

## **Climate-ready GM crops, intellectual property and global justice**

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### **Abstract**

So-called climate-ready GM crops can be of great help in adapting to a changing climate. Climate change, caused in great part by anthropogenic greenhouse gases released in the atmosphere since the industrial revolution by the developed world, is felt much stronger in the developing world, causing unexpected droughts and floods that will cause large harvest loss, leading to more hunger and malnutrition, rising death tolls and disease vulnerability. The current intellectual property regime (IPR) strikes an unfair balance between profit oriented seed industry giants and low-acreage farmers. The biotechnology industry, mainly headquartered in the developed world, has started to patent new seed varieties, taking biomaterials from developing countries, with the claim, that they will be more tolerant to flood, drought, heat, and cold. Special sales contracts prohibit saving seeds from the harvest for the next season, thus forcing the farmers to buy them every season anew, which goes against traditional farming. Using a widely accepted concept of global justice, that tackles the fact that around 10% of the world's population profits from 90% of the earth's resources, and by taking into account the feasibility of a fair IPR, we will discuss three issues. First, an ethically acceptable IPR should prevent unjust and unfair assignments of property rights (e.g. patents) that completely ignore small-scale farmers inventiveness and efforts to save agrobiodiversity. As a second task, this regime should encourage globally a just distribution of the objects of innovation that are covered by patents. Third, such a regime should encourage innovations at a rate that is effective to cope with climate change.

**Keywords:** development ethics, climate change adaptation, biotechnology

### **Introduction**

The changing climate is striking the tropics particularly hard. Many river deltas that feed millions of people, especially in Egypt and Bangladesh, have had an increase in salinity over the last years. A temperature rise of 3 °C could reduce harvest yields of some crops by 15 to 25% in North Africa (FAO, 2008). Seeds that have traditionally been planted in those areas do not promise a prosperous harvest anymore. Since the poorest countries are located around the equator, an area where the consequences of climate change are very unfavourable, those changes have become an additional burden for development. Most of those countries don't only have difficulties feeding a growing population, but also adapting their agriculture to the new climate conditions. Here biotechnology could give a hand by developing new crop varieties that are able to better withstand abiotic stress like droughts, floods, saline water, heat and cold. By manipulating the genome of food crops, specific traits could be incorporated at a much faster speed than by traditional plant breeding. To make such improvements on seeds most of the developing world lack the required expensive infrastructure.

Taking into account the proportion of arable land that is affected by the changing climate a huge demand for those crop varieties can be expected. One could talk about a splendid business opportunity for the seed industry, if only those land areas were not destined to feed the poorest people of our planet. And here lays the major problem in the way biotechnology innovations nowadays have to emerge. Research and development cost a huge amount of money and the people who could benefit most from the new seed varieties are not able to pay for the improvements. Therefore research efforts aim to more profitable

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enterprises and not to investigations that could benefit the largest number of people. Although this problem is well-known in biotechnology research and development, a new element is brought into the debate, when the case is analysed taking climate-ready seeds into account. Climate change has been caused by greenhouse gases emitted mainly by developed countries.

### **A reason to act: global justice**

Especially poor countries in the tropics, that received little benefits from the industrialization of the north, have to spend a huge amount of money for climate change adaptation. Global justice demands from the countries that have emitted most of the greenhouse gases to assist the developing world in adapting to a changing climate. If no solution is offered to overcome the problems caused by the new climate conditions, those countries will lose large harvests, with the consequence of hunger and malnutrition, making the population much more vulnerable to diseases, thus causing massive suffering and slowing down their development.

The UN member states have agreed with the Millennium Development Goals to halve the proportion of people who suffer from hunger by 2015. To achieve this goal, the additional challenge of decreased harvest yields due to climate change has to be taken into consideration. As this goal is ambitious on its own, improved infrastructure might not be enough to reach it due to the additional abiotic stress imposed on crop fields. Biotechnology research that is specifically oriented to crop development for the tropics has to be promoted, as it currently is severely underfunded. Privately funded agriculture research that is focused on the developing world amounts only to 6% of the total (De Schutter, 2009), showing a disproportion of resource dedication that is even higher than the already severely criticized 10/90 gap in pharmaceutical research and development along its failure to provide for medicines for tropical diseases at an adequate rate (Pogge, 2005). Since the right to development is recognized around the world as such, this unfair allocation of research efforts cannot be defended on any ethical grounds.

Another point in favour of aid is that the situation in which poor countries are finding themselves is not self-inflicted. Strong evidence shows that climate change is and has been largely caused by anthropogenic greenhouse emissions of countries in the north. This does not just leave the poor countries in a situation where they were accidentally placed in a situation of harm, in which altruism demands the affluent to aid. The countries that flourished with an early industrialization have unintentionally put those countries in this situation, as they ignored the consequences of massively releasing greenhouse gases in our atmosphere, and nowadays consciously worsen this situation, as they fail to take the necessary measures to limit emissions. Under this argument those countries should not only be helped out of charity, but also from an obligation of retributive justice.

To overcome this research gap a fair intellectual property regime has to come in place. After a brief introduction to the biotechnology research and development landscape, three issues will be discussed. Those are the unfair and unjust distribution of intellectual property rights, the problem of access to objects of innovation and the importance of a higher rate of innovation to cope with climate change.

### **The research and development landscape**

The most common way biotechnology companies recoup their research and development expenses is by bringing a new product onto the market. For this step they also need to spend a considerable amount of money for biosafety regulations. In order to make sure that nobody copies their product, they apply for intellectual property rights, most commonly patents. Once granted, they have a monopoly right for a given time, thus being able to charge prices as they see fit. This method to recoup expenses has a series of problems. It is very expensive, many resources have to be relocated in legal expertise and fees for patents.

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It is slow, it takes years to get a patent granted. It can be misused to block other competitors out, since once an intellectual property right is recognized, in practice there is no mechanism to force the patent holder to satisfy the market demand with products. When using a series of features patented by different institutions for the development of one product your expenses for licenses increase drastically because you will have to negotiate with every involved party.

To be able to put a product on the market, special task-driven alliances between a private and public part have been called for. They share much of their patented and traditional knowledge, are more open to share genetic materials, get better prices for licenses and more willingness to be assisted in biosafety testing, due to their not-for-profit orientation, as experience with private-public partnerships for neglected diseases has shown (Moran, 2005). Since they are promising, a brief introduction follows below.

### **A path for a fairer distribution of property rights: private-public partnerships**

The poverty of the developing world is mainly pecuniary. However, those countries harbour the areas with the richest biodiversity. A late or still not occurring industrialisation of farming, has helped many small scale farmers survive, who continue to utilize in their fields a broad diversity of seeds and are still involved in breeding. Therefore the rich biodiversity of the developing world includes also an impressive amount of food crop varieties.

Seed industry giants have lost the trust of many local governments and communities, due to biopiracy and charging them unaffordable prices for their new products. As a result local governments have denied them access to genetic materials and traditional knowledge, slowing the rate of innovation down. To reverse this situation, past practices have to be changed. Philanthropic institutions have to mediate between biotechnology corporations and local governments and construct an atmosphere of trust. This can be done with clear contracts, that give a fair share of the benefits of intellectual property to all parties. Once local communities start to feel that they can benefit from such a cooperation, the news will spread out and more communities will be willing to share their traditional knowledge and own-bred varieties. If the world society manages to capture the inventiveness of small-scale farmers for the globalized system of innovation, a huge acceleration in the rate new crop varieties come out can be achieved. The saving of agrobiodiversity cannot be seen as a minor undertaking. The tremendous fund we now have is fruit of the effort to improve harvests done by millions of small farmers worldwide who have continued to use a wide variety of seeds (Altieri and Koohafkan, 2008). This fund is supplemented by the dedication of developing world's governments to conserve nature intact in wildlife reserves, thus rescuing wild relatives of crops varieties from disappearing.

Recognizing the inventive step made by indigenous communities does not only mean that they should be granted a part of the profits, the moral right that is customarily assured to the inventor by international intellectual property regimes, that is the right to have his name mentioned in the merits, if so he chose, should also be safeguarded. This is particularly important for communities that are neglected by their home governments, they can regain a sense of pride for their people's achievements.

The custom of charging excessive prices has to be changed too. The seed industry is at risk to be seen as one single player, as the foreign giant that is allied with an oppressive government, therefore abuses by one company can jeopardize the image of the whole industry, because many people will fail to distinguish among the different companies. It will be difficult to keep track of fair and unfair players, as companies continue to merge and develop alliances.

An aspect of the intellectual property regime that is often ignored in the discussion is the importance of trade secrecy. Here the private part of the partnership has to have the certainty to be able to hire scientists

from abroad without running the risk, that they will sell the information gained inside to competitors. At a national level this situation is controlled by special contracts, in which the employee assures secrecy. Contract violations may conduce to criminal offenses that might only be enforced nationally. International laws to punish violations of contracts for trade secret protection are important to enforce and enact, only that way companies will not be afraid to hire at a higher rate scientists from developing countries. This is key to professional development in a globalized world, it facilitates communication and companies could ease their patenting habits up to a certain degree, because they will gain a new tool to protect intellectual property at a much lower cost.

### **Fair access to improvements**

In the case of climate-ready seeds the problem of access is quite severe. The developing countries feel a double injustice: they have collaborated with the genetic materials for a solution to a problem that has been caused by the countries in the north, and now they have to pay for this solution a price that they can hardly (if at all) afford. Individual farmers are tempted to borrow money for improved seeds from local money lenders, paying enormous interest rates, with no guarantee that the harvest will have as high of a yield as promised by the seed industry. It is clear that this is a situation of injustice, but accusing the agricultural biotechnology industry alone of unfairness is also not right. The biotechnology industry is profiting from the situation, while offering something, that can be considered as the solution for one of the problems caused by climate change. They succeed making those huge profits because as a private industry they have virtually a monopoly. The lack of political will, that is connected with the refusal to recognize one's responsibility for the effects of climate change, to strive for a solution that helps the countries around the equator to adapt to a changing climate, has given rise to a situation, where the profit-driven seed industry is the only provider for a relief.

As it is unfair to let alone the poorer countries pay for climate change adaptation, it is equally unjust to make the seed industry solely responsible for providing an affordable solution, since the seed industry is only one of the many actors who have benefited from industrialization.

To make a solution for climate change adaptation accessible there has to be a generous subsidy from the countries who have profited from industrialization during the longest time, but for that, a clear inventory of the research and development costs of climate-ready seeds has to be available.

After this, there is still a major problem that has to be solved. Farmers have saved seeds from their harvest for the next season for millennia, but now, in some geographic locations, where the climate has changed without their fault, those farmers are forced to pay for every season anew for their improved seeds. Justice demands some sort of remuneration for the additional burden faced by those farmers.

### **Catalyzing and prioritizing innovation**

An effort has to be made to keep innovation systems open. Facilitating access to working communication networks at least to mid-scale farmers around the world is an important goal. This is particularly important, since the inventiveness of millions of farmers could be added to the system of innovation. Observations about varieties withstanding effectively a particular abiotic stress could be thus easily shared. This information can help institutions and industry around the world provide solutions to adapt to the new climate conditions.

Research institutes and industry have to realize that patenting is not always profitable and is very time consuming. There are other alternatives, such as open source approaches, that allow freedom to operate and keep the technology from being monopolized by competitors, while putting the invention in the

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public domain and, depending on the conditions stated in the technology access agreement, even the built-up improvements.

Time is a factor that has to be taken into account. Lack of seeds improvements accessible at the right moment can mean large-scale famine. It is thus important to financially and materially aid partnerships that have the aim to develop certain crops that are urgently needed to feed the affected people. Crops that feed the largest number of people have to be prioritized. Those crops should also have a preference position in the waiting list for biosafety testing.

### **Conclusion**

Key to a new start in a relationship of trust is to depart from old customs. Private industry in particular has to make a fresh start. They have to condemn employers that keep being unfair with indigenous communities and small farmers. Being consistent with this new conception of doing business, and showing publicly that they are condemning past practices, will aid them in establishing an atmosphere of trust. Communities in the developing world have to learn to distinguish among fair and unfair foreign and national biotechnology companies. As they blame the developed world for unfair prices and for not helping them to develop solutions for their particular problems, they should also be aware that a blanket distrust from their side slows down innovation that could benefit and even save millions of people from adversity and hunger, too. The appeal to share fairly is addressed to both parties, the developing and the developed world. Further, as they demand from the developed world recognition of rights for traditional knowledge, they should not underestimate the amount of new knowledge that is put continuously in the public domain and the utility of information that becomes open for public use after the intellectual property protection time-lapse expires.

To ensure food security under changing climate conditions, the developed world has to recognize its responsibility for the consequences of elevated CO<sub>2</sub> levels in our atmosphere. This responsibility demands finding solutions for climate change adaptation. Developing new seed varieties that can withstand better abiotic stress is an urgent task for adaptation. To accomplish this goal there has to be an increased expenditure in the agricultural research for developing world agriculture. As any delay in development threatens food security, countries with rich agrobiodiversity should be more open to share and be aware that they are not just ruining a business possibility for the biotechnology industry, but also blocking an opportunity for agricultural development to other countries in need around the world.

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