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# CHANGE AND THE CGIAR: ACONTRADICTION IN TERMS?

*SUSANNE GURA*

*The world's largest organisation of public agricultural research centres continues to struggle to find its direction. Participation of civil society in the work of the Consultative Group on International Agricultural Research (CGIAR) is broader than ever before, but does not seem to be achieving much. The CGIAR decisions that might lead to further centralisation of governance reached in May in Durban, South Africa, will be elaborated at its Annual Meeting in Washington at the end of October. This article points to the challenges the CGIAR continues to face after a decade of calls for environmentally sustainable agriculture, for an approach to science that acknowledges farmers' research, and for defending public goods from corporate appropriation.*

The Consultative Group on International Agricultural Research (see box), which brought about the Green Revolution of the 1960s and 1970s, has faced institutional and financial crises since the mid-1980s. With lack of impact in Africa and ever-increasing donor pressure for sustainability, equity and participation, the crisis continues. This has resulted in programme restructuring, a reduction of the number of CGIAR centres from 18 to 16 and some significant staff cuts.

In an attempt to address the stagnating financial situation and calls for research that is environmentally sustainable, a high-level Ministerial meeting was convened in 1994. Under new leadership from Ismael Serageldin, then the World Bank's top official on env-ironmentally sustainable development, hopes were high that the meeting would provide the impetus for a full restructuring of the CGIAR. The process launched at the meeting which aimed to redirecting and reorganise the CGIAR, known as the *"Renewal,"* turned out to be little more than window dressing and an endorsement of the *status quo.* While it failed to bring in more funds, the Renewal did arrest a further decline in funding and served to boost the low morale already reigning amongst staff within the CGIAR.

**A second chance to find direction**

Between 1997 and 1999, the CGIAR was pushed, mainly by donors and civil society organisations, to undergo an evaluation, the first in seventeen years. This evaluation, known as the *"Third System-Wide Review"* was time-consuming, expensive and supposedly ambitious. Everything except for the number of Centres was to be questioned by the 19-strong panel: mandate, governance, research strategy, and finances (see *Seedling*, December 1998).

But the review did not score highly in terms of consultation with farmers or NGOs. Eighteen months of talking to scientists and policy makers and US$ 1.5 million later, the panel's much awaited report was not much more than another green light to keep things the same, and it provided little help with regard to governance. While the Renewal had cherished the CGIAR's collegiality and informality, and voted against establishing a formal organisation, the System

Review recommended the contrary. A legal entity that would serve as central body was proposed. Three reasons were given for increased centralisation:

- To ensure proper stewardship of the intellectual property developed within the CGIAR; not coincidentally, one thing the review highlighted was the reality of the growing biotechnology portfolio of the CGIAR and its increasing orientation towards the private sector.
- To secure funding from a broader variety of sources.
- To take positions on behalf of the CGIAR. The most important of these are Farmers Rights and Intellectual Property Rights.

CGIAR members rejected the central body proposal; instead, a Consultative Council was established to draft CGIAR policy. This means that the main donors meet more than twice yearly, and in a smaller circle.

Since the Review had failed to help the CGIAR find its direction, another process was initiated to attempt to do so. That process involved more people than the Renewal or the Review, but they were mostly insiders. This latest direction-finding initiative was led by the Rome-based Technical Advisory Committee (TAC), which presented its Vision and Strategy at the CGIAR's Mid-Term Meeting in May 2000 in Dresden. The key points of this strategy laid out at the meeting were:

**WHAT IS THE CGIAR?**

The Consultative Group on International Agricultural Research (CGIAR) is an informal association of 58 members (22 developing countries, 21 industrialised countries, 3 private foundations, and 12 regional and international organisations). It was established in 1971 by Ford and Rockefeller Foundations and the World Bank; the United Nations Development Program (UNDP) and the Food and Agriculture Organisation of the United Nations (FAO) are co-sponsors.

Over the last decade, its annual budget has been about US$ 340 million. The mission of the CGIAR is to contribute to food security and poverty alleviation in developing countries through agricultural research, capacity building and policy support. It operates through 16 international agricultural research centres, which now call themselves the *"Future Harvest"* Centres and which have more than 8,500 scientists and support staff working in more than 100 countries. The members of the CGIAR have traditionally held review and planning meetings twice yearly, at International Centres Week (ICW) each October in Washington and at the Mid-Term Meeting (MTM) each May. MTMs will be abandoned as of 2002 and replaced with more frequent meetings of the smaller Executive Council (ExCo).

The agenda of the CGIAR centres evolved in the 1970s to include roots and tubers, legumes, livestock, genetic resources, research in dry areas; in the 1980s to include institutional strengthening and food policy research; and in the 1990s to include agroforesty, forestry, natural resource management and aquatic resources. Over the decades, the scientists moved some of their research off station and did trials in farmers' fields. Some began to move beyond commodity research into Farming Systems Research. The Centres are autonomous institutions but they began to collaborate in System-Wide Programmes on topics such as participatory research, integrated pest management, and communal action and property rights. They also began to seek research partners outside the CGIAR system, mainly with national agricultural research institutes, but sometimes also with non-governmental organisations (NGOs).

## CGIAR Research Centers

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| CIAT | Centro Internacional de Agricultura Tropical |
| CIFOR | Center for International Forestry Research |
| CIMMYT | Centro Internacional de Mejoramiento de Maíz y Trigo |
| CIP | Centro Internacional de la Papa |
| ICARDA | International Center for Agricultural Research in the Dry Areas |
| ICLARM | International Center for Living Aquatic Resources Management |
| ICRAF | International Centre for Research in Agroforestry |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics |
| IFPRI | International Food Policy Research Institute |
| IIMI | International Irrigation Management Institute |
| IITA | International Institute of Tropical Agriculture |
| ILRI | International Livestock Research Institute |
| IPGRI | International Plant Genetic Resources Institute |
| IRRI | International Rice Research Institute |
| ISNAR | International Service for National Agricultural Research |
| WARDA | West Africa Rice Development Association |

- Focusing on issues related to poverty alleviation and hunger
- Bringing 'modern' science to bear on issues related to poverty and food insecurity
- Priority to sub-Saharan Africa and South Asia
- Regional approach to research planning and implementation
- Seeking new partners to improve problem identification, research and dissemination of results
- Adopting a task force approach to address priority issues
- Serving as a catalyst within the global agricultural research system.

The TAC's new strategy was given the green light in Dresden and was adopted by the CGIAR later in the year, along with plans for a regional approach to agenda setting.

**GFAR –co-operation or co-option?**

The Dresden meeting was accompanied by the first major meeting of a CGIAR-spun initiative, the Global Forum on Agricultural Research (GFAR). Co-operating with the prospective users of international agricultural research has been a constant challenge for the CGIAR. Scientists within the CGIAR have become increasingly interested in co-operating with NGOs, but mainly to extend the results of their research to farmers.

Participatory research has been developed only in a strictly limited way in CGIAR Centres, rather as a showcase than as a mainstream approach. Setting up NGO and Private Sector Committees in 1995 broadened participation in CGIAR governance, but farmers remained unrepresented.

GFAR is an experimental, loose forum which brings together advanced research institutes (ARIs) in the North, national agricultural research institutes (NARIs) in the South, donors, industry, non-governmental organisations and farmers' organisations. The rationale for GFAR goes like this: the CGIAR budget covers only 4 % of global agricultural research. The remaining 96% is done by, decreasingly, national agricultural research institutes and universities, and, increasingly, the corporate sector. The idea is that all of them are part of a global system, and should share a forum to discuss and set priorities. NGOs are pushing for GFAR to play a formal role in determining the work plan for the CGIAR, but it is not clear whether this vision is shared by the CGIAR.

Some of the 100 NGOs and farmer representatives from 35 countries who attended the GFAR in Dresden were skeptical, while others were hopeful that the participatory and multi-stakeholder nature of GFAR would bring about genuine change. GFAR is narrowly focused on research with little attention to development (see box). During the Dresden forum, discussions revolved around technological solutions, ignoring more fundamental issues such as landlessness, access to and control over natural resources, Farmer's Rights, food sovereignty. Small farmers (represented by Via Campesina) were only given a chance to speak at the last minute, after a request from civil society organisations. The output from GFAR was supposed to be a *"Global Shared Vision"* to be endorsed by all participants. But civil society groups were unable to endorse the statement, because of concerns over GFAR's promotion of genetic engineering and market liberalisation, in the world of agriculture, and its far-reaching openness to private sector influence on public agricultural research. Despite NGO protests, GFAR Chair RS Paroda repeatedly stated that all stakeholder groups had endorsed the Global Vision. This move fuelled civil society groups' fears that GFAR was more interested in co-option than co-operation.

GFAR's first tentative steps into the real world have added to such concerns. Its first pilot study in Meso America has met with local resistance. Representatives from eight small farmer organisations, eight NGOs and two universities from the region recently met in Costa Rica to discuss the priority-setting pilot study set up by GFAR and its Regional Forum (FORAGRO). Their Declaration of Guacimo states that GFAR/ FORAGRO's study is supposed to widen participation, but up to now has excluded the voice of peasants, indigenous people, NGOs and universities. They call for the project to be restarted in a truly bottom-up manner.

**GFAR 2000's OBJECTIVES**

- To develop a Global Shared Vision on Agricultural Research and Development
- To promote research partnerships in key scientific domains:
    1. Genetic Resources Management and Biotechnology
    2. Natural Resources Management and Agroecology
    3. Commodity Chains (including non-CGIAR mandated commercial and underutilised crops)
    4. Agricultural Policy Management
- To develop a Global Agricultural Knowledge System

**Another day, another strategy**

As calls for restructuring and change in CGIAR governance continued, a Change Design and Management Team (CDMT) was set up at International Centres Week in October 2000.. It drew up concrete proposals on governance, organisation and structure to be tabled in the CGIAR Mid-Term Meeting 2001 in Durban, South Africa. All sides commended the process for being unusually open and inclusive, but the results did not inspire NGOs that they were being listened to any more than before.

CDMT proposals may lead to more centralisation and in fact ruled out the TAC's proposals for regionalisation. The Rural Advancement Foundation International and the German NGO Forum Environment and Development proposed an alternative regionalisation strategy. Were the CGIAR to adopt a regional governance strategy, they contested, the CGIAR could dramatically reduce the costs of the Centres. They suggested cutting staff levels internationally to about 500 people by creating regional clusters of scientists to act as catalysts, animators and researchers in par-tnership with farmers' organisations, NGOs and other groups.

In this way, CGIAR could reduce running costs to US$ 60 million annually, freeing up about US$ 290 million a year for regional and inter-regional programmes. Together with increased commitment and support for the GFAR, especially the Regional Fora, many of the longstanding governance and financial problems could be solved. At the same time, national and regional collaborations could be stimulated.

African NGOs present at the Durban meeting found little overlap between their agricultural research priorities and those of the CGIAR (see box). NGO calls for regionalisation were ignored. Four major decisions were reached by the delegates, in line with the CDMT proposals:

- Creation of a smaller Executive Council and replacing the twice-a-year meetings with a once-a-year general assembly. Participation is an issue since not all members will be represented in Council meetings. Farmers' organisations were again sleighted by the absence of a seat for them on the Council, and salt was rubbed in the wound when the Chair suggested that farmers comprise the largest part of the private sector.
- Transformation of the TAC into a Science Council.
- Creation of a Systems Office, to be housed in Washington, encompassing functions of the CGIAR Secretariat, public relations (PR) and fund-raising activities. Launch of a series of Challenge Programs (CPs) to redirect the CGIAR's research agenda. These aim to establish linkages and broaden external partnerships with the NARS, GFAR, and regional organisations in the hope of creating a demand-driven, bottom-up process to define and identify CPs.

These proposed changes may further centralise power in Washington. They go in the opposite direction of NGO proposals for regionalisation. If the proposal for the CPs is followed, an initial two or three programmes will be identified and funded by new money. This will be followed by 50% restructuring of the System's research agenda in five years' time. Whether or not this move will bring in new and more money remains to be seen.

Some donors are not eager to donate new money for the CPs. Instead, they would prefer to shift their current funding to CPs, if only to force the centers to restructure and collaborate more closely with national and regional agricultural research systems in the South. But some observers suggest that existing suggestions for potential programmes do not seem to be any more rooted in regional priorities than any other

**AFRICAN NGOS CALL FOR FARMER-LED RESEARCH**

The quest for farmer-led research and development dominated the NGO and smallholder farmer discussions during the recent CGIAR meeting in South Africa. Some 30 representatives from east and southern African organisations contended that research efforts to date have ignored the needs of poor and marginalised farmers. The research issues of central importance to the poor are the ones that should be addressed first. This means including a development element to the CGIAR's research agenda. In this context, the CGIAR was challenged to:

- Move towards eco-regional issues as opposed to commodity-based issues;
- Foster farmer-led research to develop low external input technology which enhances productivity;
- Undertake research on the use, conservation and promotion of agro-biodiversity and the traditions associated with it;
- Research the impact of trade and other policies on small-holder farmers and researchers;
- Study and improve soil fertility and water management in the environments in which smallholder farmers live.

NGO delegates recommended a collaborative relationship between the CGIAR and the NGO community. This seems logical since, at least in theory, they work towards the same end – poverty alleviation and improving people's livelihoods. To do this, farmer-led organisations must be given equal status with other committees and participants in CGIAR discussions. NGOs must also make themselves more knowledgeable about farmer-led research in order to be effective in feeding into the CGIAR system through the NGO Committee. Challenges for researchers include technology generation based on local knowledge integrated with relevant scientific knowledge, increased respect for local knowledge and its dynamics, and collaboration with other development actors. Research institutes must ground their work in local realities.

Although the CGIAR claims to have made considerable progress, very little has helped increase the food security of east and southern Africa, nor the cash income of the resource-poor farmers whose poverty it should help alleviate. Perhaps the most important question posed to the CGIAR and not answered during the Durban meeting was, *"Who do you listen to in setting the research agenda and why?"*

*Source: Mutizwa Mukute, PELUM Association. PO Box MP1059, Mt Pleasant, Harare, Zimbabwe. Tel: (263-4) 744117/744237/744509, Fax: (263-4) 744470, E-mail: pelum@ecoweb.co.zw*

CGIAR programmes. They argue that regional priority setting seems to be a theoretical exercise without providing much incentive for participation. What role the CPs will play vis-à-vis GFAR's regional programmes is not clear. How all of these decisions will be put into practice is still not clear and will be decided at this year's Annual General Meeting in Washington in October. An Interim Executive Council was tasked to come up with specific proposals on how to develop and implement the CP approach, the composition and working procedures of the Executive Council, the functions and modalities of the Systems Office, and the Science Council.

The future legal status of the CGIAR System including the germplasm in its genebanks, its policy on patenting and intellectual property rights (IPRs) was not adequately dealt with in Durban. The CGIAR and public research in

general will greatly benefit from the adoption of the International Undertaking on Plant Genetic Resources forthcoming during the FAO Conference in November, and should lobby FAO members to ratify it. But whether and how the CGIAR centers that engage deeply in public-private partnerships with unclear objectives and terms can sustain their standing as producers of international public goods remains questionable. The International Rice Research Institute (IRRI) downplayed the Golden Rice it had been so eager to announce to the media only three months earlier. Instead, it issued a press release focusing on IRRI's largest project, Poverty Elimination through Rice Research Assistance in Bangladesh, which is presented as farmer-led, participatory and GM-free. Progress is being made in PR, if not IPR.

**Conclusions**

It is striking how much time, energy and resources have been invested into refocusing the CGIAR over the past seven years. Renewal, Review, Global Forum, CDMT, all written in capital letters and welcomed with fanfare, have had minimal impact on the CGIAR. Hardly anything of substance can so far be detected in terms of change. At best, some organisational juggling has been achieved, and on occasion the CGIAR has started to venture out of its almost secret small circles into the public arena. But the CGIAR has also developed a disturbing habit of cultivating participation from civil society, but ignoring its input and acting unilaterally as before.

Many NGOs and farmers' organisations have already given up on the CGIAR because of its unwillingness to address their issues and concerns. But the CGIAR is not a monolith. NGOs can find considerable support among some key decision-makers within the system for the ecologically-oriented, people-oriented research and development they are advocating – and these donors see NGOs as valuable allies. NGOs have been admitted into the committees where decisions are taken. Some CGIAR members are at least considering possibilities of a Farmer Committee, farmer panels for assessing relevance of research topics and proposals, and farmer and NGO representatives in Steering Groups of the Challenge Programs. This is the result of the continuing advocacy of NGOs within and outside of the NGO Committee. However, NGOs are rarely listened to. Unless it acts soon, the CGIAR is in danger of cutting itself off from the donors and NGOs that have been patiently tapping it on the shoulder over the years to help it find its way. Without their support, the CGIAR will surely be leading itself towards obsolescence.

*Susanne Gura is Project leader of the International Agricultural Research Project German NGO Forum Environment and Development, Bonn, Germany. Phone: (49-228) 948 06 70; Email: gura@forumue.de; Web:www.forumue.de*

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# APOMIXIS: THE PLANT BREEDER'S DREAM

*GRAIN*

*In discussions of the benefits genetic engineering can bring to small farmers, proponents love to point to apomixis – the production of cloned seed. This article examines apomixis research, and the main implications that transferring apomixis into crops may have for industry, farmers and the environment. It also looks at how the apomixis research agenda is being up led by the private sector through patent applications, licensing agreements and confidential research projects.*

Apomixis is the asexual production of seeds, so that apomictic seeds are clones of the mother plant. Uncommon in wild plants and rare in crops, apomixis is one of the most cherished dreams of plant breeders. They argue that everyone would gain from apomixis: plant breeders would be able to produce new varieties of seeds more quickly and more cheaply; seed companies would gain from the accelerated breeding capabilities and their ability to produce new, cheaper varieties faster than their competitors. Farmers would be able to save hybrid seed for the following crop, saving themselves money and keeping their yields high. But in spite of earlier claims that its transfer into crops was around the corner, apomixis is proving elusive. Some experts predict that apomictic crops may still be 20 years away from reaching the market.

**The apomixis accelerator**

In nature, apomixis is widespread but infrequent: it occurs in around 10% of the 400 families of flowering plants, but only in 1% of the 40,000 species that make up those families. Apomixis is most frequent in Gramineae (the cereal family), Compositae (which includes sunflowers), Rosaceae (which includes many fruit trees) and Asterceae (the dandelion family). Only a handful of crops are apomictic: citrus, mango, some tropical forages and a few others.

Apomixis can come about in two ways. Apomictic seeds can arise from a plant's sexual cells, which fail to go through the cellular mechanism underlying sexual reproduction (meiosis). Alternatively, seeds can be generated from non-sexual (somatic) cells. Sometimes, both sexual and asexual seeds develop from the same flower. Apomictic plants produce cloned seed, enabling them to reproduce asexually. But their pollen is often viable, so that apomixis can also be transmitted through the more common mechanism of sexual reproduction.

The most obvious benefit of introducing apomixis into crops would be to allow selecting an individual plant and propagate it as clones through its seeds. A second benefit would be to expand the range of wild relatives that could be integrated into breeding programmes. This is because asexual seeds can contain two sets of chromosomes of different sizes and still be viable, while equivalent sexual seeds would probably not develop.

Like genetic engineering, apomixis would demolish some of the species barriers that have contained the evolution of our crops. The combination of apomixis' capacity to create and stabilise new genetic combinations and to break the species barriers could lead to the *"asexual revolution",* which some think could even dwarf the Green Revolution.

**GLOSSARY OF TERMS RELATING TO APOMIXIS**

**Backcrossing:** A procedure for introducing characteristics from one *donor* variety or species into a second *recipient* variety or species. Backcrossing consists of crossing hybrids with the recipient variety, selecting the offspring expressing the targeted character, and crossing them with the recipient species again and again until a new line is obtained that resembles the donor species or variety in terms of the selected character.

**Ectopic expression**: Expression of a gene out of its expected time or place.

**Functional Genomics**: The science of how the genes in organisms interact to express complex traits.

**Hybrid**: This article refers to two kinds of hybrids. *Interspecific hybrids* result from crossing two related, but different, plant species. One example is crossing maize with its wild relative, *Tripsacum sp*. *Intraspecific hybrids* are the result of crossing two different varieties of the same species. The term *"hybrid"* is also used to signify intraspecific hybrids obtained from crossing two *inbred lines* of the same crop. These hybrids are commercially valuable because they express *hybrid vigour.*

**Hybrid vigour**: High performance (usually in terms of yield) expressed by interspecific hybrids, resulting from their genetic heterogeneity. This high performance is lost in hybrid offspring, forcing farmers to obtain new hybrid seed for every planting.

**Inbred lines**: Crop lines resulting from repetitive inbreeding. These lines are used to develop commercial hybrids.

**Polyploid**: Plant that receives more than one set of chromosomes from each of its parents. In turn, it transmits more than one set of chromosomes to its offspring. In contrast, diploid plants receive only one set of chromosomes from each parent, and transmit only one set of chromosomes to their offspring.

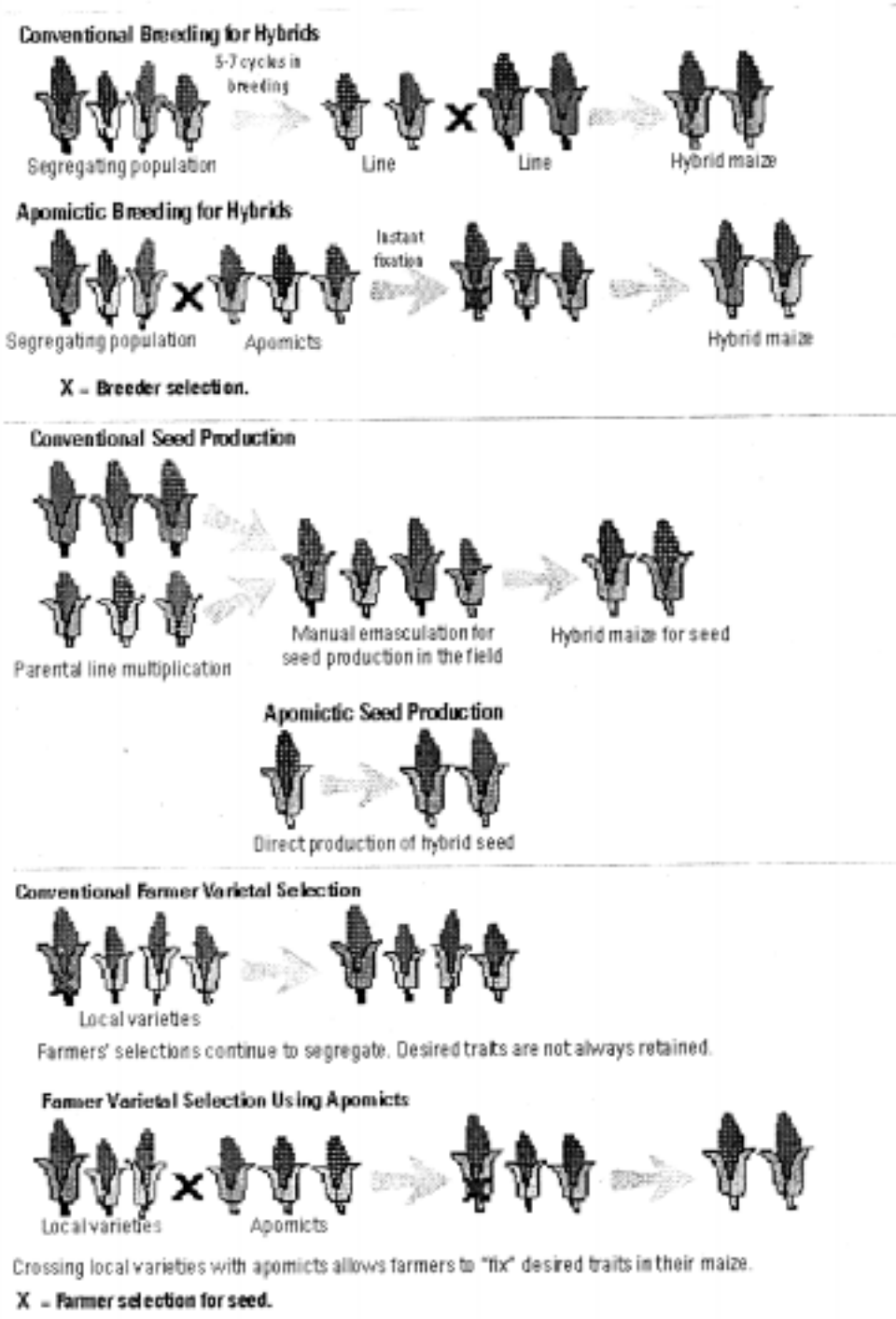
**Supergene**: a group of genes that are always transmitted together as a package.

As shown in the box on p 13, commercially viable apomictic seeds are still a far-off dream. The question is: would apomixis be worth the effort? What is to be gained from it?

**Apomixis and formal plant breeders**

To begin with, apomixis would dramatically decrease the costs of hybrid production. Just as farmers cannot save the seeds from hybrids because they do not breed true, neither can industry. Companies need land and labour to maintain the parental inbred lines that are crossed every year. With apomixis, hybrid seed could be developed from hybrid seed (see figure opposite), leading to impressive time and cost savings. An Australian study estimated that the introduction of apomixis in rice alone would have a value of US$2.5 billion (but note that the figure also includes the earnings from increased yields arising from the use of hybrids).

The implications of the apomixis-led acceleration of plant breeding could be dramatic. Lower costs and much shortened time frames could change the focus of plant breeding. As AgBioTech Net says, breeders would be able to *"genetically adapt plants to specific micro-*




*Source: CIMMYT*

*environments, rather than the current practice of adapting the overall cultivation environment to the crop plants' requirements".* Such *breeding à la carte* would further benefit from research on plant genomics, which aims to identify the groups of genes that are responsible for complex plant traits. Apomixis and plant genomics would also combine to quickly deliver uniform crops better tailored to end-product uses, be it as food, fibre, pharmaceuticals, plastic or any raw material.

The question of who controls or owns apomixis will determine the impact apomixis has on farmers, breeders and the seed industry. If made available in the public domain, apomixis would likely result in a general decrease of seed prices, and in a steep increase in the varieties available to farmers. If one or a few companies control apomixis, the effects would be radically different. Apomixis-led savings in variety development could allow the companies in control of the technology to push competitors out or impose abusive licensing conditions.

**Apomixis and farmers**

Farmers, and particularly poor farmers in developing countries, are expected to benefit from apomixis in two ways: saving hybrid seeds and stabilising their best plants. Commercial farmers are to benefit as clients of a more responsive seed industry.

First and most publicised, apomixis would allow farmers to save the seeds from hybrid plants but still conserve the superior yields. Farmers would no longer need to access or purchase new hybrid seed for every planting season in order to ensure a marketable surplus. In particular, apomixis would serve farmers living in remote areas where neither the seed industry nor governments can guarantee a yearly supply of hybrid seed. But apomictic seeds would still be hybrids, which means they would demand dependency on fertilisers and pesticides. Like other hybrids, apomictic hybrids would still be designed to perform their best under certain environmental conditions, which small farmers are unlikely to achieve and maintain. Apomixis might increase farmers' access to hybrids, but not their control of them.

Second and perhaps more important in the long run, apomixis would allow farmers to fix the genetic characteristics of any of their individual crop plants, by crossing them with an apomictic line (see figure on p 11). Apomixis would allow farmers to become faster breeders, just as it would for formal breeders. It would give farmers more control of their local agro-environment. It would theoretically guarantee yield and uniformity (and therefore, marketability) of their own selected varieties. For the pro-poor proponents of apomixis research, here lies its main potential.

Others are unconvinced. Many people working directly with farmers think that existing approaches to participatory plant breeding would be much more helpful. From her work on participatory breeding with Brazilian family farmers, Angela Cordeiro has learnt that skilled farmers breed for variability rather than yield, to afford security in the face of unpredictable environmental conditions. The stability and fixation entailed by apomixis is alien to small farmers' traditional strategies. In addition, Cordeiro's work has demonstrated that yields in traditional, open-pollinated maize varieties are limited by bottlenecks in soil management and seed storage, rather than genetic potential.

Farmers, and especially commercial farmers, are expected to benefit from the acceleration in formal plant breeding that apomixis would create: cheaper seed, more varieties adapted to their particular growing conditions and more potential end-product markets to choose from. This would depend on whether apomixis is

**SEARCHING FOR CLUES TO APOMIXIS**

There are at least four different scientific approaches to the study of apomixis:

1) Generation of hybrids between crops and apomictic wild varieties. This strategy has been applied on maize, pearl millet, cassava, beets, apples, wheat grasses and wild rye. However, so far the lines obtained are agronomically unsuitable, only partially apomictic and even infertile.

2) Identifying and mapping the genes regulating apomixis, with the view of transferring them to crops through genetic engineering. Gene mapping efforts have found that apomixis is closely related to a *supergene*: a group of genes that are always transmitted together as a package.

3) Mutagenesis in model plants through the use of mutation inducers. This approach has been applied to wild mustard and rice.

4) Crossing plant varieties with different periods of egg development. John Carman of Utah State University is trying to obtain apomictic plants by crossing two plant varieties of the same species but with different periods for egg maturation. The idea is that the offspring of these matings might produce confusing signals about when to develop the egg, causing the plant to skip egg formation and produce an apomictic embryo. The University has created a new company, F1 Technologies, to commercially exploit its findings.

Recent research suggests that biology is at least as important as genes for apomixis to occur. According to Dr. Yves Savidan, a leading authority on apomixis, apomictic plants seem to be caused by the *ectopic expression* of the genes regulating embryo development, which all plants with flowers share. In other words, the genes that regulate embryo development are *"turned on"* earlier than in sexual reproduction, and they are turned on in cells that would otherwise not be turned on at all. But this ectopic expression only results in apomixis where there is also a favourable genetic background.

Savidan is hopeful that the tools of functional genomics will elucidate the genetic switches triggering the ectopic expression of regulatory genes. These mechanisms could be introduced in crops through genetic engineering. The favourable genetic background is likely to be much harder to pin down. The supergene may play a role. Yet the fact that apomixis only happens in *polyploid* plants suggests that polyploidy might be a prerequisite for apomixis expression. Although some crops such as potatoes are polyploid, many others, including maize, rice and pearl millet, are not.

If apomixis is linked to polyploidy, then developing apomictic maize or pearl millet would only be possible after radically transforming the genetic structure of these crops. Thus it is not surprising that scientists forecast that developing apomictic maize may take up to 20 years.

accessible to all seed companies or only to a small group of them. In the latter case, companies might lower seed prices to wipe competitors out, and then raise them to whatever price they choose.

One of the significant threats to farmers getting any benefits from apomixis is the potential use of Traitor/Terminator Technologies, also known as Genetic Use Restriction Technologies (GURTs). Because in principle apomixis would allow farmers to save hybrid seed, it has been touted as the antidote to Terminator, which renders seeds sterile. However, seed companies

will only capitalise on apomixis if they prevent farmers and competitors from obtaining clones from apomictic varieties. It seems likely that companies will use GURTs in conjunction with their apomictic varieties, just as they plan to do with other seeds. As a result, apomixis would not be an antidote to the Terminator: it would simply complement it.

**Apomixis and the environment**

The introduction of apomixis into crops would alter the genetic diversity of both crops and their wild, non-apomictic relatives. What the result would be nobody knows, because apomixis is so poorly understood. This makes predictions on apomixis' impact on biodiversity highly speculative, and even contradictory. The first image apomixis conjours up is uniform fields of clonic plants. More uniform than current monocultures, these crops will be more fragile, and more susceptible to pest and disease pressures. This will lead to an accelerated genetic treadmill to keep pest and diseases at bay. Some authors think that the low rate of apomixis in nature might be the result of extinction brought about by its long-term disadvantages.

There is also a danger that apomixis could harm the process of natural selection and reduce biodiversity. This may come about because of the way apomixis *"fixes"* genetic combinations, promotes asexual reproduction, and sometimes creates genetic combinations that are not even viable for sexual reproduction. These would place constraints on crop evolution that cannot compensate for clever genetic juggling in the long run. Sudden environmental changes and new pests or diseases would be harder to respond to, because there would be fewer viable varieties and a smaller genetic pool available.

There are a whole host of issues around the dangers of the apomixis mechanism spreading to wild populations and the impact that could have on genetic diversity and plant evolution. Since the genetic and biological basis of apomixis is still little understood, it makes speculation difficult, but there are some serious concerns. For example, it seems that in nature apomixis is limited to polyploid species, which are relatively few in number. But if it becomes feasible to transfer an apomixis *supergene* into diploid plants, the *supergene* could spread to wild diploid species. The competitive advantage this might afford these plants could lead to the genetic erosion of many of wild, non-apomictic relatives.

**Corporations in pursuit**

Commercially viable apomictic crops are still a dream, but the 15 patents and patent applications covering apomixis are real. Apomixis research accelerated in the late nineties, when most of these patent applications were filed. Five of the 15 patent applications belong to the public sector; five to multinational corporations; and four to academic research centres (see table opposite). But corporations have already managed to entangle themselves in the publicly-owned patents.

The first public institution to file apomixis-related patent applications was the US Department of Agriculture (USDA). The USDA initiated its work on apomixis in the 1960s. It has two main research lines on maize and pearl millet. The project on maize has been carried on in collaboration with the Institute of Cytology and Genetics at Novosibirsk in Siberia, Russia. This team obtained commercially unviable apomictic lines through backcrossing with its wild relative *Tripsacum*. The team working on pearl millet undertook a parallel strategy, with equally limited results. However, in September 1995, the USDA filed patent applications on both teams' hybrid lines and some associated genetic markers.

The USDA has developed its apomixis patenting policy through consultations with the US seed industry. As a result, it decided to map, clone and sequence the genes in its patented lines in-house in order to ensure broad availability of the technology. Prior to this decision, though, the USDA had already agreed confidentiality agreements with more than 20 companies, including Pioneer Hi-Bred International. Whether these previous agreements will impact the availability of apomixis is unknown

In February 1997, the French development agency IRD (Institut de Recherche pour le Développement) and CIMMYT (the International Maize and Wheat Improvement Centre based in Mexico) filed a patent application on a method to identify genes involved in apomixis in *Tripsacum*. In 1989 the IRD/CIMMYT Apomixis Project was launched. Its aim was to transfer apomixis into crops so that small farmers in developing countries might eventually be able to save hybrid seed.

The apomixis patent application was the first one ever filed by CIMMYT, which was heavily criticised by civil society organisations opposing the privatisation of agricultural research. CIMMYT claimed that it was pursuing a *"defensive patent",* that would: (1) ensure that the technology will be available to small farmers, by preventing others from appropriating the results of its joint project with IRD, and (2) provide a bargaining chip to access the genomics tools necessary to map the apomixis genes, by then mainly in private hands.

In 1997, IRD and CIMMYT started consultations with large seed companies to further their research work. They refused Monsanto's inflexible request for an exclusive licensing agreement. After two years of negotiations, IRD and CIMMYT entered into five-year research collaboration with a consortium of three multinational seed companies – Pioneer Hi-Bred International (since bought by DuPont), Limagrain (closely linked to Aventis) and Novartis Seeds (now part of Syngenta). Under the terms of the (confidential) agreement, the companies received a global non-exclusive license to the research from the partnership. CIMMYT and IRD also received a global license, which is confined to research products for subsistence farmers (defined as those with farms where more than 50% of the harvest is used on the farm).

By virtue of this agreement, a successful IRD/CIMMYT Apomixis Project could ensure subsistence farmers' access to the technology, but it would also have very significant implications for the seed industry. Support to the IRD/CIMMYT initiative might help Pioneer, Limagrain and Syngenta push out smaller seed companies because of their lower costs of seed production. The stakes are very high, and Pioneer, Limagrain and Syngenta seem bent on controlling apomixis technology if and when it

**Patent applications on apomixis**

| Institution | Status | No. |
|---|---|---|
| USDA | Public | 3 |
| Cold Spring Harbour Lab | Public | 3 |
| ORSTROM/CIMMYT | Public | 1 |
| University Utah State | Public | 1 |
| Novartis | Private | 2 |
| Pioneer Hi-Bred;DuPont | Private | 1 |
| Advanta | Private | 1 |
| Sudwestdeutsche Saatzucht | Private | 1 |
| Mary Wiles Eubank | Private | 1 |
| Rohm & Hass | Private | 1 |

*Source: compiled by GRAIN*

materialises. The three companies have developed — and patented – their own apomixis technology and also have entered into partnerships with several research initiatives from the public and academic sectors (see table). The three of them seem to have created a consortium on apomixis and even outlined their agenda in a paper on the socio-economic impact of apomixis at the 2nd International Apomixis Conference. The key points of their agenda are:

- First and foremost, respect for intellectual property rights on apomixis and enabling technologies;
- The need to ensure that technology *"donated"* for humanitarian use does not interfere the patent owners' profits, and
- Introducing technologies that *"might need to be brought into an overall apomixis utilisation plan";* ie preventing commercial farmers from saving apomictic seed.

**Private money, private information**

Although no figures on the investments on apomixis have been published, it can be safely assumed that currently the public sector accounts for half of current investment. Much of the private money has been channelled into public research projects. As a rule, such collaboration agreements include clauses preventing the early dissemination of research results, which turn into proprietary information. As a consequence, information flows among the scientific community have collapsed to the point that, in 1999, the CIMMYT-based *"Apomixis Newsletter"* was discontinued, as it was not relevant any more.

The same secrecy permeated the 2nd International Apomixis Conference. Many groups could not share their most relevant results because of their legal obligations. Ironically,

**Apomixis and the gene giants: research partnerships and collaborative agreements**

| COMPANY | PARTNER | RELATIONSHIP |
|---|---|---|
| Syngenta | EPEN (European Plant Embryogenesis Network) | Novartis involved in the project "Apomixis in agriculture: a molecular approach" |
| Syngenta | ECAA (European Concerted Action on Apomixis) | Syngenta to participate in the creation of a European Apomixis network. |
| Limagrain | ECAA (European Concerted Action on Apomixis) | Limagrain has followed up Biogema's work in the ECAA |
| Limagrain | Autralian National University | Common research to find genes regulating meiosis |
| Pioneer, Syngenta, Limagrain | IRD/CIMMYT | Non-exclusive use of IRD/CIMMYT patent |
| Pioneer Hi-Bred | USDA | Pioneer providing money and technology for USDA work on pearl millet |
| Pioneer Hi-Bred | Agricultural University of Norway | The university uses Pioneer's gene collections in its research |

*Source: compiled by GRAIN*

many of them worked with the same companies. As a result, the public research programmes are left in the dark, working on their particular piece of the puzzle. Only the gene giants can see the whole picture.

**Should we worry about apomixis?**

Apomixis is likely to remain one of the most cherished dreams of plant breeders for many years to come. The hurdles are significant, but key actors seem motivated because the rewards could be immense. Companies are likely to continue investing in apomixis research because of the technology's potential to transform agriculture completely. Apomixis could put an end to variability within plant varieties and hence make them more predictable. This would open the way to the use of plants as bioreactors to extract uniform, high-quality substances for any kind of industrial use. Agriculture could then compete with industry in producing organic polymers, for example. Servicing a whole new range of markets promises spectacular profit gains to the seed industry.

For gaining public support for apomixis, industry is likely to emphasise its positive impact on small farmers. But the likelihood is that if the gene giants are controlling apomixis, none of these benefits will materialise. Small farmers working with traditional varieties might have more to fear from apomixis than to gain from it. Apomixis' ability to genetically freeze particular plants would compromise attempts to maximise variability, which is an important farmer strategy. Moreover, if polyploidy turns out to be a prerequisite for apomixis and the seed industry turns exclusively to polyploid seeds, farmer's diploid varieties will be further marginalised. In fact, apomixis might be marginalising farmers' varieties already. By promising to solve farmers' loss of hybrid vigour, it indirectly helps to promote hybrids at the expense of other technological options which are more appropriate to farmers' objectives of minimising risk and promoting diversity in their crops.

Apomixis caters to industrial agriculture's corporate agenda, rather than food security or farmers' needs. It should not be up to corporations to decide on whether or not to introduce it into agriculture. No one knows what the mid- and long-term impact of apomixis would be on crop diversity, biodiversity and the environment more generally. After all, transferring apomixis to crops equates with removing the reproductive barriers that have shaped domestication. This is too serious an issue to mess about with, no matter how cherished the dream of apomixis might be.

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# THE IMPACT OF SOYBEAN EXPANSION IN ARGENTINA

*WALTER PENGUE*

*In the past two decades, soybean production has increased sharply in the Pampas region of Argentina. Genetically modified (GM) soybeans have been particularly popular to the extent that all soybean production is now GM. This article provides a resume of the original article by Pengue on the socio-economic and environmental implications of the exponential growth of transgenic soybean production in one of the world's leading soybean-producing countries.*


The Argentine Pampas is one of the six most agriculturally productive regions in the world. Its soils cover some 9 million hectares and are rich in nutrients and organic matter. During the last quarter of a century, soybean production has increased at an unprecedented rate from an area of 38,000 hectares in 1970 to 10 million hectares today. Around 70% of the soybean harvested is converted in oil-processing plants most of which is exported, providing 81% of the world's exported soybean oil and 36% of soybean meal.

**New technologies**

Two major technological innovations have fuelled soybean's exponential growth in Argentina: the farming technique known as direct seeding and the introduction of herbicide resistant soybeans.

1) Direct seeding was introduced 10 years ago as a tool for reducing soil erosion on farms. Seeds are planted directly into the soil, without the need for ploughing, and herbicides are used to remove weeds. For this reason, direct seeding is often promoted as an environmentally friendly farming technique.

2) Argentina has been eager to adopt GM crops, and produces 23% (in 2000) of the world market in GM products. Herbicide-resistant soybeans have been the most popular, of which 67% are

sold by the company Nidera. Other companies involved in the GM soybean seed market include Dekalb, Monsanto, Pioneer Hi-Bred and some national companies such as Don Mario, La Tijereta and Relmo. The rate of adoption of GM soybeans has surpassed even the industry's highest expectations.

Both these innovations have also had the advantage of complimenting each other. Direct seeding is particularly suited to the soybeans grown in Argentina as they are grown in rotation, most commonly with wheat. This in turn has ensured the highest adoption rate in the world of direct seeding. The rapid adoption of these two new techniques has also led to increased imports of specialised machinery and herb-icides. Both techniques are dependent on the use of herbicides, such as glyphosate, which explains the rise in sales from 1.3 million litres in 1991 to 59.2 million in 1998 of this herbicide (see table below).

**A shock to the system**

The combination of these two techniques has increased the level of intensive farming for export. The main aim has been to compete on the agricultural world market. This is not an easy task a market that is often distorted by the agricultural subsidies received in many countries. And Argentina has been relatively successful … but at a price.

The initial problem that direct seeding was supposed to address was the serious soil erosion and the subsequent loss of soil fertility. Although direct seeding has reduced the rate of erosion, other problems have arisen from the further intensifications of agriculture that it requires. These include the emergence of new diseases and pests, a marked reduction of the levels of nitrogen and phosphates in the soil, and - most recently - herbicide-resistant weeds.

Already, in the Pampas, there are several types of weeds that are suspected of being tolerant to the recommended doses of glyphosate. Some of these require a doubling of the application, with a consequent increase in herbicide use. The herbicides have also been affecting ecosystems adjacent to the areas of application and aquatic ecosystems, which receive the runoff from the treated zones.

**Evolution of the Argentinean market for pesticides (in millions kg/litre)**

| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|---|---|
| Herbicides | 19.7 | 22.9 | 26.2 | 31.8 | 42.0 | 57.6 | 75.5 |
| Acaricides | 3.0 | 3.2 | 3.2 | 3.4 | 3.5 | 8.1 | 6.5 |
| Insecticides | 6.2 | 6.9 | 7.0 | 8.9 | 10.5 | 14.2 | 18.1 |
| Fungicides | 5.9 | 7.4 | 7.4 | 7.3 | 7.2 | 8.0 | 8.6 |
| Seed treatment | 0.4 | 0.4 | 0.4 | 0.5 | 0.7 | 1.1 | 1.6 |
| Others | 4.1 | 5.2 | 6.1 | 7.3 | 8.7 | 10.9 | 13.7 |
| TOTAL | 39.3 | 46.0 | 50.3 | 59.2 | 72.6 | 99.8 | 124 |
| %herbicide/total | 50.1 | 49.8 | 52.1 | 53.7 | 57.9 | 57.7 | 60.9 |

*Source: Data from CASAFE*

**Goodbye to the rural economy**

Indicators show that the country has reached many of its economic goals, but has failed to incorporate many social and environmental benefits. These include the disappearance of small and medium-sized businesses (farmers and industry), an increase in urban and rural unemployment (7.1% in 1989, 15.4% in 2000), increased population migration, and low wages. In the 1990s, the number of people living below the poverty line in Buenos Aires grew from 2.3 to 3.5 million. In 2000 the number of beggars and homeless people increased from 325,000 to 921,000, and some 15 million out of a population of 37 million people in the country are considered to be poor. Unemployment is increasing, incomes for almost 70% of the population in the region are going down, and fewer people are eligible for unemployment benefit and economic aid.

The benefits of introducing transgenic soybeans have been largely limited to large-scale producers. Smaller producers have been hampered by pressure from taxation, banks, and access to and dependence on agricultural inputs. This had led to a concentration of farms (increase of farm size), a shift towards high-tech innovation and productivity and a move away from quality. More than 60,000 agricultural establishments disappeared from the Pampas between 1992 and 1999, while at the same time there has been an increase in farm size, from 250 to 350 hectares.

**The need for government support**

The dramatic rise in the planting of GM soybeans in Argentina may well not live up to peoples' expectations. Studies in the US demonstrate that the soybeans do not live up to their promises of fewer inputs and greater yields (see box opposite). The dramatic increase in herbicides documented in Argentina over the last five years bear witness to the *"fewer inputs"* myth. In Argentina, the 'success' of the GM soyeabean story must largely be attributed to marketing by the seed companies involved, rather than scientific evidence and farmer experience. Given that GM soybeans are still an 'experimental' crop, the industry has done a good job of convincing farmers of its benefits with little evidence of performance.

The increased influence of corporations in agriculture is not limited to determining what farmers plant. Agricultural research is becoming dominated by the private sector; the take-over of science and technology by an increasingly small part of society. Developing countries are becoming the mere recipients of technology imported form the North. In Argentina, INTA (the National Institute of Agricultural Technology) has historically played a fundamental role in the country's agricultural research. Although its work was clearly biased towards increased production and concentrated in certain regions, the hybrids produced by the institute were adapted to local conditions. Today, the organisation has limited resources, extension workers have left and, like that of many other scientific and technical organisations, its role is now inadequate.

In the absence of other recognised alternatives to industrial agriculture, an alternative type of farming is emerging from the farmers themselves. This alternative model is based on technologies that are intensive in their use of human resources, low use of inputs, and addresses both domestic and export markets. For example, the Prohuerta programme supplies seeds which produce organic vegetables and poultry to sustain approximately three million Argentineans living under extreme conditions of poverty in urban, peri-urban, and to a lesser extent, rural areas. There is an increasing demand for *"green"* products, especially amongst those with higher incomes and

**PROBLEMS AHEAD FOR ROUNDUP READY SOYBEANS**

Roundup Ready (RR) soybean has been a great commercial success. More than 60% of soybean in the US this year will be planted with RR varieties, only five years after its introduction in 1996. Although it is more expensive, farmers adopted the technology because it greatly simplified weed management. RR systems achieve it by allowing the farmer to spray a wide spectrum herbicide – glyphosate (Roundup) – over the growing soybean plants, killing the majority of weeds, but leaving the herbicide-resistant RR soybean untouched for the most part.

Contrary to industry's claims, RR soybean clearly requires more, not less, herbicide than conventional soybean. This conclusion is firmly backed up by comparisons in the field of the total weight of active herbicide applied to an average acre of RR soybean as against conventional soybean (1 acre = 0.405 hectare). Looking ahead to the harvest of 2001, it is likely that the average acre of RR soybean will be treated with approximately 0.5 lb (0.23 kg) more of active herbicide ingredient than conventional soybean. The result is that this year more than 20 million pounds (9.1 million kg) of extra herbicide will be applied to the harvest.

Evidence shows that RR soybean crops produce 5% to 10% less yield per acre as against other identical varieties grown under similar soil conditions. The reasons for this drop in performance are beginning to become clear. Scientists at the University of Arkansas showed that root development, node formation and nitrogen fixation worsened in some varieties of RR soybean and the effects are worse under strong drought conditions or in relatively infertile fields. This problem arises because the symbiotic bacteria responsible for nitrogen fixation in soybean, (*Bradyrhizobium japonicum*), is very sensitive to drought and also to Roundup.

It is remarkable that the first research data documenting the sometimes-serious depression of nitrogen fixation in RR soybean fields did not appear until 2001. By this time, more than 100 million acres of Roundup Ready soybeans had already been planted in the US. The US regulatory system is better at avoiding problems that dealing with them once a technology is entrenched, with profits and market shares to defend. In the case of RR soybeans, the regulatory system's ability to seek out risks and resolve uncertainties was, in effect, silenced because regulators had little to go on in formulating their questions.

*Source: Charles Benbrook (2001), "Troubled Times Amid Commercial Success for Roundup Ready Soybeans: Glyphosate Efficacy is Slipping and Unstable Transgene Expression Erodes Plant Defenses and Yields" AgBioTech InfoNet Technical Paper Number 4, May 3.*

Argentina is in a good position to respond given its extensive certified organic production.

It is now necessary for the government of Argentina to discuss much more broadly the true costs and benefits of different production models. Though GM soybean may dominate agriculture in the Argentine Pampas, alternatives are desperately needed to provide both for the Argentinean environment and rural population.

*Walter Pengue is an agricultural engineer specialised in genetic improvement at the University of Buenos Aires, Argentina. He can be contacted at wapengue@sinectis.com His fully referenced paper (in Spanish) "Expansión de la soja en Argentina. Globalización, Desarrollo Agropecuario e Ingeniería Genética - un modelo para armar" can be obtained from GRAIN's website (www.grain.org/publications/t-pengue-sp.cfm) or on request.*

**Sprouting Up: WORLD FOOD SUMMIT - FIVE YEARS LATER**

The Food and Agriculture Organisation of the United Nations (FAO) is hosting a *"World Food Summit: five years later"* from November 5-9, 2001). Of more interest to NGOs is the accompanying *"2001 Rome NGO Forum On Food Sovereignty"* to be held from November 3-9, 2001. Both meetings were originally planned to be held in Rome, but the Italian government got cold feet after the shame it incurred following police brutality at the G-8 meeting in Genoa in July. The Food Summit will now be held elsewhere (the exact venue not known as *Seedling* goes to print).

Five years ago the heads of States at the World Food Summit set themselves the ambitious task of halving the number of hungry people in the world within 20 years. Their agenda for cure and change consisted of seven lofty commitments, some weak promises and a list of 182 actions to meet that goal and bring about long-term change. Five years later, with more not less people hungry than in 1996, the official plea is for more political will and more resources. But the problem is the proposed cure itself. This is a recipe based on market liberalisation, private investment, genetic engineering and intensive animal production. The result: an increasingly industrialised agricultural system, marginalised farmers and millions more livelihoods under threat.

NGOs, farmers' organisations and civil society have been pushing for a change in perception of food as a trade commodity to a basic need for human life to which all people have a right. Current patterns of trade liberalisation, erosion of the global commons and investment in inappropriate technologies create food insecurity. They have a destructive effect on food sovereignty and on the majority of those who face hunger: the rural poor. These are key elements to consider in any serious attempt to achieve the World Food Summit goal. The NGO Forum will consider five strategies that are key to attaining food security at global and local levels:

- **Right to Food** – in relationship to international arrangements (e.g.trade), other relevant policies and domestic social policies.
- **Food Sovereignty –** the right of the peoples of each country to determine their own food policy.
- **Agricultural Production Models** – agro-ecological, organic and other sustainable alternatives to the current industrial model including their impact on food safety.
- **Access to Resources** – land, forests, water, credit and genetic resources; land reform and security of tenure.
- **Democracy and civil society involvement** – community empowerment and the national institutional arrangements to foster its capacity and legitimacy are essential. At the same time, it is crucial that governments acknowledge their full responsibility and take effective action towards obtaining food security for all. The existence of international mechanisms should aim to support economic, social and political processes of democratisation at the country level, rather than encouraging their marginalisation.

A major cross cutting issue will be how to protect the livelihoods of the rural poor and indigenous peoples in the context of globalisation, with attention to issues of discrimination including gender, caste and class, and ethnicity.

*(continued on next page...)*

The *World Food Summit - five years later* could provide an excellent opportunity to send clear messages to the fourth Ministerial meeting of the upcoming *World Trade Organisation* (WTO), the sixth Conference of the Parties to the *Convention on Biological Diversity* in The Hague and the *World Summit on Sustainable Development* in Johannesburg. NGOs can help build the bridge between these events so that food sovereignty can be assured and hunger abolished.

In parallel with the Food Summit, the International Undertaking on Plant Genetic Resources (IU), will be finally debated by the FAO Conference. The IU is a treaty that will not only ensure the free flow of genetic resources but will also safeguard food security, Farmers' Rights and international agricultural research. However, three key outstanding issues concerning **Intellectual Property Rights**, the relationship with the **WTO** and which **crops and forages** will be included in the treaty will have to be resolved. These issues will reverberate around the Food Summit The challenge for governments is simply whether the world's agricultural biodiversity is to be nurtured to provide profit for a few or food for all. The IU, while not perfect, could provide the start of an answer. The Food Summit, although potentially distracted by development targets, biotechnology and food aid, could be the medium to convey this good news.

Fidel Castro castigated world leaders at the World Food Summit in 1996 about mis-placed priorities, evidenced by the massive multi-billion dollar expenditure on armaments, and said: "*The bells that are presently tolling for those starving to death every day will tomorrow be tolling for all humankind if it did not want, did not know how, or could not be sufficiently wise, to save itself*." Have we become wiser in the last five years?

The NGO Forum On Food Sovereignty is being organised by the "*Italian Committee"*, which comprises NGOs from different sectors of Civil Society working with a Core Planning Committee for the Food Summit. The Forum will comprise 80% participants from the South and 20% from the North with an equitable mix of gender, a significant representation from indigenous groups, farmers' organisations as well as NGOs. The forum will challenge governments to rethink their priorities and responsibilities for food security of their constituents and of their neighbours.

In the week preceding the WTO's Ministerial Meeting (November 9-11), it will be all the more important to emphasise the impacts on poverty and food insecurity of agreements made by the WTO, especially the Agreement on Agriculture and the TRIPs Agreement. (The venue of the WTO meeting is also unknown – it was to be in Doha, Qatar, but now will more likely be held in Geneva, Switzerland). For this reason, the Forum organisers' banner is *"Let the hunger-debate be the human bridge between Rome and Qatar!"*

**The Italian Committee has established a Secretariat to whom applications for attendance at the Forum should be sent. Email: ngoforum@libero.it**

*Source: Patrick Mulvany, Food Security Policy Adviser, ITDG, Schumacher Centre,Bourton, Rugby, CV23 9QZ, UK. Tel: (44-1788) 661169, E-mail: Patrick_Mulvany@CompuServe.com. Extensive documentation on the WFS/fyl, the WTO and the IU is available at the UK Agricultural Biodiversity Coalition's website: www.ukabc.org or at www.grain.org*

## INITIATIVES & ACTIONS

**EU Life patenting directive on the loose again**

On June 15, the European Court of Justice (ECJ) Advocate General concluded that the motion to annul the legal challenge against the EU's biotechnology patenting directive should be rejected. The challenge was tabled by the Dutch government in 1998, and joined by Italy and Norway in 1999. Technically, this is not the end of the proceedings, as the ECJ must issue a final decision. But it is widely expected that the Court will uphold the conclusion of its Advocate General. The directive was adopted in June 1998 after ten years of controversy and public protest. It allows for the patenting of plants and animals, as well as elements isolated from the human body (cells, genetic sequences, etc). Although the Directive is now law, most EU countries have so far failed to implement it. Last year, France called for an interpretation of the directive from Brussels, while the German government committed to seek its renegotiation.

**The full text of the Advocate General's opinion is available (English only) from the ECJ's website. To retrieve the text,, go to www.curia.eu.int/jurisp/cgi-bin/form.pl?lang=en, select Opinion at the top, enter "C-377/98" in the Case Number search box and hit the Submit button.**

**Bt cotton rejected in India**

India's Genetic Engineering Approval Committee (GEAC) of the Ministry of Environment and Forests to turn down Mahyco-Monsanto's application for commercialisation of Bt cotton (cotton engineered with *Bacillus thuringiensis* genes to protect it against the boll weevil). Mahyco-Monsanto has been asked to conduct research trials for one more year. The company has also been asked to address some of the environmental concerns raised by the Indian Council of Agricultural Research (ICAR) last year. India NGOs contesting the introduction of Bt cotton are pushing for a further year of trials to conform with the accepted three-year norm for GM field trials. They are also demanding that the committees that evaluated the Mahyco-Monsanto data be disbanded, alleging that they were party to scientific fraud.

**Contact Devinder Sharma, Tel: (91-11) 525 0494 or People's Caravan 2000, PO Box 1170, 10850, Penang, Malaysia. Tel: (604) 657 0271/ 656 0381, Fax (604) 657 7445, E-mail: pcaravan@tm.net.my Web:www.poptel.org.uk/panap/caravan.htm**

**FoE fights GMO contamination in Europe**

Friends of the Earth (FoE) has launched an e-mail action as *"a last ditch attempt"* to get the European Commission to dump its proposals to allow for contamination by non-EU approved genetically modifed organisms (GMOs) in the forthcoming proposals for Regulations on Traceability/Labelling of GMOs and Novel Food/Feed. The action consists of a simple e-mail to Commissioner David Byrne whose directorate is responsible for the proposals. You can find the suggested text of the message on www.foeeurope.org, then click on 'GMO alert'. FoE argues that the new proposals will weaken the recently adopted Deliberate Release Directive before it has even been adopted in Member States. FoE also says that current EU legislation allowing up to 1% contamination of food derived from EU-approved transgenic crops without the food having to be labelled is also unacceptable.

**Contact Gill Lacroix, Biotechnology Co-ordinator, Friends of the Earth Europe, Tel: (32-2) 542 0182, Fax: (32-2) 5375596, E-mail: gill.lacroix@foeeurope.org**

**Nicaragua accedes to UPOV**

On August 6, Nicaragua became the 49th member State of the International Union for the Protection of New Varieties of Plants (UPOV). In January 1998, Nicaragua signed a bilateral treaty with the United States on intellectual property rights (IPR). It was the first of its kind in Central America and, in the words of the US government, was designed to provide a level of IPR protection that goes beyond the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights. First, it obliged Nicaragua to enact a law granting monopoly rights over plant varieties based on the UPOV Convention. The government lost no time in presenting such a draft to the National Assembly. This triggered a wave of protest from different sectors of civil society against what became known as *"the UPOV law"* and eventually led to Supreme Court proceedings on matters of constitutionality. The bill was nevertheless adopted in October 1999. The deal with the US also obliged Nicaragua to *"make every effort to accede"* to UPOV itself. This is what has now been accomplished, but it's not the end of the story. On top of the UPOV pressure, the bilateral treaty from the US makes no allowance for Nicaragua to exclude plants or animals from its patent law if it so wishes...

**For information on pressures on countries to adopt *"TRIPS-plus"* IPR legislation, visit GRAIN's website: www.grain.org/publications/trips-plus-en.cfm**

**Sri Lanka reneges on GM food ban**

Regulations on genetically modified (GM) food which were supposed to come to in operation in Sri Lanka on September 1st were postponed indefinitely by the Minister of Health on August 30th. This is seen as a move to appease the US. The US Embassy and the High Commissions of Australia and the New Zealand backed the pro-GM Foods lobby (led by Kraft/Kellogg) in opposing the ban. NGOs aruge that this is a clear case of double standards as the New Zealand government recently extended its own moratorium on GM foods and the UK, Italy, Luxemburg, Germany, India, Philippines, Thailand, Austria, and France all have restrictions on GM foods. NGOs argue that GM foods, having lost markets in developed countries, will now flood Sri Lankan markets and its unsuspecting consumers.

**Contact: Environmental Foundation Ltd., 3 Campbell Terrace, Colombo 10, Sri Lanka. Fax/Tel: (94-1) 697226, E-mail: efl@ef.is.lk**

**GM protests in New Zealand**

The protest march for a GM-Free Aotearoa/New Zealand on September 1st was attended by 10,000 people, despite cold and continuous rain. There were speeches by a number of activists, most of whom argued for a ban on commercial releases and field trials. Maori speakers argued that genetic engineering is spiritually and culturally unacceptable, and called for a ban on genetic tinkering in the lab as well. The government will announce its decision to keep or revoke its GM moratorium at the end of October

**Contact: Meriel Watts, Soil & Health Association of New Zealand Inc, PO Box 36-170, Northcote, Auckland, New Zealand. Tel/fax: (64-9) 480 4440.**
**Email: info@organicnz.pl.net,**
**Web: www.organicnz.pl.net**

**Sign up: Re-thinking TRIPS in the WTO**

A joint statement is circulating to bring together the many NGOs and civil society groups campaigning on different aspects of intellectual propery rights in light of the forthcoming 4th Ministerial Conference of the World Trade Organisation (WTO). This meeting was scheduled to be held in Doha, Qatar, from November 9-11, but as *Seedling* goes to print, there is talk of moving the venue, perhaps to

Geneva, Switzerland. The aim of the NGO statment is to develop a common platform to demand a fundamental review and reform of the WTO's Trade Related Intellectual Propery Rights (TRIPS). The statement reiterates many of the proposals and demands that NGOs have made in their different campaigns relating to the patenting of life, biopiracy and food security, and public health and access to affordable medicines.

**For more information about this statement or to sign on, contact: Cecilia Oh, Third World Network, Tel: (604) 2266159, Fax: (604) 2264505, Email: twnet@po.jaring.my**

**RiceTec hit again in the Basmati battle**

In August, the US Patent Examiner changed the title of RiceTec's patent from *"Basmati Rice Lines and Grains"* - covering a broad generic claim to the invention of Basmati, to *"Rice Lines Bas867, RT 1117, RT1121."* The latter are restricted to the specific breeding done by the US-based RiceTec corporation. The original patent covered wide ranges of plant height, grain size, and aromatic quality. The patent holder now cannot claim the unique qualities of Basmati nor the unique name *"Basmati"*. The cancellation of other claims now prevents the potential use of the Basmati patent against growing traditional Basmati.

**Contact: Research Foundation for Science, Technology and Ecology, A-60, Hauz Khas, New Delhi - 110 016, India. Tel: (91-11) 6968 077, 6853 772, 6561 868. Fax: (91-11) 6856 795, 6562 093. E-mail: rfste@ndf.vsnl.net.in or the International Center for Technology Assessment, 666 Pennsylvania Ave. SE, Suite 302, Washington, DC 20003, USA. Tel: (1-202) 547 9359, Fax: (1-202) 547 9429, E-mail: info@icta.org.**

**Seed-saver organisation needs help**

Association Kokopelli was created in May 1999 as a result of the intensification of threats to the existence of Terre de Semences both from the seed industry and from French government. The *"Decree of 1997"* in France (creating a National Catalogue for the listing of 'amateur' vegetable varieties (subject to impossible-to-implement conditions) and subsequents threat from the Fraud Squad forced the closure of Terre de Semences whose seeds (all organic or bio-dynamic) are distributed all over Europe. The present collection of seeds offered by Kokopelli includes 500 varieties of tomatoes, 400 varieties of peppers, 150 varieties of squashes, 130 varieties of lettuces, and many varieties of eggplant, amaranth, corn and basil. Association Kopokelli is now sending out an SOS (Save Our Seeds) for financial support *"in order to maintain its task of enchanting the family gardener with the beautiful seeds of life, in Europe, in Africa and in Southern Asia."*

**To see Kopokelli's *"Manifesto for Survival"*, contact Dominique Guillet, Association Kokopelli, Quartier St Martin, 07200 Aubenas, France.**
**E-mail: kokopelli.assoc@wanadoo.fr**

*Kokopelli, the hunch-backed flute player,has been a symbol of fertility throughout North, South and Central America for millenia. While he sows the seeds hidden in the hump of his back, Kokopelli sings and plays the flute. In this way, he instills in the seed the breath of Life.*

**Sprouting Up: WANT TO LET OFF STEAM ABOUT IPRS?**

The World Intellectual Property Organisation (WIPO) decided to celebrate all the benefits of intellectual property rights with an I*nternational Day of Intellectual Property Rights* on April 26, 2002. Part of the process leading up to it is an essay contest in response to the question: "WHAT DOES INTELLECTUAL PROPERTY MEAN TO YOU IN YOUR DAILY LIFE?"

Shortly afterwards, WIPOUT, an international organisation consisting of academics, artists, musicians, and other activists, launched the Intellectual Property Counter-Essay Contest The counter contest is intended to challenge the over-protection of intellectual property, which is doing much damage to education, health care, the environment, and economic security for millions around the world.

Entrants are being asked to address the same question that WIPO has posed and expects rather different answers to those WIPO is seeking out. WIPOUT's website also has a space for shorter 'Point of View' pieces on the same topic for those who have something to say, but do not want to write an essay. WIPOUT's contest will run until 15 March, 2002. The winning essays will be chosen by an international panel of judges and the results announced on 26 April, 2002, the same day that WIPO announces the winners of its contest. WIPOUT's prize fund currently totals £1,500 (approx. $US2,100).

Unlike submissions to most essay contests, WIPOUT's essays will be immediately posted on the website and accessible to all readers, not just the judges. And although WIPOUT is hosting a 'contest', we see the competitive aspect of the contest secondary to the purpose of enabling a public and critical debate on the over-protection of IP. More than 40 groups and individuals from 10 countries have, to date, announced their support for WIPOUT. WIPOUT sees the contest as a way of building on recent high-profile issues such as the South African anti-HIV drugs case, the growing protests against the TRIPS agreement and the WTO, and public concern about genetically modified crops and the patenting of human genes and plants. Essays can be submitted to WIPOUT in English, French, German, and Spanish. A selection of initial essays, submitted for judging purposes or for the shorter non-judged "point of view" section of the website, has already been posted on the website.

So what can you do? First, go and check WIPOUT's website, www.wipout.net, and look at the contributions already posted. Then if you want to become a part of the contest and join in the campaign against the over-protection of intellectual property, you can:

1) Write an essay or a 'Point of View' and submit it to WIPOUT.
2) Become an official endorser of the competition.
3) Make a contribution to WIPOUT's prize fund.
4) Put a link to WIPOUT on your website (a .jpg button can be provided).
5) Talk about it in your newsletter/magazine.
6) Download the WIPOUT poster and put it up in your workplace, university, school, etc
7) Spread the word.

The Intellectual Property Counter-Essay Contest is at www.wipout.net
You can email WIPOUT at contact@wipout.net
Details of the WIPO contest can be found at: www.wipo.int/pressroom/en/alert/2001/ma03rev.htm

## RESOURCES & DOCUMENTATION

The second edition of Gabriele Stoll's 1986 *Natural Crop Protection in the Tropics* compiles information on natural crop protection techniques in a user-friendly, even and persuasive way. Stoll's work integrates different knowledge systems – traditional, local and scientific – in a way that enriches each of these approaches, and makes them relevant to farmers. The first chapters describe the different crop and storage pests and methods of protecting the stored harvest against them. The last chapter focuses on helping farmers to bring these methods alive. It does so using eight case studies on the adoption of natural crop protection methodologies by farmers, developed through participatory research and extension. The book's clear structure, its beautiful drawings, its clear layout and its exhaustive information (including its 675 references) make it an invaluable resource.

**Gabriele Stoll, *Natural Crop Protection in the Tropics: Letting Information Come to Life*, CTA and AGRECOL, 2000, 375 pp, ISBN 3-8236-1317-0. Priced at EUR 55 (about US$ 50). Order from: Margraf Verlag, PO Box 1205, D-97990, Weikersheim, Germany. Fax: (49-79) 34 81 56. E-mail: margraf@compuserve.com**

*Seeds of Suicide: The ecological and human costs of globalisation of agriculture* shows how privatisation of the seed sector has led to the emergence of a new kind of feudalism in Indian agriculture, which has resulted in many farmers' suicides in Andhra Pradesh and Punjab. *Seeds of Suicide* first summarises the deve-lopment of the seed sector since the Green Revolution, with a focus on the effects of market penetration by multinational seed companies. The book then assesses the implications of genetically modified organisms (GMOs) using the introduction of Bt cotton into India as an example. (Bt cotton is cotton engineered with *Bacillus thuringiensis* genes to protect it against the boll weevil). The book depicts the social implications of bringing cotton growing to Andhra Pradesh and Punjab: the delivery of bad seed, the emergence of a new lending class, and the rise of a new corporate feudalism. The book ends by looking at alternative seed systems: Tarai Development Corporation, which is presented as a model for public sector seed supply, and the Navdanya project, which aims to strengthen community seed supply.

**Vandana Shiva *et al*, *Seeds of Suicide: The ecological and human costs of globalisation of agriculture*, Research Foundation for Science, Technology and Ecology, New Delhi, 2000, 144 pp. Available at: Research Foundation for Science, Technology and Ecology, A-60, Hauz Khas, New Delhi, 110016, India. Fax: (91-11) 696 8077, E-mail: vshiva@vsnl.com.**
**Web: www.vshiva.org**

*Food without Farmers? – Agricultural research needs a profoundly changed CGIAR* is a collection of articles focused on a range of issues related to agricultural research, and the Consultative Group on Agriculture Research (CGIAR) in particular. Although interesting to read, some of the articles suffer from the use of heavy and bureaucratic English, making them hard to understand for the uninitiated. Nevertheless, Ann Waters-Bayer does present a clear picture of what has been happening in the CGIAR and the NGO Forum up until April 2001, despite the apparent complexities of the

situation. Another interesting article by Ilse Köhler-Rollefson provides details and proposals of the conservation of farm animal breeds, a subject she claims "*has received much less attention than plant genetic diversity".* Kristin Dawkins of the Institute of Agriculture and Trade Policy provides a good analysis of how research institutions have accepted without discussion or analysis that agriculture is dependent on global and liberalised trade. Aileen Kwa analyses how agricultural research is affected by "*politics, power, greed and profits which are the key obstacles blocking access to food for the poorest, rather than the issue of needing more knowledge about how to produce food*". Overall, worth persisting with, especially if you wish to know more about CGIAR and theGlobal Forum on Agricultural Research (GFAR).

**Susanne Gura (Ed),** ***Food without Farmers? – Agricultural research needs a profoundly changed CGIAR*****, German NGO Forum for Environment & Development, May 2001, Bonn. Available (free) from German NGO Forum for Environment & Development: C/o Burghofstr. 116, D-53229 Bonn, Germany. Tel: (49-228) 948 06 70 Fax: (49-228) 976 47 77 E-mail: gura@forumue.de; Web: www.forumue.de**

*Conserving Agricultural Biodiversity in situ: A scientific basis for sustainable agriculture;* Proceedings of a workshop held in Nepal in May 1999, organised by the International Plant Genetic Resource Institute (IPGRI), the Nepal Agricultural Research Council (NARC) and NGO Local Initiatives for Biodiversity, Research and Development (LIBIRD). Main topics discussed in the workshop and included in this publication are the distribution of genetic diversity maintained by farmers over time and space, techniques used to maintain genetic diversity on farm, the people involved in involved in biodiversity conservation, and factors that persuade farmers to pursue diverse variety choice.

**D Jarvis** ***et al*****, (Eds),** ***Conserving Agricultural Biodiversity in situ: A scientific basis for sustainable agriculture;*** **Proceedings of a workshop, 5-12 May 1999, Pokhara, Nepal, IPGRI, Rome (Italy), 2000, 250pp, ISBN 92-9043-440-6. Available from: IPGRI, Via dei Tre Denari 472/a, 00057 Maccarese (Fiumicino), Rome, Italy. Fax: (39-66) 197 96 61, E-mail: ipgri@cgiar.org**
**Web: www.ipgri.cgiar.org**

*A Training Guide for In Situ Conservation on Farm* is intended for national programmes interested in supporting on farm conservation of agricultural biodiversity. It discusses information needs and practical steps for on farm conservation. The disciplines referred to in the Guide range from genetics to ecology and anthropology, and topics covered include sampling, data analysis and participatory methods.

**D Jarvis,** ***et al*** **(Eds),** ***A Training Guide for In Situ Conservation on Farm, Version 1,*** **IPGRI, Rome (Italy), 2000, 161 pp, ISBN 92-9043-452-X. Available from: IPGRI, Via dei Tre Denari 472/a, 00057 Maccarese (Fiumicino), Rome, Italy. Fax: (39-66) 197 96 61, E-mail: ipgri@cgiar.org, Web: www.ipgri.cgiar.org**

*Responding to Bioprospecting: From biodiversity in the South to medicines in the North* is a compilation of contributions sharing experiences of and perspectives on bioprospecting. Part one is focused on the theory of bioprospecting and the benefits involved, part two oultines challenges resulting from bioprospecting activities; and part three explores the legal implications of the Con-vention on Biological Diversity related to bioprospecting practices.

**Hanne Svarstad and Shivcharn Dhillion (Eds),** ***Responding to Bioprospecting: From biodiversity in the South to medicines in the North,*** **Spartacus Forlag As, Oslo, Norway, 2000, 220 pp, ISBN 82-430-0163-8. Available from: Spartacus Forlag As, PO Box**

**2587 Solli, N-0203 Oslo, Norway, E-mail: post@spartacus.no**

*From plants in the South to medicines in the North: Access to Genetic Resources: The Convention on Biological Diversity Article 15 and the Costa Rican Biodiversity Act,* is a recent thesis. The Costa Rican Biodiversity Act is used as a case study to illustrate how the principles of Article 15 can be implemented in domestic legislation. A broader discussion on bio-prospecting, benefit sharing and sovereignty is included.

**Monten Tvedt, *From plants in the South to medicines in the North: Access to Genetic Resources: The Convention on Biological Diversity Article 15 and the Costa Rican Biodiversity Act,* Thesis submitted for Cand. Juris, Institute of Public Law, University of Oslo, Norway, 2001, 157 pp, ISBN 82-90391-41-2. Available from the University of Oslo Books 1072 Blindern, N-0216 Oslo, Norway; Tel: (47-22) 85 50 50.**
**Email: publications@sum.uio.no**
**Web: www.sum.uio.no/**

Emerging from a 1997 expert workshop, *Broadening the Genetic Base of Crop Production* is a call to broaden our crops' genetic base and a guide on how to achieve this goal. The main subjects covered include general principles (such as technical concepts, farmers' management of biodiversity, and regulatory constraints to breeding for diversity); crop case studies that explore the history, diversity, research networks and diversity broadening breeding strategies for millet, maize, potato, cassava, and plantains; and examples of other approaches to achieve the same goal. Organisations promoting agricultural biodiversity will enjoy the book's review of the state of diversity in the crops mentioned above, and the serious treatment given to farmers' approaches to plant breeding. One drawback is that the papers are technical and a little challenging to follow for those without a strong science background.

**David Cooper, *et al* (Eds), *Broadening the Genetic Base of Crop Production*, CABI Publishing, UK, 2001, 452 pp, ISBN 0-85199-411-3. Order from: CABI Publishing, Wallingford, Oxon OX10 EDE, UK. Tel: (44-1491) 83 21 11; Fax: (44-1491) 83 35 08; Email: cabi@cabi.org**
**Web: www.cabi.org**

*Divided they stand: Biotechnology industry and its critics in the USA* is a report from Beyond Biodevastation conference of biotechnology critics and the annual meeting of the US Biotechnology Industry Organisation (BIO). These meetings highlighted several aspects of ongoing polarisation around the issue of biotechnologies in the US. BIO and the US biotechnology industry are emblematic of the development of technologies in the context of globalising competition: they unite the most advanced national and international actors in a race for the lucrative US pharmaceutical market. At the same time, the US government actively creates a favourable environment for biotechnology inventions. This includes funding of federal research, tax breaks, strong enforcement of intellectual property rights, and the ability of corporations to self-regulate rather than relying on state intervention. Given the transnational character of the biotechnology industries, matters of US regulation are not limited to the US but are inevitably intertwined with the international agenda. The report gives an overview of some of the policy challenges the US government faces as well as an assessment of their implications.

**Volker Lehmann, *Divided they stand: Biotechnology industry and its critics in the USA*. Heinrich Böll Foundation, 2000, 29pp. Available (free) from: Heinrich Böll Foundation, 1638 R Street, NW, Suite 120, Washington, DC 20009, USA. Tel: (1-202) 462 7512, Fax: (1-202) 462 5230,**
**Email: info@boell.org,**
**Web: www.boell.org/500.asp**

**GENES ON THE NET**

The Centre for Alternative Agricultural Media (CAAM) was established in India in December 2001 to focus on developing a farmer-friendly communication system. Its website hosts articles by well-know journalists on a wide variety of issues facing farming communities in India, including genetically modified crops, pesticide poisoning, and the Slow Food movement (to counter Fast Food). There are also sections on Farmers Own Media, Farmer-Friendly Media, Writing for Farmers and Self-Help journalism.
**www.farmedia.org**

As a part of the Reinvesting in America Program's efforts to identify organisations which create self-reliance, economic justice and food security, it is currently investigating different seed saving efforts around the world. These are being collected to create a feature on seed saving for World Hunger Year's (WHY) web site. WHY's collection now comprises 20 seed saving programs from the US, Canada, Africa, South America, and the South Pacific. Other seed saving groups are encouraged to contact WHY to be included in the feature. Note: Seed saving efforts are not yet on the website.
**www.worldhungeryear.org**

The Forum for Organic Resource Management and Agricultural Technologies (FORMAT) based in Kenya now has a web site which aims to inform people about accomplishments being made in organic resource management in Kenya and the larger East African region. There are articles on various issues and mini-portraits of local entrepreneurs making furniture from the invasive water hyacinth plant and intercropping with maize and beans. There are links to other organisations working in the region on organic farming.
**www.formatkenya.org**

CAMBIA, an Australian non-profit agency promoting biotech research for developing countries, has set up a new site called CAMBIA IP. Entirely devoted to intellectual property issues, it carries a range of materials including articles, tutorials, a newsletter and links.
**www.cambiaip.org**

A Commission on Intellectual Property Rights has been set up by the UK government *"to look into how national and international intellectual property rules and practices might be improved to take greater account of the needs and interests of poor people and developing countries."* The website contains working materials of the Commission as well as bulletin boards and other mechanisms for the public to express its views.
**www.iprcommission.org**

Eldis, a digital development library housed at the University of Sussex, has set up a special resource centre devoted to IPR. It contains research pieces, articles, news, conference information, job postings, links and an extensive archive**.**
**www.ids.ac.uk/eldis/ipr**

The Africa Faith and Justice Network and the Africa Trade Policy Working Group have launched a national campaign to urge the US government to support the interests of African small-holder farmers in its trade policy. As a first step, they are presenting a public declaration of support for the African (OAU) Model Law on Farmers' and Community Rights over biodiversity to President Bush before the Qatar Ministerial Conference of the World Trade Organisation this November. You can support this initiative by endorsing the *"Declaration of Support for African Small-Holder Farmers"* at their website.
**www.afjn.org/GRI-Declaration.htm**

**SEEDLING**

is the quarterly newsletter of Genetic Resources Action International (GRAIN), an international non-governmental organisation (NGO) based in Spain. GRAIN promotes the sustainable management and use of agricultural biodiversity based on people's control over genetic resources and local knowledge, with a special emphasis on developing countries. *Seedling* aims to provide a platform for the exchange of news and analysis among people engaged in these issues. We need your input. Please send us information about your activities: articles, campaign materials, research results, criticism and suggestions.

**SEEDLING**

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**GRAIN**
Girona 25, pral, E-08010, Barcelona, Spain
Phone: (34-93) 301 13 81. Fax: (34-93) 301 16 27.
Email: grain@grain.org Web: www.grain.org

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