

Technology and extreme poverty

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Poverty is first and foremost a generic. It is difficult to define such a varied phenomenon. While it is essential to distinguish between destitution, extreme poverty and economic marginalization, these terms have been overused. The term poverty needs to be applied sparingly. Mental and spiritual poverty also need to be included as two key concepts, indispensable to sustain the economic world. Three billion people or half of the world's population live below the poverty line, as defined by the UNDP, with less than two dollars a day. Furthermore, there are also other poor people, such as those rich people who are not aware that they are mentally poor, poor in their inability to share their wealth'. The lack of values and social targets are characteristics of mental and spiritual poverty. Combined with wealth and power they have systematically provoked disasters. How can humanity overcome this very profound traumatism?

Poverty and basic needs

An African proverb reminds us of a fundamental truth: when actions speak, words are unnecessary. If so much is said about human rights today, it is because violations of those rights are cruel and unlimited. The United Nations adopted a 'Declaration on the Right to Development' in 1986. This Declaration is based on the definition of basic needs and guarantees a minimum standard of human dignity. It elaborates a range of different rights: the right to food, to employment, to housing, to health, to environmental quality, to cultural respect and even to freedom of speech. In being essential for human progress, these criteria are one of the very few common interests of humanity. It is this first step in the establishment of rules that will serve as a reference point for national legislation in the field of the environment as well as for fundamental needs such as nutrition, basic education, primary health care and so on. Nowadays, the majority of states sign any number of UN resolutions but do not keep their promises. They enjoy unlimited impunity, and hence benefit from unrestricted freedom without any international supervision or sanctions.

A partial definition of poverty might therefore be that a poor person is a person who is deprived of his or her basic rights. The specific case of the right to food illustrates the value of a normative approach, in hoping that it will serve as a guiding principle for other essential rights.

¹The wealth owned by the 100 richest people in the world exceeds the GDP of China.

The right to food

In 1998, the United Nations Committee on Economic, Social and Cultural Rights recognized that violations of the right to food (adopted in 1989) constitute crimes against humanity – as is the case when, for example, crops are destroyed during war or when humanitarian aid is denied to ethnic minorities in order to subjugate them.

However, the right to food does not yet have any legal basis. Political leaders close their eyes to situations of hunger and malnutrition; undernourished people have no political influence, and the media most often only cover headline-worthy famine. Several United Nations agencies (FAO, UNICEF, WHO and WFP) participate in campaigns against hunger and draw up recommendations and obligations relating to the right to food, but coordination and often cooperation between these different agencies is crucially lacking. In addition, in many countries the structure of the judicial system does not allow proper remedies where the authorities are lax or refuse to act. Examples include countries at war and dictatorships such as North Korea, Myanmar, Zimbabwe, Somalia, Ethiopia, Niger, Sudan, etc.

There can be no improvements in living conditions in developing countries as long as 250 million children are either dying of hunger or living with chronic malnutrition. We are living in an economic system that excludes and condemns hundreds of millions of children, particularly children from 6 to 24 months who suffer significant micronutrient deficiencies in terms of minerals, vitamins and essential amino acids in their cognitive development that result in serious 'social deficiencies'. These micronutrients are essential to daily life and are not 'extras' like the spare wheel of a car; they are vital and decisive for children's neuronal development, their ability to concentrate and learn and of course their social adaptation. In other words, we are in the process of creating hundreds of millions of children without a future, with limited cognitive development, who have no work and a propensity to create violence.

1. Malnutrition: strategic components

Malnutrition: a silent massacre².

It is essential to distinguish between hunger³, famine and malnutrition.

Hunger is a physiological sensation resulting from a shortfall in calorie intake that prompts a person to seek food.

Famine is the deprivation or disappearance of food on a large scale over a long period.

Malnutrition is primarily associated with the quality of food absorbed and its nutritional value. It is a pathological or weakened state arising from the prolonged exposure to food that does not supply all the elements necessary for health (sugars, lipids and proteins, but first and foremost essential fatty acids, vitamins, minerals, etc.). In poor countries, malnutrition is primarily caused by poor access to a varied diet.

² See Antenna Technologies' document on this subject at www.antenna.ch.

³ See *Hungry for Trade: How the Poor Pay for Free Trade*, John Madeley, 2000, Zed Books

The visible misery of chronic child malnutrition in slums across the world is a tragic expression of malnutrition. This type of malnutrition – often confused with hunger – results in irreversible damage to the physical and mental development of both children and breastfeeding mothers.

In India, more than 80 million children suffer from malnutrition. Yet India is perfectly capable, in scientific and technical but also in financial terms, to ensure that each child gets one meal a day in every kindergarten and primary school. This right to a school meal was enshrined by the Supreme Court ruling that obliges the states in India to facilitate the distribution of such meals, along with an indication of the calories provided. Despite the Supreme Court's decision, only a few Indian states apply these recommendations. It is not status-enhancing to invest resources for the benefit of the most destitute members of society. In other words, the budgetary options of the Indian government, despite the noteworthy judgements of the Supreme Court, are unlikely to be used to reduce malnutrition. It is left to Indian NGOs to ensure that the decisions of the courts are implemented.

A similar situation persists in Brazil, which – despite being the world's foremost exporter of soy beans in the world – has 20 million chronically-malnourished children.

Let us hope – since humanity does sometimes take small steps forward – that there will soon be enough courageous leaders, including women as a matter of necessity, to impose policies to eradicate extreme poverty, starting with the elimination of hunger and malnutrition worldwide. United Nations agencies and the 100-odd affected states are not showing us the way forward. In the field of food, each agency works in isolation and even, occasionally, in competition. The FAO is responsible for agricultural production, the WHO has committees dealing with micronutrients which make recommendations regarding vitamin A doses, while other committees prescribe daily recommended allowances of iron, selenium and so on. Meanwhile, UNICEF deals with children, the WFP with emergencies, etc. The structure is split, disparate and cut into slices. At the international level, there is no real coordination, nor any collective instrument that might make it possible to draw up a universal policy to reduce hunger and malnutrition. At the same time, NGOs and civil society, which continue to be the indispensable link between institutions and the field, are still very weak. Without NGOs, the catastrophe of chronic malnutrition would be even more serious; however, they are not managing to raise public awareness despite ongoing famine and chronic malnutrition. There is still a long way to go to awaken political consciousness and to mobilize states, particularly emerging states, to join an international effort to combat hunger. In addition, any policy to reduce malnutrition and hunger cannot make headway without the participation of the food industry. The international effort must be extended to all basic needs, including drinking water, public health, primary and secondary education and above all the emancipation of women.

Today, the WHO and UNICEF recognize that malnutrition has been neglected for too long and that it considerably diminishes the productive capacity of entire nations. Without international pressure the number of victims of hunger will progress. Why do most of the states reject a food policy requiring them to invest 1% of their GNP? The number of victims of hunger, the recent food riots and a criminal

absence of infrastructure in public health will not come to an end. Meanwhile, the vulnerability of the United States increases since they are persuaded that they have to give priority to invest in their military, rather than pursuing development-focused policies.

The great majority of people do not feel concerned about destitution or extreme poverty even in their own country, much less in countries which are far away. Are people born with a tendency to fatal indifference? Or are environment and education responsible for it? What is to be done? We believe that, if people were convinced of the necessity to act efficiently, they would join one of the thousands of existing local movements or associations.

Today, capital has no need of the poor: the rich, numerous enough, keep to themselves, like the members of a club.

The divisions between the rich and poor, along with political divisions, are at the root of social degradation. The free market locks the privileged few into a fortress and forces billions of powerless people into a subsistence economy from which they cannot escape. They then become instruments of violence and can no longer control their own lives. The FARC in Colombia, the Naxalites in India and many other 'liberation movements' are all manifestations of economic exclusion reacting to the violence of despair...so that the club of the rich cannot ignore them any more.

Unless the wealth accumulated by a few states, a few multinational companies and a few individuals contributes to development, we will return to the class struggle. It is now recognized that the actual form of the economy has to be reoriented. The highway which we are on now leads us towards inextricable problems. We cannot build a new world excluding the largest part of humanity, creating several dozens of local wars and dictatorships. Economic bridges no longer exist; rather, we see all-out capitalism that blindly follows the law of supply and demand alongside extreme poverty. A subsistence economy must be admitted as a necessary condition.

The hydro-electrical project in Omo valley in Ethiopia is a perfect demonstration on how states can make business using international money at the cost of the local population. This giant dam will be the highest in Africa with a power equivalent to 2 nuclear plants (800 megawatts). Half a million people will lose their land and livelihood, without mentioning the destruction of the ecosystem. The Ethiopian government planned to remit this land to foreign companies for various purposes. The World Bank and the African Development Bank are requested to lend \$ 1.4 billion! There has been no serious impact study and no consultation from the civil society. Such projects have nothing to do with the local population...who will be obliged to join slums. Ivan Illich's radical critique of industrial capitalism seems to have been confirmed 30 years after it was written.

The battle on three levels: international, national and local

In the battle against poverty we must first and foremost use the tools that are at hand: recognizing community responsibility, raising the awareness of local authorities, adapting production techniques to local needs and teaching through village or district schools – tools that are very, very local.

Paradoxically, those with the lowest incomes provide the best assets for our

economic future. They represent the solution for development: it is their numbers which assure the growth of the economic world. The challenge is to make such growth fair, which today's capitalism has knowingly and intentionally failed to do. Should we do this for the sake of our own well-being? For the sake of peace, which can only come about through human dignity? The fact is that development is a constitutional right, a right to life, for everyone, everywhere.

The international level

The United Nations Millennium Campaign is a welcome initiative, but who has heard of it? Who are the national and local decision-makers who got involved with it? In spite of the UN's efforts to organize a large information campaign, unfortunately results are weak. What has been difficult to achieve is to show what kind of action had to be undertaken. Were the targets unreachable or is it a lack of tools facilitating to undertake action? Avaaz (www.avaaz.org) is a good example of successful internet campaigning. Making a commitment is a more demanding step, but how much more fulfilling! Each of us could choose one subject in a specific field to improve living conditions for the most abject poor. Collective action will then grow from this personal commitment.

The fundamental question is: how to form leaders and creators of wealth receptive to an economy that benefits the greatest number of people? What kinds of initiatives might be effective in including those populations that are currently excluded from the economic system and enabling them to derive benefit from what they produce and a marketing system suited to their basic needs?

The Intergovernmental Panel on Climate Change (IPCC) acts to raise the awareness of both governments and the public by providing an objective source of information about climate change. Its reports furnish decisive input for discussions about global environmental management, as has been seen at the Bali Conference in 2007 and in Copenhagen in 2009. Why does a similar process not exist to combat the poverty that affects half of the global population? Is this considered less important?

If we wish to contribute to the fulfilment of the Millennium Development Goals, a new approach coordinated by the United Nations agencies, international NGOs and the large Western foundations will be necessary to implement policies for national poverty reduction. Organizational efficiency will only be achieved if we include women and youth. This process, which involves the poorest states, must be responsible for the implementation of projects. There is currently no international system that can monitor and evaluate the impact of investments on development. Dambisa Moyo's book on *Dead Aid* gives an impressive factual description of the loans, subventions and the worldwide known corruption linked to aid. Solidarity is crucial to lifting half the world's population out of poverty, but investment is equally important. Global assistance has amounted to some 2400 billion dollars over the last 40 years, yet Africa is poorer than it was in 1960 – and basic needs are far from being met.

Adapting our societies to the addition of two billion more people requires the urgent reorganization of the United Nations. Wars are self-evidently disastrous, but the 'market' and 'competition' are not up to the task of meeting the basic needs of three billion people. We need a mobilizing structure and large global projects organized by theme and by region to transform subsistence economies.

The United Nations climate conference held in December 2007 provides a good example of what could be done. The reports of the Intergovernmental Panel on Climate Change (IPCC), assisted by two UN sponsoring authorities – UNEP (the United Nations Environment Programme in Nairobi) and WMO (the World Meteorological Organization in Geneva) – opened the debate to the public and called for proposals for the implementation of binding agreements for the post-Kyoto period. Even though only few countries will reach the proposed objectives and major polluters will oppose effective and draconian measures, new renewable energy technologies will at last be promoted. The model, which has been given broad media coverage through the efforts of a scientific panel and the support of United Nations specialized agencies, provides hope for a strategy which challenges the major economic players.

The political and economic system has so far been incapable of internal reform which would direct the economy towards the needs of the very poor. How can we make large industrial groups become socially responsible? Is this aim absurd, a paradox? Can leaders participate in the radical reform that is required by new structures, co-managed by international institutions? Why might this not also be their role? Industrial and financial processes are inseparable from development. This commitment by businesses has yet to be defined in the form of a charter or code of conduct like those that already exist in large numbers. However, few of them refer to their responsibilities vis-à-vis development, like those that support fair trade or – as with some banks – participate in networks of business people and investors supporting microcredit.

With regard to politicians, their participation in development requires that they are held accountable at election time. The detrimental example of the United States' congressmen has shown how priority is given to war – such as the war in Iraq, now in Afghanistan, and tomorrow? Many other local wars are planned and budgeted already. The hundreds of billions of dollars are no longer sufficient to cover costs, or to fund new military technology, while a hundredth of this astronomical amount would enable a radical reduction in global poverty without affecting the gross domestic product of the United States.

No national debate has been conducted on this subject, either in the United States or in Europe. As long as arms dealers and their lobbies run the world, there is no hope of reversing the economic patterns of waste and plundering of the planet's resources. Moreover, democracy is curtailed, distorted, rigged; our votes change nothing because we miss the important points, even more so because information is manipulated by those same lobbies that own the media. Thus the people can no longer count on globalization to improve their living conditions with the necessities for survival. What is the use of international organizations if they do not keep their promises or fulfil their mandates when confronted with the collapse of standards of living?

The national level

At the national level, it is rare to find a state that has established a policy on the right to food along with appropriate practical actions. Rogue states also exist, which do not consider that their people need to eat their fill. Thirty-odd dictatorships scorn this basic right, most of them supported by Western states. In addition, food aid is

organized by countries that overproduce cereal crops. The United States and others apply foreign policy criteria when deciding who will receive cereal subsidies – and thereby enter into the circle of dependence. Reducing child hunger and malnutrition thus depends on the good will of rich countries and their leaders. The question is as much one of political will and a recognition of the problem by political authorities as it is one of finance. Of the members of the European Union, only four fulfil their commitments, while the others display only a weak intention of reaching 0.7% of their gross national product (GNP) by 2015, in line with the Millennium Development Goals. Switzerland, the richest country in Europe, again lowered its aid budget in 2006 to 0.39% of its GNP. A European evaluation would prompt us to take a firm stand against these sorry results.

States must be held responsible for the implementation of policies on the right to food. Everyone knows that there is enough food, enough agricultural production in the world to feed double the current figure of 6.3 billion people.

When will a supranational task force be set up, with the support of the Special Rapporteur on the right to food, the United Nations specialized agencies and NGOs? Although a WFP and UNICEF plan of action – Ending Child Hunger and Undernutrition Initiative (ECHUI) – gives cause for hope, states are not getting involved. ECHUI will not use any coercive measures in order to rescue the decisions and credibility of the 1992 FAO Conference. However useful a plan of action that defines a strategy to address the disaster might be, states will not be obliged to follow the recommendations. As always, the weakness of international law remains the major obstacle.

This programme must be combined with a plan to denounce the corruption that is linked to food aid and above all, for states to legislate local food security through sped-up agrarian reform. Let us not forget that the liberalization of trade has marginalized poor peasants and made them poorer. According to the FAO, the recent recession pushed another 100 million people into starvation. Riots and famine will continue. No technology will help and nor will genetic engineering or nanotechnology pretending to revolutionize the food industry.

Despite this, the myth that economic growth positively impacts on the living conditions and social progress of the world's most destitute people continues to gain ground. Why do developing and Western countries (malnutrition also exists in industrialized countries, particularly the United States) not grant NGOs the right to act, using the law to denounce the disaster of malnutrition? This ability to act has been widely recognized in the area of the environment, but not in that of human rights, despite the fact that the right to food is the constitutional corollary of the right to life.

The local level

Extreme poverty cannot be remedied by the extreme wealth of the rich. In the last 50 years, private capital has appropriated all essential goods such as energy, water and the financial system at the international and national levels. The local level is left out. Nevertheless, several niche areas do exist which might initially improve the lives of the very poor significantly. Thousands of positive examples, despite being little known for lack of exposure in the media, offer real solutions.

They start with the determination of local authorities – communes (Panchayats in India), districts, regional councils etc. – to assume responsibility for policies that fulfil key needs in their area.

Is the very, very local level entirely devoid of resources? The answer is no: even extreme poverty provides the occasional economic opportunity, such as barter, small kiosks and small businesses. The example of local food production is significant; the provision of access to family garden seeds (through microcredit if necessary), followed by access to shared land for the most destitute people in a society, is a solution available to many communities, even when the communal land is ‘squatted’ by owners. The worst-off people have no title deeds, despite having farmed their plots for generations. When local landowners or moneylenders illegally appropriate communal land, often by force, power struggles become inevitable. Landless people have to assert their local right to space for individual or communal ‘family gardens’. They can supply vegetables, fruits and therefore provide the calories and nutrients necessary to fulfil daily requirements.

The future looks very disastrous in most of the countries where over 80% of the farmers belong to the small and marginal sector, like in India, China and almost all African countries. Multinational agro-industry monopolies have free hand to alter farming methods and cropping. In countries like India around 80% of seeds used by farmers are distributed by private companies.

How is it possible that the FAO only has a tiny unit responsible for promoting policies in favour of family allotments throughout the world, despite the fact that food security starts at home? How can we ensure that the poorest farmers have access to the seeds they need to survive? It is up to us to confront the FAO and all other relevant agencies and NGOs in this regard. Only 15% of the population of Africa is currently able to buy vegetables, whereas most of the population could produce them. A French NGO, JTS[†], which specializes in the production of seeds for tropical kitchen gardens, is finding it difficult to survive as a humanitarian and commercial business. Huge quantities of cereals are traded for primary raw materials at cut-rate prices, despite the fact that the trading countries could themselves produce these cereals and their micronutrients. Global agricultural policy – or the globalization of agricultural policy – thus runs counter to common sense by perpetuating the plundering of extremely poor countries, and ensures their continued dependence through a system of emergency assistance which has pernicious economic effects. Local food-security policies that recognize and register land titles are necessary. A charter signed by thousands of communities would facilitate the establishment of an action plan, a kind of certificate of good governance at the local level.

While examples of positive development initiatives should be on the internet, it is necessary to understand the significance of the detrimental effects of ‘bad’ development. There are legal frames discouraging organic farming. At the same time they allow multinational companies or Chinese and South Korean governments to buy thousands of hectares of land necessary to the African populations in order to produce agricultural goods. This can be called ‘delocalization of agriculture’. On top

[†]JTS, Les Semences Du Jardin Tropical (Seeds of the Tropical Garden), www.jtssemences.com

of that, there is the well-known controversial issue of the genetically-modified species. African governments are accomplices, and there is no possibility to combat such new trends in courts. Without a strong judiciary, such problems cannot be solved in courts.

Sometimes, as with the Nestlé court case in 1976, 'bad' development serves to awaken the public. Mothers worldwide obtained a fundamental recognition of the benefits of maternal milk over those of processed milk. More than 30 years after the Bern court ruling, the code of conduct that came into force following a WHO vote in 1981 continues to be violated. Although collective awareness has grown – as several 'breastfeeding only' hospitals in Asia prove – Nestlé continues to contravene the code, undermining breastfeeding with fatal consequences for infant health (IBFAN newsletter of April 2010: <http://www.ibfan.org/newsletters-world-europe-20100422.html>). This example shows that the struggle with the big transnational industries has not been resolved, despite the WHO resolutions, purely because no sanctions are imposed. What is at stake is profit in the billions rather than ethics. Activism in the courts is no longer enough. Only a media-friendly subject can have any impact. The same is true for the environment, human-rights violations, slavery or child labour. The voiceless do not have access to the law. Nevertheless, the organization at the local level that is linked to an international and specialized network spread across many countries can be impressively effective. Vital local action must be taken up at the international as well as the national level. The training of 'barefoot' lawyers, who improve the access of the most powerless people in society to a means of protecting their rights (the registration and issue of land titles and protection from deforestation, torture, forced disappearances, massacres, violence against women, child labour, slavery, usury and so on and so forth), is crucial. Bringing to justice large corporations that violate the fundamental rights of citizens must become a normal and everyday activity of humanitarian and charitable organizations.

Let us hope that more NGOs will commit themselves to this course of action by creating coalitions that enable a central network to gain critical mass so that denunciations by action groups do not get crushed by the tyrannical power of armies or police forces in dictatorships. Too many local NGOs work alone, forgetting that effectiveness operates like a three-stage missile: it needs the local, the national and the international level. If one of those is missing, the chances of success are dim.

2. Research and technology as strategies to combat poverty

Research for development has the poorest budget. Without investing in basic-needs technology to remedy extreme poverty, there will be little improvement in the living conditions of the poorest people in society.

Let us take the example of Baron Bic, who revolutionized the world of literacy by inventing the Bic ballpoint pen. In only a few years, the very cheap Bic ballpoint had spread through all the slums of the planet. Its quality and very low cost meant that the poorest people had access to an essential literacy tool.

Public research should promote and develop this kind of technology dedicated to fulfilling basic needs.

Examples of essential or basic needs to be incorporated into local policies include:

- Access to water, drinking water and sanitation
- Access to sufficient food, locally produced; food security, including access to seeds, biological fertilisers, biological pesticides, etc.
- Medicinal plants
- Local building materials
- Primary education and literacy programmes, prioritizing girls
- Microcredit which facilitates the access to jobs
- Local transport
- LED lighting
- Micro-irrigation
- Green fuels⁵ grown on land unfit for agriculture (semi-arid and eroded soils)
- Community-run renewable energy systems (solar, wind, geothermal, etc.)
- Pedal-operated pumps (as in India, Nepal and Bangladesh).

Many companies are believed to have the potential to develop technologies which could be appropriate to address extreme poverty. There are hundreds of examples of such technology, one of them are soup cubes, which have a high nutritional value and are rich in proteins and micronutrients, unlike the cooking fats marketed by one internationally famous multinational, which contain taste enhancers and artificial flavourings. There is a need to promote local products, such as flours or porridges (soya, sorghum, maize), which are enriched with micronutrients (locally produced spirulina, moringa, etc.). Products labelled with the fashionable term 'food fortification' should never be imported. Junk food made by food multinationals is promoted across the world. A code of conduct would be better than nothing. Many examples prove that agribusiness corporations have no interest in promoting high-quality products which could fight malnutrition. Their economic model excludes more than half of the world's population because they believe that the added value to be derived from this section of the population is not profitable enough. The profit margin is greater for frozen products than for soup cubes ... Meanwhile, weakened by malnutrition, 20 000 people die every day from the effects of extreme poverty (UNICEF hyperlink <http://www.unicef>).

Public or NGO-sponsored research must play a full role in the emancipation of the very poor. An inventory of the hundreds of positive examples, which exist in every country, should be published and disseminated over the internet in order to encourage young people and universities to cooperate in this kind of research. How can we convince scientific institutions and scientists that their participation in this challenge is necessary? Too many scientists fiercely and naively defend scientific neutrality – but science without a conscience is subjugating itself to the dominant system.

In order to illustrate the results of such research with a view to applying it in the field, the research must be scientifically corroborated. This is the mandate of Antenna Technologies.

In order to meet the basic needs of the world's worst-off people, it is essential to

⁵See *Jatropha curcas*, le meilleur des biocarburants, J.-D et E. Pellet, 2007, Favre

innovate and simplify certain technologies so that they can be made accessible and adapted to the socio-cultural conditions of the people concerned.

Antenna Technologies, founded in 1989 in Geneva, Switzerland, is a foundation which specializes in basic needs such as nutrition, drinking water, medicinal plants, public health, LED lighting, etc. It consists of a network of scientists, academics and engineers and carries out projects in partnership with local Antenna associations and other NGO partners in the field. Antenna Technologies is committed to the active participation of the populations involved in order to develop their self-sufficiency.

Antenna Technologies works as a team. Development strategies and guidance are discussed jointly or through the network. The key idea is to invent technologies for development, prioritizing benefits for the very poor and for children. Thinking on these issues began with human rights and the international convention signed by states. The first step was to develop independent broadcasters to fight against dictatorships and the most serious violations of human rights. Human rights and development cannot exist unless those suffering from exclusion are free.

A working group on the right to food was set up at the United Nations Commission on Human Rights. At the time when thinking about human rights began, it was essential to supplement the rules-based approach with a focus on the application of this right, which was considered to be unprecedented and which became most important in the field.

This concrete aspect – the right to food – was to fall under the remit of the FAO. A few days later, we – along with a few scientists working in this area – asked ourselves what malnutrition really was, since the theory relating to such a right was meaningless without concrete examples. This was why, with a few friends, we founded Antenna Technologies. One of the research topics was microscopic algae, given their extraordinary potential for combating child malnutrition.

2.1 Using spirulina to combat child malnutrition

The dietary benefits of spirulina have been known for thousands of years. In Africa, spirulina is found in lakes and lagoons with high levels of carbonates and salts. In the region of Kanem, in Chad, women have always harvested spirulina by filtering water through tightly-woven wicker baskets. The microscopic algae which are collected are then dried in the sun in the form of deep-green pancakes. When crushed, the spirulina is added to everyday dishes, boosting their nutritional value.

Spirulina is the ideal dietary supplement: it has high levels of beta-carotene, vitamins, iron, calcium, essential amino acids and protein. This entirely edible micro-organism can be produced in hot regions, and even in the desert. It has been used for 20 years as a dietary supplement in industrialized countries where sugar and fat levels are high but micronutrient levels are low. Antenna Technologies aims to bring it to disadvantaged areas of the world where people are prone to malnutrition.

The association has developed a small-scale production method using ponds, which allows local people to grow their own blue algae independently and safely. The ponds are no more than some 20 cm deep, as the production of spirulina requires a tenth of the water needed for soya, and are built using simple materials (plastic tarpaulin linings, soil, etc.). Antenna Technologies contributes by identifying production sites, supervising the construction of the ponds and providing the initial

spirulina material. With regard to cultivation methods, the key lies in transmitting know-how to malnourished populations so that they can grow the algae themselves.

It is important to know that one to two grams of spirulina a day for four to six weeks, taken together with a portion of protein and calories, are enough to relieve light to moderate malnutrition in children. A pond measuring 4 metres by 5 can supply the daily micronutrient requirements of 100 children. Today, 50 000 children benefit from Antenna Technologies' spirulina-based programmes.

Our research is financed with the support of the Swiss Agency for Development and Cooperation as well as foundations and private funds. At the same time, however, and incredible as this might seem, UNICEF, the WFP and the WHO have lost interest in spirulina, on the grounds that there is not enough scientific proof – something that Antenna Technologies readily admits. We should point out, though, that industrial forms of re-nutrition are not based on any greater scientific evidence. But who will fund double-blind studies with a randomized protocol that are published through a peer-review process? So far, nobody: no development agencies, foundations, or laboratories have come forward to finance the clinical trials of a natural product such as spirulina, from which there is no money to be made because it is not patentable! In developing countries, healthcare personnel and thousands of mothers bear witness to the efficiency of spirulina – but this evidence has no scientific worth. Yet what of the packaged products that some companies sell to emergency relief programmes? These imported products do not enjoy greater scientific credibility. Are 'miracle' concoctions based on peanuts the solution? Then they must be produced locally! And what about the extremely high prices that only Western charities can afford? And what about the claims when such products are not based on double-blinded and randomized clinical trials? We all hope that these products are a step in the right direction. Everybody has to know that the solution to malnutrition must be a local solution, using local products made locally by the people themselves! This is the precondition for a sustainable solution.

When local populations have to make do with imported products or with solidarity in the form of emergency relief, an economy of dependence is established at the expense of local self-sufficiency.

Working within this perspective, Antenna Technologies' scientists have developed another simple, robust, sustainable and cheap technology called WATA ('water appropriate technology Antenna'). It consists of a small device that harnesses electrolysis to produce active chlorine that disinfects water and makes it drinkable.

2.2 WATA: the solution for disinfecting water and making it drinkable

Access to water is a primary Millennium Goal, and drinking water is essential for life. Diarrhoea, which is rare and harmless in the West, is the second greatest cause of death in the world, outpacing HIV/AIDS and malaria. In developing countries, drinking-water distribution networks are either non-existent or inadequate. The result is highly contagious waterborne diseases (those that are linked to the consumption of dirty water that is contaminated by bacteria, viruses or parasites) that principally affect infants and children under five years of age, of which 5000 die every day.

WATA is a very compact and cheap to run device by means of which an

extremely powerful chlorinated disinfectant can be produced locally. Chlorine is a very effective disinfecting agent that has been used throughout the world for more than a century. It rapidly and effectively destroys viruses, bacteria and micro-organisms.

Until now, however, manufacturing chlorine where it is to be used has not been possible without major investment. Sturdy, cheap and long-lasting (it can run for 10 000 hours between services), WATA is an efficient solution that can produce a litre of concentrated disinfectant at a cost of only 0.01 Euros.

Diluting this concentrate produces a solution that can be used to disinfect instruments and utensils used in connection with food. The device can also safely chlorinate drinking water for 300 to 40 000 people a day, depending on its size.

WATA is not only designed for use in hospitals, clinics, schools, slums, village households, NGOs and so on, but also for businesses such as laundries, butchers and dairies. WATA provides a way for institutions to implement public health standards on a wide scale.

2.3 Antenna Technologies commits to traditional medicine: promoting local health resources

The vast majority of our world's inhabitants use traditional medicine to treat themselves. Contemporary studies can help to protect traditional knowledge, improve its effectiveness and reduce risks. It should be remembered that more than one medicine in three bought in Africa contains little or no active principle.

For example, in Mali a significant proportion of the population does not have access to primary health care, but uses traditional methods of treatment. A pilot project to integrate traditional practices into primary health care centres (clinics) has been established in order to boost and reinforce local treatment capacities sustainably. The local Antenna Technologies teams in charge of this innovative project have achieved very encouraging results, in particular with treatments which are potentially important for public health, such as those for malaria and hepatitis. The cooperation between Antenna Technologies and its Malian partners is increasingly successful within the framework of the 'Improved traditional medicines' policy.

In Haiti, many health auxiliaries have been trained. Building on basic medical knowledge, these auxiliaries are now able to identify common pathologies as well as emergency situations and provide advice on hygiene and nutrition. In response to a request from one of them, a list has been drawn up of local medicinal plants whose therapeutic properties can – in 80% of cases – replace modern medicines (which are often unavailable).

Antenna Technologies has focused its research on medicinal plants, particularly those used to treat malaria. This disease is currently the worst plague afflicting tropical countries. Although there is an international anti-malaria pharmacopoeia promoted by the WHO, there is a need for a complementary solution for remote regions. Countries which suffer from these illnesses have neither the means nor a public health system using conventional medicine which can eradicate these devastating diseases. By importing products which, in turn, create resistance, we only postpone the problem. We must hope that the countries concerned and the

European Union will support this local solution, which would enable the effective use of plants with proven and significant clinical effectiveness.

The same absurd situation prevails in the field of health, where the WHO has only two professional people responsible for traditional medicines. However, these medicines are aimed at most of the world's population, whereas only a minority uses conventional Western medicines, because they are too expensive or unavailable.

Public health also begins with the boosting of local investment in order to cover the basics of primary health care needs.

The economy is currently primarily oriented towards finance. On the one hand, transnational companies bulldoze their way into all economic sectors with their products and investments through dumping, juggling prices and competing with local products. The party with the greatest advertising clout is the strongest. Unless the local economies of developing countries are boosted, the output of small producers will eventually be overwhelmed by mass-consumer goods. It is the struggle between the iron pot and the clay pot.

2.4 Fair trade and microcredit

At the same time, quality local products can now be exported: there are hundreds of examples, such as high-quality shea butter, which is more attractive than so many of the synthetic cosmetics sold in hypermarkets, or organic cotton fabric, etc. All of these products suffer from inadequate marketing. The answers are out there – fair trade, microcredit, farmers' cooperatives which secure better incomes and protect their distribution channels. We should welcome every drop in the ocean.

It is up to us to identify and encourage these solutions in the distribution networks of international bodies and in fair-trade companies and to engage consumers through powerful advertising campaigns. Recently, 200 organizations from 40-odd countries combined to call for trade agreements that benefit development: economic partnership agreements which are proving to be essential.

Even if we must content ourselves with these crumbs that fall from the table, they do offer some encouragement. The World Bank proudly announced that it aimed to achieve a target of 100 million dollars in microcredit grants. This grant represents less than 1% of total World Bank lending. What an unfortunate demonstration of how the World Bank ignores the fight against poverty, acting against its own mandate! Since the World Bank provides loans to governments, as well as loans and technical assistance to private investors through the International Finance Corporation, why does it see the microfinance sector as so irrelevant? The World Bank works with governments – and we presume that no government would be against constructive microcredit activities. In addition, this anticipated microcredit budget is shamefully small when compared with the billions invested in areas which lack any focus on development or on the poor – all the more so as some microcredit repayments considerably outweigh the risks taken by the investors of banking capital – a well-known fact in the world of finance. Why is microcredit ignored by bankers? Which of the other 300 Swiss banks follow the example of alternative banks and cooperate in microcredit schemes? Given the scale of potential improvements in the living conditions of the very poor, it is incomprehensible that big business does not express more interest in this subject. A punitive tax should be

imposed on banks which refuse to take part in this system. Microcredit provides essential and intelligent assistance which generates wealth - even though it is not a universal panacea, particularly since some microcredit is in fact 'macro microcredit'. A loan at 25% interest is better than one from a money lender shark who demands 50% or 100%, but it is still abusive. How can anyone accept granting such a margin at the expense of the poor? Yet again, it is a question of ethics.

3. International solidarity in the future

How can we create a surge of *solidarity among young people*? Young people, with their generosity and their good will, must take the problem of extreme poverty seriously. Those who have been lucky enough to be born on the right side of the fence can devote one or two years to development, in the North or in the South. Young people are capable of acting to change the unfair global balance of wealth and power. In order for this to happen, they need to go into the field and thus discover the reality of the situation. And, of course, it is obvious that they will receive far more than they give.

The concept of charity has to be reconsidered. Political charity looks like utopia. Yet it is political charity, and that alone, which can change things. Abbé Pierre provided a very good role model: politically grounded charity is the prerequisite for a sustainable movement. Charity must penetrate and inspire politics. Even though many scientists are suspicious regarding activism, it must be appreciated and encouraged. To do nothing is to be guilty of failure to assist persons in danger.

Improving the condition of the poor will not be achieved through a better distribution of tax revenue. The fiscal problem is a technical red herring: it does require reform, but this will not change the demands of international competition. The example of Switzerland demonstrates that extraordinary accumulations of wealth are particularly unequally distributed. In 2004, around 4% of taxpayers owned 54.5% of wealth and 6700 taxpayers declared net wealth of over 10 million Swiss francs. The aggregate net personal worth came to 1078 billion francs! Yet by Swiss standards, nearly a quarter of the population suffers from poverty. Neither the federal nor the cantonal authorities will create new distributive tax scales to reduce these differences. Redistributing wealth through taxation will not sustainably reduce poverty levels. But the essential question remains, even if they could collect additional money from their taxes, how will they use it? It is seriously doubtful that the poorest will be the beneficiaries.

Citizen science⁶ is a new challenge which will benefit the poorest members of society. The tragic situation of half of the world's population makes it necessary to find a science that will ensure progress by responding to their aspirations for greater well-being in economic, ecological and social terms. Current research is disconnected from learning to be guided by the goal of service to humanity. Present research is mostly competitive, money-focused and profit-oriented ignoring the basic values of a human being. This system leads us to a deadlock-provoking illusion that the accumulation of wealth is the only happiness. Research careers are defined by financial interests and governed by the highly suspect ethics of public-private partnerships. The targets of Antenna Technologies are fundamentally different.

⁶ Fondation Sciences Citoyennes, Paris (France), www.sciencescitoyennes.org

Globalization is synonymous with the unlimited expansion of trade; it also facilitates an era of all-out capitalism which aggressively seeks to eliminate all attempts of opposition, particularly in developing countries. In addition, it tries to secure markets and to control natural resources. Violence is a tool used to this end. And international law – considerably weakened by a lack of jurisdiction and sanctions – remains insignificant. Despite primary safeguards such as the International Criminal Court, more than 100 states are involved in the worst acts of violence against people – torture, disappearances, massacres and other serious violations of human rights. This dictatorial and criminal behaviour goes unpunished; indeed, some states such as the United States, Russia and China support it. This is why Burma, Somalia, North Korea etc. – the most recent of the empires of blood, corruption and terror – can violate human rights conventions systematically and with impunity... A few brave voices and human rights NGOs (Amnesty International, World Organization Against Torture [OMCT], Human Rights Watch, etc) are left to condemn the abuses committed by the tyrannical rulers of 30-odd dictatorships. Despite UN efforts to establish special tribunals, international criminal justice is pathetically slow ... due to the delaying tactics of a few states. The struggle against extreme poverty also requires justice, and NGOs are essential to fight silence over State massacres.

The work of NGOs like The Advocacy Project (www.advocacy.net), The Human Rights Law Network (HRLN) in India or TRIAL (Track Impunity Always) and the establishment of international networks will enable the rapid exchange of information and guidance for plaintiffs, so that criminal proceedings can be instituted against killing dictators, torturers, warlords, arm and drug dealers.

The system is constructed so that it disfavours the weak. This is why the rich get richer and the poor get poorer; and why universities, NGOs and researchers should focus, as a priority, on the mechanisms of rogue states and the ways in which they acquire wealth, including of course major state and individual corruption⁷. Extreme disparities in wealth merit a detailed analysis country by country. These disparities are equivalent to a hidden crime. Sociological and economic studies of poverty are legion, whereas analyses of extreme wealth and how the very rich in the South spend their money are rare. In this regard let us also mention Transparency International (TI) and their corruption index which provides a useful reference as it includes a Bribe Payers Index.

The flip side of development and the fight against extreme poverty must be the anti-corruption struggle. Joseph E. Stiglitz, 2001 Nobel Laureate in Economics, has condemned the World Bank stating that corruption and economic growth are closely linked. Corruption should be fought on all fronts, since the large-scale embezzlement of public and private wealth is responsible for the failure of development.

Conventions such as the OECD Convention and the Foreign Corrupt Practices Act are extremely important legal instruments, since they oblige state parties to

⁷ *Criminalité organisée et corruption en Suisse*, Nicolas Giannakopoulos, 2001, Haupt. *When Corporations Rule the World*, David C. Korten, 1995, Kumarian Press Inc. and Berrett-Koehler Publishers Inc. *Affairisme: la fin du système*, 2000, OECD.

initiate criminal proceedings and punish those guilty of corruption, money laundering, etc. If the World Bank and individual states imposed a legal framework upon themselves, taking a firm stand against large-scale corruption, capital flight and organized crime, substantial improvements would be possible. Responsibility lies as much with the corrupters as with the corrupted. The World Bank has estimated that 30% of funds to its African programmes are embezzled.

The fight against extreme poverty is above all a question of ethics. Globalization and the destruction of the environment require an ethical engagement with regard to production and consumption. Human values and responsibilities are inextricable from production and consumption. Even though multinational companies have a multiplicity of codes of conduct and charters, they are not binding and there are no penalties – no legal action is taken against those who infringe their own codes!

Could these codes be made binding? ... Let us dream a little: it could be the role of the ILO (International Labour Organization) to impose penalties in the sphere of working conditions, freedom of association, etc., on states which do not respect the Conventions they have signed ... but also to penalize transnational corporations. However, ethical criteria are not part of their remit.

The controversy around increasing the access of poor countries to essential drugs highlights the lack of ethics in the pharmaceutical lobby. The goal of universal access to health is opposed by the pharmaceutical industry, for which the only driving interests are the law of the market and the protection of patents – profits, in other words. An international treaty which would ensure research and development on the most neglected and serious tropical diseases such as malaria – which, according to the WHO, affects 250 million of the world's population – would constitute essential progress. The strong opposition of pharmaceutical companies to the concept of universal access to health, which was suggested by the WHO Intergovernmental Working Group on Public Health, Innovation and Intellectual Property (IGWG), can only be successfully countered by dialogue – and by an ethical approach of transnational corporations.

The World Trade Organization (WTO) does not get involved with trade accountability and violations of labour law ... they are not within its jurisdiction. This leaves us with the personal ethics of citizens and consumers, who have a choice in what they buy as long as companies are obliged to play the transparency card and consumers are made aware of the ethical significance of the act of buying. Wal-Mart, the world's No. 1 retailer, is regularly accused by consumer organizations of anti-union practices and of selling products made by child labour. The meagre salaries and slave-like working conditions of Chinese women working in the toy industry do not hinder the Western trade in toys. Chinese toy factories ignore environmental rules; their emissions of pollutants into the water, air and of dangerous chemical substances are as much a threat to human rights as to the environment. So, many commercial sectors should be boycotted, which would not affect the well-being of consumers in any way since buying better and less is within their reach. Consumer consciousness must be raised in families, schools and churches and through the media and NGOs, etc.

Ensuring peace and global security means taking up the challenge of fighting to reduce extreme poverty. Europe, now at peace, is particularly well placed to initiate a charter of responsibilities related to economic activities. Similar proposals already

exist which confront companies, public authorities and associations with a tripartite responsibility to encourage the search for solutions to eliminate extreme poverty. The planet belongs to all of us, including the very poor who make up half of all human beings. The inescapable focus needed by the environment and climate problems provides an opportunity for all of us. We need to invent new research and development paradigms to ensure that they are of high technological quality and adapted to vital needs so that they reinforce local and sustainable innovations instead of destroying air, sea and land. The challenge of this century is to make life liveable for all, in the North as in the South, in the East as in the West, and this will never be possible unless we share.

Antenna Technologies (www.antenna.ch and www.antenna-france.org) – with its research programme focused on basic needs and action in the field – is one of the few NGOs made up of scientists involved in research for lowest-income groups. Let us hope that in the future many scientists will follow this path, and that young people will devote their time and generosity to reducing the waste caused by the glaring disparities between people. The environment is showing us that we can only save ourselves through action, and only if we work together!

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