not viable in the African farmers' minuscule fields. But the benefits, he believes, offer more than ample compensation. "Push-pull", on the other hand, he regards as little more than a nice idea, because the planting sequence will overtax many of the farmers. Simultaneously cultivating three different types of plants is simply uneconomical. With Bt-maize, on the other hand, the technology comes in the seed, so that nothing can go wrong. "All the farmers have to do is sow, reap, and eat."

Of course, they would have to buy the seed first. Plus chemical herbicides (because Bt-maize is not immune to St. John's Wort) and chemical fertiliser, before their – quite substantial – investment can be hoped to bear fruit. In the "Push-Pull" method, in contrast, the do-it-all desmodium enriches the soil with nitrogen all by itself. "Quite apart from all the other problems", the Kenyan trade journalist comments, "the fact is that the

poverty-stricken African smallholders couldn't afford the genetic technology in the first place. That shows that winning the battle against hunger is not the objective here, but rather the marketing, under the mantle of humanitarianism, of a controversial technology."

Lawrence Odek can only agree. "There is not a single man attending my Field Day who could so much as afford the seed for conventional high-yield maize." If there is one farmer in the entire Lambwe Valley capable of making any investments in his farm, it would probably be himself – something he, incidentally, owes to the very double and triple planting from the "Push-Pull" method criticised by Mugo. Whereas the corn crop is devoted almost exclusively to covering food and school tuition, he can readily sell the Napier grass and desmodium; both are in high demand as fodder. Which explains why Odek is now faced with an altogether novel problem. Should he spend the money he has made on a cow barn and venture into the extremely lucrative field of dairy farming? Or should he rather save up for a draught ox, so that he can plough more land? Or would it be smartest to take a second wife, a practice quite customary for residents near Lake Victoria with money to spare? After all, the wife would be able to help both with the cattle and in the fields. "My neighbours keep giving me all kinds of advice", the farmer says. "But nobody can make the decision for me. Before I learned about Push-Pull, I was never faced with such dilemmas."

*Marcel Keiffenheim (text) and
Matthias Ziegler (photos)*



During "field days" farmers teach each other the "push-pull" method.

Genetic engineering produces risks, not solutions

An interview with the Ethiopian expert Dr. Tewolde Egziabher

The Ethiopian Dr. Tewolde Egziabher, aged 61, represents the developing countries at conferences on genetic engineering, biodiversity and gene patenting. The ecologist runs the Ethiopian environmental protection authority and the non-profit "Institute for Sustainable Development".

GP: Are you happy about the agricultural giants' offers to fight world hunger with new plants developed through genetic engineering?

Tewolde: Not at all. It's naïve to imagine that plants and their highly efficient gene pools - which have evolved over millions of years - can be improved by replacing or adding a new gene. The interaction between genes and proteins is far too complex. Which is why so many genetic experiments go wrong.

But don't you take their offer seriously?

No, they're missing the point. Famine in developing countries is mainly the result of unfair distribution. Today, the world is producing more food than ever before - but there are still more people starving than ever before as well. Producing even more food doesn't automatically mean that the poor will benefit. They simply haven't got the money to buy it. And genetic engineering isn't going to change that.

Couldn't the genetic engineering industry produce plants that are better adapted to dry or salty soils?

There's a lot of propaganda about this, but there's absolutely no proof that these plants are more prolific. The big companies actually have very different goals: they want to supply farmers with strains that are immune to specific pesticides, in order to make them dependent on these pesticides. The Life Sciences Industry also has a second goal: to take control of the developing countries' existing seeds and gene pool. The strategy is always the same: they supply free seeds until farmers have used up their own resources or the resources are no longer usable, and then they start charging fees.

That's a serious accusation.

It coincides with the experiences we've had with pesticides and artificial fertilisers. And it's the very same agro-chemical companies that are pushing genetic engineering today. Controlling seeds and charging the poor farmers for this service is not going to solve the problem of famine.

If the farmers' harvests improve, they can afford to pay the fees.

Some 30 different parties own patents for the notorious "golden rice". None of them charge fees at present. But once they have the farmers under their thumbs, they'll get their money. Agricultural companies are using patents to make us dependent on their seeds. There could hardly be a more

effective form of colonialism? The genetic engineering industry will effectively be able to hold us hostage. That isn't the way to bring about world peace. Rather, it will spark an unprecedented rebellion with waves of refugees heading for the most affluent countries.

Why does the UN development program UNDP support genetic engineering?

Because its work is dependent on money from the industry. The report definitely discredits the UNDP. I often wonder whether it is really still on the developing countries' side.

How can the world's affluent countries help?

By supporting developing countries' endeavours to improve their infrastructures. We need decent roads for transporting the food produced here to the markets. We need to preserve food, and be in a position to process it. And we need warehouses where we can keep surplus food from good harvests in store for harder times.

None of this is necessarily inconsistent with using genetic engineering in agriculture, though.

We should only start contemplating this new technology when we've solved the other problems. We don't need any new plants for food either; nature provides all the nutrients we require. These nutrients simply need to be distributed evenly. Genetic engineering doesn't present solutions; it presents risks. The tropics are home to an incredible array of species, and a valuable and irreplaceable gene pool. If genetically manipulated species were to be released, they could contaminate this gene pool, and many strains or species would die out. And that would be irreversible.

Do you believe that sustainable farming can produce enough food to eliminate famine completely?

Yes, I really do. Jules Pretty's study provides a lot of examples to support this view. Farming in the north has ceased to become an alternative for us. It destroys the soil and contaminates the ground water, which is ultimately our drinking water. We can use artificial fertilisers, but only if they improve the soil quality rather than destroying it. All the methods need to pass a test: they shouldn't be allowed to disrupt natural cycles and processes. Bio-farming is no longer a luxury for us. It is our only remaining hope.

Interview: Michael Friedrich

Good news from Bangladesh



Densely populated and threatened by floods and storms - Bangladesh is one of the poorest of the world. But there are seeds of hope: farmers bring in better harvests and live better since they use the methods of "Nayakrishi Andolon" – New Agriculture. The revolutionary simple model finds more and more supporters and can become an example for a whole region.

Korshed Alam is part of a revolutionary movement, but he doesn't carry a gun. His day begins at 4am, but he works for no boss except himself. His mission is political, yet it springs from the very soil itself. He farms a mere 3.5 acres in one of the world's poorest countries, yet the movement he is a part of has the potential to strike at the very heart of modern industrial agriculture.

Korshed's revolution is an ecological one. Like tens of thousands of farmers all over Bangladesh, he has abandoned the chemicals and hybrid seeds of 'modern' agriculture for something, well, even more modern. It's a shift that he's made not just because he is committed to the principles of organic agriculture, but because it simply makes sense.

"It's changed my life," he declares, squatting with other farmers in the shade of a large jackfruit tree in Nandoria village. "Before we changed, everyone had skin diseases from the chemicals. We couldn't even take the fish because they were poisonous, and there were no wild plants to eat because they were either dead or very bitter. Now we've got good food, and it even tastes different - it's healthier and there are more vitamins."

Conventional farming wisdom preaches the value of efficiency, of maximising the yield of a single staple crop like rice or corn. This is how Korshed used to farm. He would buy the latest 'high yielding variety' seeds at the local market, and spread artificial fertiliser on the soil. Obediently following the doctrines of the government and the World Bank, he would spray his crop several times to keep pests under control. But even as the poisons began to contaminate the soil and water all around him, he saw no alternative.

He explains: "Before we started using chemicals our soil was good, and just adding a little bit of fertiliser gave us a huge boost in productivity. But the yield soon began to go down, and we had to put on more and more fertiliser per acre. The amount of fertiliser we had to use went up a hundred times over thirty years. To make things worse, the price tripled over the same period. So everybody was losing - but they had to keep pumping in chemicals to try and get enough yield to pay for next year's seeds and to buy enough to eat."

Locked into a vicious chemical treadmill, farmers all over the country started to go bankrupt. Many had to sell their land and move to the cities in

a desperate search for work. And all the while no-one thought to question the basic economics of conventional agriculture. Corporate adverts for new hybrid seeds and ever-better chemicals flooded the billboards and the airwaves. Everyone thought there was no alternative.

Then came the 1988 flood. Floods are a regular occurrence in Bangladesh, and far from being the disasters they are often portrayed as, regular flooding is essential to renew soil fertility and fish stocks. But the 1988 deluge was unusual - it lasted for weeks, and many farmers lost everything. It hit particularly hard around Tangail, a small town three hours north of the capital Dhaka, where a small, radical NGO called UBINIG was conducting a research program with handloom weavers.

"We had no experience in agriculture even," remembers Farida Akhter, now Executive Director of UBINIG, whose name is the Bengali acronym for 'Policy Research for Development Alternatives'. But we felt we had to do something. So we gathered together a medical team, took care of drinking water and helped buy people clothes."



Women are traditionally the ones keeping the seeds.

But as soon as the water started going down, UBINIG - which had a strong environmental background - found itself in a quandary. A group of farmers approached Farida asking for financial support so they could buy chemicals and seeds to start farming again.

"We thought it would not help to supply them chemicals," says Farida. "Instead we said if they wanted to talk about doing something else, we could." So UBINIG called community meetings, and discussed with the farmers the alternatives to chemical-dependent farming. "It was the women who responded most positively," she recalls. "Most of the men, especially the younger generation, could not see any alternative to chemicals."

Then at one particular meeting an elderly midwife stood up. "We should not be using pesticides at all, because it destroys our bodies," the woman declared. She told the meeting about all the miscarriages she'd seen, and blamed chemicals for

ruining the health of both people and animals. It was a breakthrough. Other farmers chimed in, telling stories of terrible diseases, of spiralling debts, and of soil that although once renowned for its softness had become more recently as hard as cement. "Now our number one principle is no pesticide," says Farida proudly. "We got that first principle from that woman."

That one meeting didn't just change the farming practices of those who attended, it sparked a nationwide movement - now called the Nayakrishi Andolon. 'Nayakrishi' means 'new agriculture'. It's a name that was chosen to show that the practitioners of ecological farming were not going backwards towards traditional agriculture, but forwards to something new and better - having learned from the mistakes of the 'Green Revolution'. And the results were staggering.

Korshed is now proud of his fields. "Using modern agriculture in this field here I only used to get one crop - of sugar cane," he says, pointing across a stream to a small plot full of lush growth. "Now, because we've started inter-cropping I get seven - onions, garlic, potatoes, radish, lentil, pumpkin and sweet potato. And I still grow sugar cane in between. I don't have to buy any chemicals, and I can sell the surplus at the local bazaar." Instead of artificial fertiliser, nitrogen is fixed in the soil by leguminous crops like pulses and okra ('lady's finger'). Korshed pulls up an okra plant, and shows how the root clump is clustered with white nitrogen nodules. Compost is made from water hyacinth (which grows ferociously on all the ponds, and used to be considered an invasive weed), banana leaves, rice paddy straw and cow dung. In Bangladesh's steamy climate it rots down in less than a month. The soil is soft and covered in worm casts. "They are nature's plough," he says. Seeing this example in Nandoria village, ten villages around have declared themselves Nayakrishi, and eighteen more have expressed interest.

Throughout Bangladesh a total of 65,000 rural households have now converted to practising Nayakrishi. UBINIG has established five Nayakrishi centres in different parts of the country, which hold workshops for farmers and co-ordinate the sharing of knowledge between different villages. The centre at Tangail now employs 40 people, many of them extension workers who travel by motorbike between the nearby villages to hold the weekly Nayakrishi meetings within the communities.

One of these co-ordinators is Abu Bakar, a 25-year-old former farmer. Sitting cross-legged on a mat in Nallapara village, he is joined by 20 local farmers and their wives, as well as a crowd of eager children. Puffed rice is handed round as he works through the various agenda items. This week the discussions focus on making an inventory of seeds. Now is the time to plant paddy rice seedlings in

well-tended seedbeds, to be planted out later in bigger fields after the rains. In addition, new banana trees can be put in, and the bamboos which grow in profusion throughout the village - and are used for everything from buildings to bridges - are 'pregnant' and so should not be cut. It's very detailed and very practical. Abu Bakar runs two to three of these meetings per day, covering 13 villages and 17 hamlets in total. "My main concern is to involve more farmers and to listen to their concerns," he says. "More people keep coming to meetings because they're curious to see how it works, and the number of Nayakrishi farmers is increasing rapidly."

One of those attending the meeting is 58-year-old Hayet Ali. "Before I started Nayakrishi the water was so poisonous you could not put your feet in," he remembers. "We had lost many of our local varieties of seed because the government was promoting hybrids. The soil condition was hard, and we were all losing money on chemicals and buying seed. Then after the 1988 floods we started talking with UBINIG about alternatives. We found immediately that with mixed cropping rather than monoculture we were eating better than before. We were eating our own varieties of rice and vegetables, and soon we had some left over to sell so we were gaining financially too. And our health was improving - skin diseases, stomach problems and even cholera had all gone."

Perhaps the central thrust of Nayakrishi is the promotion of diversity - not just in the varieties of seed but in the whole ecosystem they are grown in. Nayakrishi fields are teeming with life - birds, insects, frogs and fish splash, plop and flit about in between the crops. It couldn't be more different to the average European field, where acres of the same crop stretch into the distance and even hearing birdsong is a rarity.

"See this fence - it has fifteen varieties of tree growing in it," says Raiqul Haque, universally known as 'Tito', the energetic director of the coastal Nayakrishi centre near Cox's Bazaar. "Birds are coming in and making nests. Fallen leaves are decomposing on the soil, so that's food for micro-organisms, and we're getting some grass and other uncultivated plants coming. That's diversity for you - it's all over the place."

Touring the centre, his enthusiasm is infectious. "See that pond?" - he indicates over to a green patch of water, the surface of which is continually rippled by fish coming up to catch flies. "The droppings from the ducks are the best feed for fish. And those chickens over there - we've got 31 varieties of chicken. We're not even ploughing here - the soil is so fertile you can just stick seeds in with your finger."

He turns round again: "Look - if I use pesticides, I'm destroying all the life-forms, friendly

insects too. If I use fertilisers I'm destroying micro-organisms in the soil. If we leave the insects they become food for the chicken. Only by ensuring biodiversity can we ensure food security for everyone." Partly because of this commitment, the Cox's Bazaar centre has been running a programme to replant the area's lost mangrove jungle - once the home of tigers, elephants, monkeys and crocodiles - which was destroyed by commercial prawn farming during the 1980s.

This philosophy turns the conventional view of farming on its head. In Europe farmers still think they have to abandon biodiversity altogether, by turning over their fields to a single monocultural crop. Mountains of wheat pile up, and therefore food security is ensured. Surely Bangladesh, plagued as it has been by famines and malnutrition, should aim for the same thing?

Tito shakes his head vigorously. "No, you don't understand. I'm talking about food security for all life forms, not just for humans. That's not possible without biodiversity. I might be getting one crop for me, but what about the trees, the insects, the grass and the chickens?" Put simply, the Nayakrishi view is not to see humans as separate from nature, dominating it. Instead, humans are part of a much larger cycle of life, all of which has a value. It's a much more expansive concept than straightforward organic agriculture, which sees abandonment of chemicals as the major goal. Instead Nayakrishi sees the protection of the entire ecosystem as central to the human role.

Farhad Mazhar, Farida's partner and co-director of UBINIG, has a story that illustrates the concept well. "When I go into a village to do training, the first thing I do is to give a farmer a stick, and tell him to hit the nearest child with it. He says: 'No, I won't do that.' I say: 'Why not?' and the farmer says: 'Because it would hurt him.' Then I ask the farmer: 'So why do you put pesticides on the land, which hurt the other life?' This is an ethical principle. Insects and birds all have a right to food. So why cut a plant when it is food for another animal?"

It's perhaps a consequence of this approach that makes Nayakrishi farmers have a rather different concept of the 'household' than is usual in the West. In Europe, a rural household might include a farmer and his wife, their children, and occasionally an older relative or two. In Bangladesh, cows, goats, chickens, even trees and wild plants that grow around the homestead are all considered part of the 'household'. Trees help shade the huts and beaten-earth courtyard from the glare of the tropical sun, whilst also providing building materials, fuel and fruit. Wild plants - so long as they're not contaminated by chemicals - have all manner of medicinal uses and food value too. As the evening draws on in the Cox's Bazaar centre, a flock of doves gathers on the roof of one of the

huts, cooing gently. Tito scatters them some seed. "They too are Nayakrishi members," he beams.

Spend some time in a Nayakrishi village and all your preconceptions about Bangladesh begin to evaporate. There's a gentle rhythm to life which is a world away from the TV images of floods and famines. Children play hide and seek in amongst the jute and sugar cane stalks. Dogs stretch out idly in the shade, whilst untethered cows wander in the fields, grazing on weeds and old rice stalks. But there's some other quality to the village which makes its unhurried pace doubly attractive. At first you can't quite put your finger on it. Then suddenly the truth dawns. People actually talk to each other. All the time. And even more shocking, they are happy.

Happy? How many European village meetings could you go to where farming people would smile, laugh and declare themselves 'happy'? "Shuki! Shuki!" (Bengali for 'happy') is a common refrain. No BSE, no foot and mouth disease, and a real community where people still live together and help each other out with seeds, advice and good company. Sound idyllic? Welcome to the Nayakrishi Andolon.

The focus on community life is no accident. It's one of the key pillars of the Nayakrishi approach that farmers should work together - especially on saving seed. Every household has its own seed bank, and every community has a shared seed centre where resources are pooled. And as a third backup, each regional Nayakrishi centre has a 'Seed Preserving Centre' from the whole area, storing literally thousands of local varieties of crop.

Each seed centre is specially designed so that it's kept cool, and the air circulates. In the Tangail centre, hundreds of glass bottles hang from the beams of a wooden hut - each with a different colour according to the amount of light that the seed prefers. Each is carefully labelled with name, place of origin, scientific name and number. Altogether this seed centre contains a staggering 1400 different varieties of crop. There are 298 varieties of rice, 68 varieties of bean, 16 of corn, 31 of wheat, 36 of chillies, 113 of jackfruit, 7 of potato and 4 of mustard seed and many more. Each variety grows best in a particular type of soil and at a particular time of year.

There's an immense skill in keeping seed - in knowing exactly which conditions to keep it in, and how many times to dry it in the sun after harvesting. It's knowledge that was traditionally kept by women, increasing their status in the community and the household. "We get much more respect because we are the ones keeping the seed," says Sharbanu Banu in Nallapara, wrapping a bright red sari around her shoulders. "It really binds the family and the community together." She smiles.

"Sisters keep seeds in your hands'. That's our slogan."

These may be household concerns, but Sharbanu doesn't just see herself as part of a local or national movement. "It's global," she says. "Last year we had a three-day gathering of farmers from all over, including from abroad. The biggest issue was about the patenting of seeds - foreign transnational companies steal our seeds so they can make a profit. If some company comes round here, we don't tell them anything." Several farmers from nearby villages have been to protests in Dhaka, and some went on an international 'People's Caravan' all over Asia in 2000, meeting other farmers and spreading the word.

"If we go for ecological agriculture then we are really fighting transnational corporations," says Farhad Mazhar. "We're not just saying: 'We don't want Monsanto', but we can actually show that we're much better off without Monsanto." It's not a dogmatic position: "I'm not against the market, or even international trade. It's just that trade should be non-exploitative, and local needs should come first. Now we've found that Nayakrishi agriculture is more economically viable than conventional modern farming, many households are beginning to go into cash crops for the market too."

But even as one battle seems to be going well, new storm clouds are gathering on the horizon. Genetic engineering is the new buzzword amongst the seed and chemical corporations - and Asia is being targeted by companies like Syngenta, who are eager to sell patented GM seeds to farmers across the continent. Syngenta has hit upon 'golden rice' as a key promotional too. The new rice is genetically enriched with vitamin A, supposedly as a way to combat malnutrition.



The ducks eat the harmful insects in the paddy-fields, their faeces are used to feed the fishes.

Haroun Rashid, who farms 2.5 acres around Baratia village near Tangail, is unimpressed. He hasn't heard of 'golden rice', but he understands immediately what the game is. "In that rice we'd get only one kind of vitamin," he counters. "What

about the other kinds of vitamins." Another farmer adds: "Imagine if one person out of a family of seven is vitamin A deficient. If you feed them all 'golden rice' then the other six will get sick!" Everyone laughs, and the decision is clear. "No, we're not interested in golden rice," confirms Haroun. "We've had enough of these chemical things. Enough is enough."

Instead of importing yet more innovations from the corporate laboratories of Western agribusiness, the practitioners of Nayakrishi are intent on exporting some of their ideas into a farming system they see as destructive even for those who seem to benefit from it. "Western farmers have a miserable life," says Farhad. "I know, because I have lived with them in Canada. People are very unhappy, and there are many cases of suicide." But surely Europe at least is self-sufficient in food. "That's a myth," replies Farhad. "Europeans produce 1 calorie of food by spending 9 calories of energy. In Bangladesh we get 3 calories of food with 1 calorie of energy. All the oil and fertiliser come from pirating the resources of other countries using military and trade power. It's not an argument to say that Europe is self-sufficient in food."

"Last year I also visited some farmers in Canada, and it made me realise just how much better off we are in Bangladesh," agrees Farida.

"One farmer had 7000 acres and several huge tractors, but only his son there with him. He was lonely and I felt so sorry for him." But surely she's not suggesting that life is better in a Bangladeshi village than, say, a German village? "Yes I am," she replies calmly. "Life is far better in a Bangladeshi village than a German village because people there cannot lead a normal life. The government is paying them not to cultivate. It's like a museum. But in our villages there's a community - there are living people there." But what about poverty? "People in Northern countries suffer from a poverty of happiness," she says. "It's difficult for them to see that they don't have certain things we have."

And as for famine? Well, here's a typical menu for an evening meal at the Tangail Nayakrishi Centre: Local paddy rice (speckled brown, not sticky, with a subtle nutty flavour), dhaal (lentils with onion, garlic, ginger, oil and water), green beans with jackfruit seeds (life soft nuts) cooked with amaranth, fresh-water prawn and pumpkin leaf (cooked like spinach with a hint of chilli) and fresh fish (cooked with onion, turmeric and other spices in a mouth-watering sauce). Followed by fresh, sweet mangoes and cow's milk.

Anyone for a bowl of genetically engineered vitamin A rice? Thought not.

Mark Lynas / Karen Robinson



Greenpeace demands:

- **Food is more than a commodity – it is a basic human right.** This must be reflected in the policies of governments (North and South), international organisations and the private sector. The 1996 'Plan of Action' as a result of the 'World Food Summit' was a modest start, but real progress will only be achieved, if the poor are enabled to feed themselves.
- **The large number of successful models for sustainable agriculture must be applied globally.** Rather than pushing the agenda of a handful of agribusiness giants Greenpeace demands that these models of sustainable agriculture be applied, further developed and refined in a truly participatory fashion for the immediate benefit of farmers and the livelihoods of the rural poor.
- **International organisations like the UNDP must reconsider their controversial techno-enthusiasm in agriculture.** Rather than focusing on theoretical 'potential benefits' of Genetic engineering that are far away from materialising, international organisations must stop ignoring the ecological risks involved with such technologies and redirect their attention towards the immediate direct needs of the poor (the people that supposedly justify the UNDP's existence).
- **The basic human right of food for all must take precedence over trade agreements.** Food sovereignty should rank above WTO procedures.
- **The "true costs" of food (including the environmental costs and benefits not reflected in prices) have to be the basis for structuring incentives in agriculture policies:** so far, neither the environmentally beneficial aspects of ecologically sound agriculture nor the destructive effects of conventional farming are being adequately addressed by agricultural policy and the incentive structures it creates.

