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Seeds as protected commons*

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1 Seeds as individual property – Introduction

Privatisation has been proceeding for more or less three decades, not only in the seed sector. Today about 75% of commercial seed is sold by ten companies, three of them are in control of more than 50% of the global seed market (ETC-Group 2011). New breeding methods like hybrid technology or genetic use restriction technologies have been developed, forcing farmers to buy new seeds every season (but leading to improved yields as well). Individual property rights (IPR) are enforced as far as possible, forcing users to pay license fees when buying seeds and restricting the use of the harvest. Beyond that, seed laws have been introduced to protect breeders' interests since the 1940s. This happened first at the national level, but in the 1960s the first international organisation dealing with plant breeders' rights was founded (UPOV, see section 2), strengthening the rights of breeders at a global scale. Patents on seeds, traits and breeding methods, which are based often on local varieties and the knowledge of the farmers, were the next step in privatising the collective heritage of mankind – as it was called until the mid 80s.

The strengthening of plant breeders' right in international and national laws together with the commercialisation of breeding and agriculture mainly in Europe and North America have led to the extinction of approximately 75% of formerly used plant species. Today "only some 150 plant species are being cultivated, and mankind primarily depends on no more than 12 of these" (Esquinas-Alcazar, 2005, cited in Ramirez-Villegas 2013:78). But today's plant varieties are based on thousands of years of traditional breeding. Farmers all over the world have adapted their varieties to local climatic and soil conditions reducing pest loss and improving yield. They have exchanged their knowledge and preserved the wild relatives of crops in order to come back to special traits, which may help cope with specific biotic or abiotic stresses. The importance of preserving wild relatives of cultivars is highlighted by Ramirez-Villegas et al. (2013: 80): "The use of crop relatives has increased dramatically over the past decade and will continue to increase thanks to biotechnology tools". Plant genetic resources (PGR) have been exchanged globally, but not everyone has benefited. In his ground-breaking study *First the Seed* Jack Kloppenburg estimates that PGR-related information and genes worth more than one billion dollars have made their way from developing to developed countries (Kloppenburg 1988/2004).

There is one other aspect. Humans have to increase world food production because it is expected that world population will increase to 9.1 billion in 2050 and more and more people will change their eating habits to include more meat products (UN 2005). Additionally climate change is affecting agriculture and lots of farmers will have to change their cultivation techniques. Nonetheless, "[p]lant genetic resources for food and agriculture (PGRFA, as seeds are addressed in the literature, G.K.) will play a crucial role in providing the genes to help confront these challenges" (Ramirez-Villegas et al. 2013:78).

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These developments of international politics on PGR have at first led to a dramatic loss of agricultural biodiversity. Secondly the privatisation of knowledge and seeds through seed laws and patents hinders commercial as well as traditional breeding and is a major obstacle to developing new seeds in cooperation with farmers (Kotschi 2010). Thirdly farmers all over the world are confronted with field controls and lawsuits by big corporations that seek to enforce their intellectual property rights.[1] The argumentation of the corporations in favour of IPR is grounded in international law which is based on an „information feudalism" as Brathwaite and Drahos (2002) have labeled it. Confronted with these consequences, farmers, researchers and activists all over the world are looking for alternatives. One possibility might be another approach towards plant breeding, based on participatory interaction between breeders, farmers, and other parts of society and the principles of the commons.

In the next chapters, I will describe one possible new approach. First I will briefly describe the international legal framework concerning PGRFA. Then I will discuss the concept of the commons as it was researched by Elinor Ostrom. After that I will introduce the concepts of *Open Source* and *Material Transfer Agreements* (MTA), and discuss whether they could function as alternatives to private intellectual property rights. Offering a stable financial basis for breeding activities is an important aspect when trying to convince small and medium sized breeders to change their approach to breeding. In the final section, I will present some conclusions and an alternative model to the current system.

2 Institutional Framework[2]

In 1961 the first international agreement was signed by six countries to restrict access to new varieties bred by commercial plant breeders. *The International Union for the Protection of Plant Varieties* (UPOV) set the stage for subsequent intensive discussions on intellectual property rights on PGR in the 1970s and 80s. In 1983, the FAO General Council adopted the *International Undertaking* which contained „the universally accepted principle that plant genetic resources are a heritage of mankind and consequently should be available without restriction". However, a number of developed countries did not agree to the *Undertaking*, because it did not accept plant breeders' rights. In 1989, the FAO adopted a new resolution stating that the heritage of mankind is subject to the recognition of plant variety protection rights (Halewood 2013: 15). Following complaints mainly by developing countries, the 1992 *Convention on Biological Diversity* (CBD) stipulated that nations have sovereign rights over their genetic resources and have to be asked and have to agree when a third party wishes to use those resources. PGRFA come, in principle, under the purview of the CBD, but the CBD delegates their handling back to the institutions of FAO. At the same time, the *WTO TRIPS Agreement* was adopted (in 1994); in its Art. 27.1, it contains the following obligation for WTO members: "[P]atents shall be available for any inventions, whether products or processes, in all fields of technology". Members can exclude plants from patentability but when they do, they instead have to provide „for the protection of plant varieties … by an effective *sui generis* system" or by any combination of patents and a sui generis system (Art. 27.3 TRIPS). Since this time, more and more patents on PGR have been granted. According to a survey compiled by Ruth Tippe, a researcher of the campaign *No patents on life,* on the European Patent Office (EPO) in Munich only few patents on plants were granted until 1990. After 1995, the numbers increased dramatically, reaching around 200 in 2005. Since then, 150 to 180 patents on plants are granted annually by the EPO, most of them based on genetic engineering (see

1 See e.g.: www.percyschmeiser.com or www.ig-nachbau.de (in German only).

2 See for detailed analyses e.g.: BUKO (2004), Aoki (2008), Tansey/Rajotte (2008), Brand et al (2008), Kaiser (2012).

Then/Tippe 2009 or Kaiser 2012 for details). But since 2005, more and more patents have also been granted on conventional plant breeding.

Additionally, over the last decade, dozens of bilateral free trade agreements have been negotiated between different states, containing stronger IPR rules than the WTO TRIPS Agreement.[3] With a mandate given to it by the CBD, the FAO started in 1994 discussing a new International Undertaking. In 2001, this resulted in the *International Treaty on Plant Genetic Resources for Food and Agriculture* (ITPGRFA). Different from TRIPS and UPOV, the ITPGRFA is compatible with the idea of PGR that are shared as commons. In its Preamble states declared that PGRFA are "a common concern of all countries", in Art. 12 ITPGRFA, parties agreed that patents shall not be claimed on plant genetic resources „in the form received" from the multilateral system (FAO 2001), a tool "which is efficient, effective, and transparent, both to facilitate access to plant genetic resources for food and agriculture, and to share, in a fair and equitable way, the benefits arising from the utilization of these resources, on a complementary and mutually reinforcing basis."
Aoki (2008) coined the term „Seed Wars" when analysing these international developments. On the hand agreements, actors and governments in favour of commonly shared PGR, on the other hand agreements, actors and governments arguing for private intellectual property rights Halewood et al. (2013) conclude: „While the impact of these restrictive policies on commons-based pooling of PGFRA has not been fully documented (…) anecdotal evidence strongly suggest, that they have had a negative impact on the willingness of a range of actors to make PGRFA widely available, with negative consequences for scientific research and agricultural development." That is why new avenues have to be explored.

3 Common property

Growing protests and resistance against privatisation and appropriation have led to a rediscovery of the concept of the commons whose origins date back to medieval times. The concept has become more and more popular at least since 2009, when Elinor Ostrom received the Nobel Prize for her work on the commons (e.g. Ostrom 1990). She and her collaborators conducted hundreds of case studies in different countries, analysing how the collective management of common pool resources – in most cases forests, fishing grounds, meadows, or marshes – has to be conducted to be successful. After 30 years of work, they identified eight design principles that make a common-based management of natural resources sustainable and stable over long periods of time:[4]

- Clearly defined boundaries of the resource, of users and not-users,
- Rules of appropriation that are adapted to local conditions,
- Collective choice arrangements to participate in decision making,
- Effective monitoring of the resource and the use of it,
- Graduated sanctions which could be applied when community rules are violated,
- Mechanisms of conflict resolution,
- Self-determination by the community, accepted by higher level state authorities,
- Polycentric Governance, meaning in case of larger resources a multi-level governance with the local community management at the basic level.

The quality of life of all people improves when they are part of rule development and decision

3 See www.bilaterals.org (16.04.2013).
4 See e.g.: Ostrom (1990), Helfrich et al (2010).

making; the interaction between people is the most important aspect of the commons. Commons are not only a resource managed in a certain way; commons are the people and the interaction between them (the commoning) in addition to the resources.
It is possible to apply the above principles to PGRFA: Boundaries of authorized users can be defined along (inter)national borders or concerning special groups of crops. Having agreed on boundaries, policy-makers, researchers, breeders and farmers can negotiate effective rules of appropriation (who can use the resource; who is allowed to breed with which PGR, etc.), rules on effective monitoring, graduated sanctions and conflict resolution mechanisms. Even self determination and polycentric governance are possible – at the global level we already have an agreed understanding of several of these points: The ITPGRFA defines boundaries concerning the crops and forages included under its scope; it member states agreed for some self determination of farmers (Farmers' Rights) and regulate the appropriation of PGR. It can be part of global commons governance, if concrete and effective policy measures are taken at the national and local level taking the ITPGRFA's rules and its spirit into account. Unfortunately, there is still opposition by several states and institutions defending IPR, strong breeders' rights and their national interests only. That is why the *Material Transfer Agreement* (MTA, see below) and the Treaty itself do not generally exclude patents on PGR. At the heart of the commons as I understand the concept is the idea of sharing products, ideas, knowledge and resources for the purpose of enhancing the welfare of the majority of people. But we have to be careful: The power of dominant actors (multinational corporations, northern universities, etc.) enable them to appropriate genetic resources without sharing the benefits and without the participation and agreement of traditional users or communities of these resources. Biopiracy and exploitation are the consequences of a wrong or naive understanding of the commons.
It is important to note that there is a huge difference between the commons and public goods. Public goods are non-rivalrous, i.e. the use of one person does not prevent another user from using the same good at the same time (e.g. air), and non-excludable, i.e. these goods are available to everyone and no one can be prevented from using them. No one has to ask anyone else when using public goods. Commons can be non-rivalrous as well, but in most cases they are excludable – a specific community is a part of the commons, has agreed on rules and sanctions and a third party wanting to get access to a resource managed as commons, needs to request the consent of the specific community before using the respective commons.

4 Open Source and Material Transfer Agreements

Discussing the commons one example often referred to is the open source concept known from informatics. Open source means inter alia that the software code is accessible for all interested people, that it is understandable, that changes can be made and no license fee is charged. For several years, researchers and activists have tried to apply the open source model to biological research and developments (e.g. Kipp 2005; Hope 2008). One of the best known approaches is the CAMBIA model: A website is used to share information about new developments in plant-breeding; the published methods, tools, etc., are patented, but can nonetheless be used for further research, if users agree to share their results as well. But this model does not question IPR, it uses them and offers patented products or methods to registered members only.
In 1999, Michaels presented a *General Public License for Plant Genetic Resources* (GPL-PGR) based on the principles of the GPL for software programs (Michaels 1999). But his intention to widen the access to protected PGR for breeders only is not enough; farmers, gardeners and other parties should be able to get access as well. All users of material protected by the GPL-PGR have to license their results and new varieties in the same way, so that through "viral" effects more and more PGR become part of the protected commons. If this avenue is to be explored further, there is

a need for a standard setting body for this kind of licenses, because there might be a need for different licenses for different seeds (there are already 70 different open source software licenses and the *Open Source Initiative* coordinates and registers them).

One important tool for managing the exchange of PGR in a transparent way are *Material Transfer Agreements* (MTA). In MTAs providers and users of PGR fix the terms of exchange and define the rights of each party. MTAs are already used in the exchange of biological material between companies, universities or in the context of the ITPGRFA. Including reference to GPL-PGR in an MTA means e.g., that parties agree to share their results with third parties or pay benefits to farmers, who developed the used PGR originally.

As said earlier in this paper, farmers have played and will continue to play an important role in plant breeding and the protection of land races and wild relatives. But often their work is not adequately valued by commercial breeders and the society large, at least in developed countries. In the Philippines, the MASIPAG Network[5] has established an alternative network of farmers, non-governmental organisations and scientists to promote organic farming and on-farm breeding. Its more than 35.000 members are active in 45 out of the 79 provinces of the country. Land races are collected, described, registered and breeding programs for conservation, adaption and new varieties have been established. Until today more than 1100 rice varieties could be conserved and 500 new varieties have been bred. These new varieties are not called varieties, because in order to bypass plant variety protection rights MASIPAG calls them selection – a term which is not defined in the above described agreements. These selections are distributed in the network and can be adapted to local climatic conditions – without any intellectual property rights and in shorter breeding time as compared to commercial breeding of varieties (Helfrich 2012).

When a applying the above cited design principles of the commons to seeds we will see that it might be possible to organise breeding in this way – and that the ITPGRFA might be one element of polycentric governance concerning the multilateral exchange of seeds. But for this purpose, at least three important steps have to be taken: First, the Governing Body of the ITPGRFA has to adopt a new resolution concerning the patenting of PGR. Stating that patenting of material „in the form received“ from the system is not allowed, is not enough. A least a procedure should be agreed for obliging the users of PGR received under the Treaty to put their results back into the system. Second, the concept of Farmers' Rights, which is well formulated in the Treaty, must be implemented at the national level – most likely against huge resistance of breeders. And third, the anticipated *Global Information System* (Art.17 ITPGRFA) through which information about the genetic resources included in the system can be shared has to be developed and established (Halewood et al. 2013: 17).

5 Financing of breeding in the age of common property

Thinking of breeding new plant varieties without the possibility of applying for IPR means that we have to think about other ways of financing breeding and research – at least in those countries where a distinction has been established between breeding and farming. First trading with seeds has to be excluded from breeding, because trading can still be done at markets. Conceiving of PGR as protected commons does not mean that seeds are priceless. But it means that no license fee can be included in the seed prize and that license fees cannot be used for re-financing breeding. Additionally, the harvest can be used for re-seeding and under a commons management it is not possible to abolish this. New institutions have to be established to finance breeding, research and to protect and develop land races. Possible new funding mechanisms could be the following:

5 See www.masipag.org/cms (20.04.2013).

- an increase of grants for breeding financed from tax revenues
- a breeding charge/cent which will be added to final price of a product,
- contributions of farmers and breeders or their professional organisations
- mandatory contributions of citizens (e.g. in Germany there is a TV and radio fee, every household has to pay a special amount monthly),
- acquisition of existing patents and plant variety protection rights by societal institutions to provide them for further breeding
- the establishement of specialised foundations, who finance public breeding only, controlled by an advisory board composed of representatives of different groups of society.

Some projects have already organised breeding and the cooperation between farmers and breeders in this spirit, e.g. Fair Breeding[6] in Germany/Austria or seed fund (Saatgutfonds) of the German Zukunftsstiftung Landwirtschaft.[7] Both are good initiatives, but play a minor role in overall breeding efforts so far (but are very important for those breeders who get their funding).
In the following I will describe a model for financing and organising breeding at the national level based on the principles of the commons; at the global scale the ITPGRFA could be the overarching entity that coordinates institutions at the national level (assuming that the above suggested changes have been implemented). As said, commercial plant breeding does not necessarily satisfy the needs of farmers and society. For example, in Germany most consumers are against GMOs, but breeders still invest money in GMO research and breeding. In order to satisfy the needs of consumers and farmers, a different process for deciding on breeding priorities has to be established. For example, a non-profit organisation composed of breeders, farmers, academics, NGOs, etc. could be in charge of supervising breeding and research programs at the national level and decide about projects and funding. Public funds which today have been applied for by each company could be allocated by his new institution. Different departments could deal with different kinds of crops or horticulture, like potatoes, grain, vegetables, etc. Additionally, traits adapted to regional conditions could be developed to provide the most suitable varieties to farmers. Because of the non-profit character of such an organization, patents or plant breeders' rights that might eventually be granted would not lead to a monopoly automatically. Using licensing models like the GPL-PGR, the institution could spread new ideas rapidly by sharing them with other interested organizations; it could thus enhance and broaden the commonly owned gene pool through the viral effect of these licenses. This viral aspect is very important to avoid the appropriation of newly bred varieties by big corporations.

6 Conclusion

Agricultural biodiversity and a great variety of plant genetic resources in general are essential for food production in the future. Among other things, commercialisation of breeding and agriculture were driving forces of a significant loss of PGR in the past. It is very important to stop this trend and enhance the diversity again. To me, the only possible way seems to be abolishing private intellectual property rights on PGR; at the same time, breeding should be re-organised in a way that treats PGR as a commons[8] – but not as a (global) public good. If seeds, varieties or PGR as a whole became a public good, local farmers would be confronted with multinationals eager to obtain the information and the seeds without given anything back; this was the situation prior to

6 See www.kultursaat.de or www.naturata-verein.de (20.04.2013). Also Kaiser 2012, pp173f.
7 See www.saatgutfonds.de (20.04.2013). Also Kaiser 2012, pp171ff.
8 Additionaly patents on PGR are neither ethical nor a driver of investment. See for details e.g.: Patal (2010), Pirscher (1997), Leger (2005), Alston/Venner (2000).

the CBD and the ITPGRFA. That´s why power politics of have dominant actors, institutions and governance have to be taken into account when thinking about changing the system.

As said in the beginning, the number of patents on PGR is still rising although patents cannot be granted in Europe on new varieties bred with conventional breeding techniques.[9] Additionally, there is evidence that restricted access to PGR is a major obstacle for commercial companies as well. Recently we could observe some changes of the policies by some companies: E.g. in the beginning of 2013, Syngenta announced a new website to offer their products and methods of horticulture breeding to academic or non-profit research at preferential conditions.[10]

We have seen several practical and theoretical developments showing that there are alternatives to the current state of commercial plant breeding. Even though breeding requires a substantial amount of funding for paying researchers and carrying out necessary tests, this money does not have to be earned by selling the seeds, but could come from other sources.

As the example of MASIPAG has shown, the participation of farmers in the breeding process is one important step to reach a higher degree of interaction between users and providers of seeds; it is a necessary requirement to develop varieties that fully satisfy the needs of farmers (and consumers).

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9 See http://www.presseportal.de/pm/108565/2443765/europaeisches-patentamt-bestaetigt-die-nicht-patentierbarkeit-von-biologischen-verfahren-in-der (16.04.2013).

10 See www.syngenta.com (16.4.2013).

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