PATENTING, PIRACY AND PERVERTED PROMISES

Patents on life: the last assault on the commons

Genetic Resources Action International (GRAIN)

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World-wide, countries are under strong pressure to establish the patenting of life -- genes, food crops, livestock and human cells. A crucial battle is presently being played at the European Parliament (EP), which after refusing two years ago to adopt legislation allowing for these patents, is now in its way to adopt a very similar one. Pushing the patenting of life are major transnational corporations who want these patent rights in order to increase their profits from food, drug and technology sales. At stake for them is new markets and legal control over the basic technologies and resources of our food supply and health care systems. At stake for society is a wide range of ethical, economic and political concerns revolving around one central question: whether it is right that corporations should own the biological underpinnings of life.

The patent system, and other forms of intellectual property rights (IPRs), is supposed to stimulate innovation. Governments give inventors an exclusive monopoly on their creations while society, for a period of time, by allowing such incentives, is supposed to get the disclosure of the invention and the technological progress in return. Patents are rights to stop anyone else from using an invention without permission -- and the user has to pay a price -- be it a license to manufacture Honda Civics or a royalty on a can of Coke. While this might seem fine for cars or soft drinks, should farmers need to get a license to grow crops? Should people see their body parts patented? Should European or Japanese scientists get ownership rights over indigenous peoples' and rural communities' traditional knowledge, crops and medicines? Should these people's countries be forced to acknowledge such ownership? Would it be more admissible if indigenous peoples and rural communities were able to patent their traditional knowledge?

Right now, it is illegal in Europe to patent plant and animal varieties as well as inventions that offend morality. Yet, as in Japan and the USA, in Europe companies and university researchers working in biotechnology are claiming widespread monopoly rights on human cells, entire species such as genetically modified soybean, plant derived sweeteners long used by Africans, pain killers developed by the Chinese, and traditional rice varieties nurtured by Indian farmers. This is causing outrage. Public interest groups consider that patenting life is unethical and will foster the development of unsustainable, even anti-social, technologies and development strategies. Developing countries, for their part, call this kind of patenting "biopiracy" as many of the biotech "inventions" are based on locally developed biodiversity and knowledge, thus robbing traditional communities from their collectively held knowledge systems. Yet the proposed change in European legislation, which deliberately overlooks biopiracy, would further reward it.

The European Union aims to align itself with the more liberal US patent rules in order to fall in line for the next round: the revision in 1999 of the Trade-Related Intellectual Property Rights (TRIPs) agreement under the World Trade Organisation (WTO). The objective is to delete existing patent exclusions under TRIPs, which reflect current European IPRs legislation, and force all countries to acknowledge patents on life forms and their parts.

What follows are thirteen examples of patents already granted in some parts of the world on plants,

animals and humans. Each of them has profound and wide-ranging implications for society. *All* of them would be allowed under the proposed directive. Unless the European Parliament, and those it represents, react strongly, they will be justified in Europe and then forced upon the rest of the world.

PATENTS ON LIFE

13 Examples Of What Patents On Life Are All About

PATENTING OUR FOOD SYSTEM

> ***Seventy percent of our food supply comes from a few plants: wheat, maize, rice, potato…The European Patent Convention of 1975 states that patents may not be granted for plant varieties, the thinking being that they are the very backbone of food security, crop production and plant breeding. However, biotechnology corporations and researchers are trying to get through this legal loophole by claiming ownership on "genes" and "plants" instead of specific varieties. How can genes be new? How can you invent a plant? What about those that developed the desired traits in the first place? But perhaps most importantly: what does it mean for farmers and for local, national and global food security?***

Bt gene

Background: A naturally-occurring soil bacterium called *Bacillus thuringiensis* (Bt) produces a protein that kills a range of common insects once it is ingested. Because of this, Bt has been used as a biological pesticide by farmers since the 1940s. Due to severe ecological consequences associated with synthetic chemical pesticides, the environmental-friendliness of Bt has caught the attention and investments of several large agrochemical companies. Biotechnologists have isolated the Bt gene and inserted it directly into a range of crops, including maize, soybean, cotton, rapeseed, potato, tobacco, rice and tomato so these plants may produce their own insecticide.

Patents: As of March 1996, there were no less than 432 patents granted or pending related to Bt worldwide. Sixty percent of these come from just ten companies, which means the technology is heavily concentrated in few hands. Bt-maize, Bt-cotton and Bt-potato have all received commercial approval in the US. In fact, companies are at each others' legal throats over who really owns what. For instance, Belgium's Plant Genetic Systems (a biotechnology company now owned by the giant AgrEvo) has been granted a US patent for "all transgenic plants containing Bt", and the American Mycogen has been issued a European patent which covers the insertion of "any insecticidal gene in any plant". Such broad patents confer huge market power to the company that wins….while blocking anyone else that wants to work further in this area. In February 1998, Monsanto won a patent case against Mycogen on the the transplant of the gene from Bt into plants.

Implications: As a technology, Bt crops carry many threats. The insects that are supposed to die once they chew on a Bt plant can develop resistance to the toxic gene extremely fast. Experiments at the University of Hawaii show that insects which survive Bt transmit genetic resistance to their immediate offspring. In *one generation*, insects are resistant to many forms of the toxin, rendering Bt useless as an implanted pest control strategy. Worse, it means organic farmers cannot use Bt as a spray any more, since conventional

farmers using transgenic Bt crops will have destroyed its effectiveness. Being able to patent Bt genes and crops encourages the development of Bt crops. Biotechnology companies will thus be able too make quick money by convincing the farmers to buy seeds which supposedly do not need insecticide sprays. The potential market is huge and companies have quickly cornered it. In the US, legal wrangles over ownership of Bt technology are consuming vast amounts of time and money amongst many of the leading agrochemical companies. This time and money could be spent developing alternatives to a technology that is likely to fail. Rather than promote inovation, the patent system applied to life rather seems to foster pirating of proven technologies and a waste of resources. The livelihoods of thousands of farmers and the consumer's right to choose are also at stake.

Soybean

Background: Soybean (*Glycine max L.*) is a multi-billion dollar commodity crop. It was domesticated by the Chinese as a food crop and is now an important oil crop and animal feed. Today, the top soybean producers are the USA, Brazil, China and Argentina, with the USA cornering well over half of the global export market. While still an important vegetable and protein crop for Asians, soybean now ends up in unfathomable industrial products – from the ink in your daily newspaper to the ketchup on every fast-food outlet's hamburger. Patent rights over the world's soybean crop would mean enormous economic, social and political control over a basic item in the world economy.

Patent: In 1994, the biotechnology company Agracetus was awarded European patent number 301 749 which, among other demands claims *"A soybean seed which will yield upon cultivation a soybean plant comprising in its genome a foreign gene effective to cause the expression of a foreign gene product in the cells of the soybean plant"*. This means that Agracetus' patent covers *all* transgenic soybeans. The biotechnology industry was stunned by the patent, which underwent fire in the courts. The chemical giant Monsanto opposed the patent in November 1994 on the grounds that, "the alleged invention lacks an inventive step" and was "not ... novel". But then later Monsanto simply bought up the whole of Agracetus -- including the patent – and stopped complaining.

Implications: Species patents such as this one on soybean, and others on cotton and rice, show how the patent system itself is being grossly distorted by unbridled corporate greed. Transgenic species do not exist as such, and technologies have to find their expression in specific terms, such as well-defined varieties which farmers grow in well-defined conditions. Patents as this one are being used to stake territorial claims with no relation to invention, as a means to block research and competition. In addition, farmers have to follow stringent rules when using transgenic soybeans in those countries where the patents are recognised. US soybean farmers have already been subjected to this kind of contract to grow Monsanto's "Roundup Ready Soybeans" (RR). In purchasing the patented seed, farmers may only use Monsanto's herbicide on the crop, may not save a single seed to save costs for the next season – as is traditionally done --and may not conduct any research using the soybean. By February 1998, Monsanto had cases against at least 100 farmers who had re-sawn RR soybeans.

Quinoa

Background: Quinoa (*Chenopodium quinoa*) is a high protein cereal which is an important part of the diet of millions of people in Andean countries of Latin America, especially indigenous people. Since pre-Incan times, they have cultivated and developed varieties of quinoa suitable for the wide range of harsh conditions in the Andes. In recent years, quinoa has started to enter the US and European market for its high nutritional value -- about twice the protein content of maize or rice. The value of Bolivia's export

market is estimated at about US$1 million per annum.

Patent: In 1994, two researchers from the University of Colorado received US patent number 5,304,718, which gives them exclusive monopoly control of male sterile plants of the traditional Bolivian "Apelawa" quinoa variety. The researchers admit that they did nothing to create the male sterile variety, which one researcher agrees it was *"just part of the native population of plants ... we just picked it up."* They do claim that they were the first to identify and use a reliable system of cytoplasmic male sterility in quinoa for the production of hybrids. The US patent claim is not limited to a single hybrid variety, but covers any quinoa hybrid that is derived from "Apelawa" male sterile cytoplasm, including, but not limited to, some 36 traditional varieties cited in the patent application.

Implications: Although the researchers have promised to make the technology available to researchers in Chile and Bolivia, the US patent has serious implications for Bolivian farmers. The primary aim of developing hybrid quinoa is to increase the crop's yield and to make it suitable for commercial-scale cultivation in North America. Before long, the patent is likely to find its way into corporate hands, where the right for the patent owners to prevent Bolivian exports of quinoa to the US will probably be exercised. The displacement of the Bolivia's export market would undermine the livelihoods of the thousands of farmers who grow quinoa, who are predominantly smallholders. Alternatively, they may be pressured to grow the industrial high-yielding varieties for export. If they start planting a handful of hybrid varieties instead of the diverse array they now grow, there will likely be serious erosion of local quinoa diversity. In addition, the high-yielding varieties may well not be adapted to local conditions.

Brazzein

Background: Brazzein is the name of a protein found in a West African berry that is reported to be 500 times sweeter than sugar. Unlike other non-sugar sweeteners, brazzein is a natural substance and does not lose its sweet taste when heated, making it particularly valuable to the food industry. The sweetener was chanced upon by a researcher after he observed people and animals eating the berries in West Africa.

Patent: Researchers at the University of Wisconsin have received US patent 5,527,555 and European patent 684995 for a protein isolated from the berry of *Pentadiplandra brazzeana*. Subsequent work has focused on making transgenic organisms to produce brazzein in the laboratory, thereby eliminating the need for it to be collected or grown commercially in West Africa.

Implications: The University of Wisconsin reports that corporate interest in brazzein is strong: the worldwide market for sweeteners is reported to be $100 billion a year. The university is quite clear that brazzein is "an invention of a UW-Madison researcher" and there are no plans for benefit-sharing with the West African people that discovered and nurtured the plant for their original pleasure. This is a clear example of how the patent system completely disregard local knowledge and innovation of Southern peoples by permitting biotechnologists to claim that something was invented once it was isolated and reproduced in a Northern laboratory. By allowing patents on discoveries, the redefined patent system promotes what Third World countries rightly call biopiracy.

PATENTING ANIMALS

> ***The European Patent Convention and subsequent national laws prohibit the patenting of animal breeds/races and inventions contrary to morality. As with the prohibition against***

patenting plant varieties, scientists, companies and patent offices have been skirting around these rules and are obtaining patents on animals. These moves have aroused strong objections for the cruelty involved and the hazy borderline between technological applications on animals and on humans. Others are concerned about the future of raising livestock, currently still in the sphere of family farming but with the help of the patent system likely to be moved further under corporate control.

Dolly

Background: Dolly is the world's first cloned mammal, a living proof that viable offspring can be developed from a single adult animal cell. News of this cloned sheep took the world by surprise in February 1997, for while there had been much talk of cloning mammals over recent years, few people realised how close the reality was. What shocked people even more was how relatively easy Dolly was to create, and how cloning a human being would be almost as simple to achieve. Suddenly the ethical and moral debates surrounding life patenting came alive for millions of people.

Patent: The Roslin Institute, responsible for the Dolly experiment, has applied two world patents (WO 97/07668 and WO 97/07669, still to be approved at the national levels) for the cloning technology used. The patents cover the use of the technology in *all* animals, including humans. The reason for this, Roslin says, is that the Institute has no commercial interest in, nor moral tolerance of, human cloning, and that it specifically included humans so as to ensure that nobody else could lay claim to human cloning. While the motivation may be honest, this outcome is unlikely. Depending on the conditions of licensing agreements, with Pharmaceutical Proteins Limited (PPL, the company Roslin created to commercialise its research) or any of the large pharmaceutical companies knocking at the door, companies may be within their rights to develop human cloning. In addition, rarely any successful small institute has escaped being bought by one of the large transnationals. And most importantly, once the legal precedence has been set for the patenting of humans, turning the clock back is much more difficult.

Implications: In addition to the well publicised moral and ethical dilemmas about cloning, Dolly raises further questions. Widespread cloning of livestock will further exacerbate the serious problem of genetic erosion among domestic animals. Livestock breeds are already being lost at the rate of 5% each year thanks to selective breeding and artificial insemination, and cloning could make the situation much worse. This furthering of genetic erosion in the European livestock sector as promoted by the patent system will have a dramatic impact on the vulnerability to pests and diseases of the animals involved, which in turn will mean greater use of potentially harmful control strategies.

Tracey

Background: Tracey is a sheep which was transformed into what a company spokesperson described as one of Pharmaceutical Proteins Ltd's (PPL) "furry little factories walking around in fields." The introduction of human genes into her mammary glands mean that they now produce the protein *alpha-1-antitrypsin*, a human blood-clotting agent. Tracey's transformation was considered successful enough by PPL to provide "a strong impetus to the further exploitation of transgenic sheep as bioreactors for the production of large amounts of pharmacologically active proteins". Some people call this "factory pharming".

Patent: Tracey and her relatives are now the subject of US patent 5,476,995 and a multi-million pound contract between PPL and the German chemical giant Bayer.

Implications: Tracey raises important questions about how animals are not only treated in industrial-scale processes but now radically altered in their genetic makeup to serve as tools for corporate profits. Sheep naturally produce meat, milk and wool. They do not naturally produce human proteins. Turned into a four-legged pharmaceutical factory, Tracey is no longer an animal but a machine that is described as a human invention and patented, much like a typewriter or refrigerator. By allowing the patent to be applied to such engineered animals, corporate interests will be able to further impose its conditions upon family farming, thus marginalising the backbone of agriculture even further.

The oncomouse

Background: The oncomouse or Harvard mouse was genetically transformed to be susceptible to cancer. Medical research facilities now have a ready-made test patient for experiments in cancer therapy, since all its offspring are predisposed to contract the disease.

Patent: The oncomouse was the first animal to be patented, in 1987, in the US. The research had been done at Harvard University but the patent was granted to Du Pont Corporation. Du Pont was awarded European Patent 169 672 in 1992 for the oncomouse. Du Pont's European patent application attempted to gain control over all animals, and their descendants, modified using the oncomouse technique. Most relevant, the company also claimed patent protection on any anticancer product ever derived from the mice.

Implications: The European patent on the oncomouse has been heavily challenged by public interest groups on the grounds that this patent contravenes principles of morality. The EPO authorities first replied by saying they had no competence to interpret what is morally acceptable and what is not. They later accepted the challenge and ruled that any invention whose benefit to mankind outweighs the suffering of an animal is on high moral ground. Opponents to the patent find this unsatisfactory and the patent is still in limbo in Europe. The central question in this case is: should we allow patents on animals created to suffer their entire live and die of cancer, thus further pushing this approach to animal experiments?

PATENTING HEALTH CARE SYSTEMS

> ***Health care systems often turn to biochemical compounds found in nature. This is as true for approaches using synthesised drugs as it is for natural medicine. Many of these compounds derive from the biodiversity of the tropics and subtropics. And most leads on their effectiveness come from indigenous and local communities who have rich medicinal knowledge of their environments. Western scientists are often accused of biopiracy when they pinch not only the chemical cures derived from the rainforests but also the traditional knowledge of shamans and healers who master the use of local materials for health problems. This is not only physical theft but intellectual theft, since indigenous knowledge gets patented by foreigners once they return home. This is completely against the ethics of most local communities, for whom private ownership and monopoly of life and associated knowledge is unthinkable.***

Turmeric

Background: To many people from India, turmeric (*Curcuma longa*) is a magic cure-all. The orange root is native to the subcontinent and for thousands of years has been used for sprains, inflammatory conditions and topical wound healing. Turmeric is an ancient component of ayurdevic medicine.

Patent: In 1995, two US scientists from the University of Mississippi were granted a US patent (No. 5,401,504) on the use of turmeric for healing wounds, claiming this to be novel. In their application, they acknowledged that "turmeric has long been used in India as a traditional medicine for treatment of various sprains and inflammatory conditions". However, they claimed that there was no research on the use of turmeric as a healing agent for external wounds. The Indian government challenged the patent, which it considered a form of blatant thievery, and provided many research papers predating the patent application proving that turmeric has been used in India specifically to heal wounds. Finally, the US Patent and Trademark office gave the reason to India, by rejecting all 6 patent claims.

Implications: The US patent would have prevented Indian companies from marketing turmeric for wound healing in the US. If the US government is successful in pushing stronger patent protection in other countries including India, the same patent would also have illegalised the use of turmeric in India. Still, the Indian government opposed the patent on principle. It is concerned about the increasing plundering of its natural resources, which are not always as widely documented as turmeric is, by foreign companies and has been vocal on these issues in international fora, such as the World Trade Organisation. The best example is India’s celebrated Neem tree which has now more than 35 patents on it in the US and Europe, mainly for its pesticidal properties. Local communities are already victims of reduced access to this traditional resource due to greatly increased market prices.

Sangre de Drago

Background: Sangre de Drago (*Croton spp*) is a medicinal plant widely known and used throughout the Amazonian region for wound healing, haemorrhoids, skin problems, and as an anti-inflammatory and anti-rheumatic agent.

Patent: Shaman Pharmaceuticals, a US company which prides itself on its progressive stance towards local peoples and biological resources, has developed two Sangre de Drago-derived products: Provir, an anti-diarrhoeal; and Virend, an anti-herpetic. Both are in clinical trials. A patent for anti-viral activity has already been awarded to the company (US 5,211,944). The company argues that the development of new medicines from wild biodiversity and local ethnobotanical knowledge will not only benefit the company, but will also aid biodiversity conservation and improve the quality of life of indigenous peoples, since Shaman's policy is to provide returns to the communities it collects from.

Implications: The Sangre de Drago case parades as an equitable benefit-sharing agreement, which is supposed to give bioprospecting a clean face. The resources are extracted, the knowledge is lifted, the results are patented but at least the locals get a share of the profits in return. These deals sound good on paper, but in practice yield little, if any, benefit for local communities. In its publications, Shaman acknowledges the importance of crediting the "intellectual property rights" of communities yet Sangre de Drago products are patented in the US under the company’s sole name. The real issue is that patents like this one privatise and individualise a collective knowledge widely held by many indigenous peoples in different parts of Latin America.

PATENTING PEOPLE

From micro-organisms like Bt to macro-organisms like* Homo sapiens*, the patent threshold is perilously thin. One broadly defined claim can make all the difference between a patent on mice and a patent on humans. Whether plant genes are human inventions is subject to debate. Whether human genes are human inventions adds a whole other layer of emotion to this debate. The emotion is not misplaced. Our patent laws are powerful tools to regulate control over technology and markets. Should they be used to control the fate of humanity? Can scientists and the companies hiring them have intellectual property over people and over so-called inventions they cannot even describe? Are people just strings of DNA which have an industrial application? The patenting of human life – genes, sequences, constructs, even body parts and means of programming our children's traits – is probably the most controversial aspect of life patenting. And rightly so. Once you accept the patenting of life, there is no way of keeping the doors closed to the patenting of human genes, cells, organs and whatever other parts of the human body from which one can make money on.

John Moore

Background: In 1976, Mr. John Moore underwent surgery at the University of California. He had a rare form of leukemia and the doctors had to remove his cancerous spleen. Although he signed a pre-operative consent form which said his spleen would be destroyed after removal, the doctors cultured some tissues and cells from it and found that it produced a special protein. Moore knew nothing until his attorney told him that his doctor had received a patent on a cell line taken from his body. Later John heard that the doctor referred to him as his "gold mine".

Patent: Moore's doctor obtained a US patent for the cell line dubbed "Mo" removed from Moore's spleen, which was claimed to produce valuable pharmaceutical compounds for use in cancer therapy. The long term commercial value of the cell line was estimated at more than three billion US dollars, and in the end the Swiss pharma giant Sandoz obtained the exclusive right for the commercial exploitation of the patent for the alleged amount of US$ 15 million. Moore felt violated and debased, and he demanded the return of the cells and control over his body parts. However, the California Supreme Court decided that he was not entitled to any rights to his own cells after they had been removed from his body.

Implications: While the court has ruled that Moore has no claims to his own cells, this patent is unique since it was the first one on human genes and the "donor" of the invention is well and alive to talk about it. In Moore's words, "Ultimately, everyone was protected and rewarded: the researcher, the physician, the entrepreneur, even Science. But I knew nothing. What was I? The dehumanisation of having one's cells conveyed to places and for purposes that one does not know of can be very, very painful." The question is not whether Moore hinders useful research on cancer - as some accuse him of - by claiming rights over his own cells: he might very well have wanted to donate his cells to humanity if anyone had bothered to ask.. Permitting patents on human material is not only about ethics and morality. It is about the personal agony of injustice and speculative greed. Current trends in patent system development are unacceptable once they validate, encourage and legalise the corporate appropriation of human parts, as John Moore's case proves.

Tristan da Cunha asthma genes

Background: The people of Tristan da Cunha -- a small island in the South Atlantic -- have one of the highest incidences of asthma in the world, with 30% of the population suffering from asthma and another 20% being asthma-prone. Two or three of the island’s original seven families of settlers were known to

suffer from asthma, and so this isolated population represents the ideal "target" community for researchers in search for asthma genes.

Patent: In 1991, researchers from the University of Toronto began the two-year process of persuading the unwilling residents of Tristan da Cunha to participate in their research. In 1993, the researchers finally acquired blood samples from 272 of the residents and returned to Canada. The following year the samples were turned over to Sequana Therapeutics, which is using DNA to pinpoint the genetic mutation that predisposes people to asthma. In May 1995, Sequana's Director of Operations reported that the company had "made tremendous progress" in locating the precise location of the so-called asthma gene. Three months later, the company announced that it has signed a deal worth up to $70 million with pharmaceutical giant Boehringer Ingelheim, which now has the worldwide rights to develop and commercialise therapeutics based on the asthma genes. Sequana retains rights to diagnostics. The island people, in return, were to be left with some new medical equipment.

Implications: As mainstream scientists increasingly tries to identify genes as an explanation for every human physical and psychological trait, human populations are becoming prime subjects of research, particularly isolated communities like the people of Tristan da Cunha. The Guaymi people of Panama and residents of the Solomon Islands have also found their cell lines become the subject of patents owned by the US government. In none of these cases was it made explicit to the people that agreeing to give blood samples meant becoming subject to a patent claim, and once they found out local people were outraged. Many indigenous groups see the patenting of human life as a violation of their integrity and against their own traditions and laws. In some cases, local communities' loud objections, supported by NGOs, have led to withdrawal of these patent applications, but overall the practice of patenting particular cells of special human populations for the benefit of a particular researcher or company continues as before.

Umbilical cords

Background: Foetal tissue is widely used in medical research. Blood cells of the umbilical cord of new-born babies are of particular interest both in traditional transplant medicine and gene-therapies. The blood cells are especially important for blood and marrow transplantation. The special properties of umbilical cord blood cells is widely know in medical circles.

Patent: The US-based Biocyte Corporation, recently bought by Avicord, has been granted European patent (EP 343 217) on the blood cells of the umbilical cord of foetuses and the newborn. The patent holder has done nothing except show that these cells can be isolated and deep frozen. The patent gives Biocyte/Avicord monopoly control over the extraction and use of the cells and over any therapies developed in connection with them. The granting of this patent means that Biocyte can refuse the access to and use of these blood cells and any therapeutic products derived from them to anyone unwilling or unable to pay their fees. Further, the consent of the subjects from whom the cells are taken is not required.

Implications: The patent has been challenged by European public interest groups on the grounds that the European Patent Convention prohibits the patents of therapeutic and diagnostic processes. Opponents also claim that this is a discovery, there is no inventive step, and that it is an offence against morality and public order. The patent has also been challenged by Eurocord, an alliance of transplant doctors. The International Society of Transplantation states that "no part of the human body can be commercialised and that organ or cell donations should be free and anonymous". Eurocord holds that "We deplore any attempt to patent a non-pharmacological method of treating patients with haematological diseases and recommend that clinicians and scientists disassociate themselves from patents of this type, be they already granted or only in application form."

African HIV carriers

Background: The HIV virus, which causes AIDS, is thought to have originated in Africa. Be they prostitutes in Kenya or villagers in the West African Savannah, HIV carriers are being tapped for DNA samples in the form of blood, saliva and other cells by Western researchers trying to find a source of immunity which could lead to a vaccine or some other means to stop the scourge.

Patents: In 1991, the Paris-based Institut Pasteur, which claims it first discovered the HIV virus, was granted US patent number 5,019,510. The patent covers a mutant of HIV virus-1 which is claimed to be useful as a source of antigens for vaccines and detecting antibodies to the retro virus. This strain of HIV-1 was isolated from a Gabonese "donor" in 1986.

Implications: There are, in fact, several HIV-related patents on human cell lines taken from African carriers. It has not been determined whether their consent was clearly granted before they become donors and patented subjects, once stripped of their cells and these were cultured in Europe or the US. Nevertheless, the controversy arising from these patents is that the Africans will most likely never benefit from the research carried out on them. AIDS research is the most lucrative corner of the pharmaceutical industry. Profit margins on current therapies tip the 70% mark, before distribution. While Africa harbours well over half the 22 million HIV carriers today, the current cost of triple-drug therapy is 30 times the average annual income on the continent. Patents are jacking up the jackpot from the US$ 2.3 billion market in the industrialised countries, at the expense of African HIV donors. This will always be the case as long as major medical research is governed by commercial interests: medicines will only be accessible to those who can buy them.

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This briefing has been produced by Genetic Resources Action International (GRAIN), an international NGO based in Barcelona, 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. In our opinion, the patenting of live goes against this important objective as it undermines people's control over their resources and livelihoods, and pirates the collective knowledge systems of local communities in many parts of the world.

Janet Bell did a lot of the research and writing for this briefing, while GRAIN staff in Barcelona and Los Baños provided backup research and did the final editing and production. Sources used were many, but include several issues of *RAFI Comunique* of the Rural Advancement Foundation International, the original patents, GRAIN's newsletter *Seedling*, and materials from "Global 2000" and the "No Patents on Life Coalition". We would appreciate feedback and comments. This second edition was printed in April 1998.

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