The exploitation of plant genetic information: Political strategies in crop development

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The Exploitation of Plant Genetic Information

Introduction

Biological diversity is often thought to be an area exclusively for biologists and environmentalists. In the past 20 years they have indeed played a leading role in the discussion on the conservation of 'biodiversity'. Since the United Nations Conference on Environment and Development (UNCED) in 1992, the loss of biodiversity has obtained a prominent place in the debate on the global environment. The overall message is that there are 30 million species left, but every day another one is lost forever.

Less well known is that the environmental/biological interest in maintaining biodiversity is increasingly shared by industry, albeit from a more utilitarian perspective. New biotechnological techniques have enabled industrial corporations to screen the earth's plants, insects, and microorganisms at unprecedented speed for useful genetic information. Genes that are economically interesting can now be 'engineered' and transferred from one organism to another, for medical or agricultural purposes, or a combination of the two. Biodiversity has thus become a potential industrial, genetic resource.

Because of the industrial interest in genetic information, the realization is widening that ordinary plants, insects, microorganisms, or human blood cells represent economic value. This awareness formed the starting point for a long, intense and still ongoing conflict over who is to benefit from the exploitation of genetic information. The conflict has become most visible in political debates between industrialized and developing countries, most often at the United Nations forum. Plant genetic resources are found especially in relatively undisturbed areas in developing countries, while the technological know-how to exploit organisms as a resource is primarily available in advanced OECD countries.

The first clashes took place within the FAO in the early 1980s, revived in the 1990s during the preparations for the UNCED in 1992, and resulted in the U.S. Congress refusing to sign the Convention on Biological Diversity (CBD). Political turmoil of the same magnitude occurred during the Uruguay Round of multilateral trade negotiations, when an international agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) was being prepared. In the light of the heated debate surrounding the implementation of the CBD and the TRIPS agreement, it can be expected that controversies on the exploitation of genetic information will last well into the 21st century.

Although most conservation and intellectual property rights (IPR) regulation is developed in OECD countries, the implementation takes also place in developing countries. 'Global' conservation regulation is required to protect forests, coastal areas, wetlands and farmlands both for long-term ecological and for industrial interests. 'Global' IPR regulation is designed to prevent farmers and breeders from using plant varieties without paying royalties. IPR protection of plant-related innovations, has probably been the most disputed issue of crop development over the
past decades. IPR are expected to encourage private organizations to invest in plant breeding research so that new varieties are developed to the benefit of agriculture. Many organizations in developing and OECD countries, however, strongly oppose plant-related IPR protection for ethical or cultural reasons. They also disapprove of IPR on the grounds that it primarily serves the interests of the northern crop development industry. IPR protection is often regarded as a new form of protectionism, through which national industries are protected abroad without violating neo-liberal policies. The sharp controversy demonstrates the confusion over the precise benefits and disadvantages of IPR for agriculture in developing countries.

The intention of this book is to examine the socio-economic causes underlying the international controversy over the exploitation of genetic information. This is not a matter purely of academic relevance. Every attempt to achieve more international consensus on the way plant genetic information is to be exploited requires an accurate analysis of the relevant power constellation of the actors involved. In our view, such an analysis must include:

(a) an assessment of the exploitation of genetic information in relation to the production sector from which the information derives its value, rather than an assessment in relation to the legal context of international agreements on biodiversity and intellectual property protection;

(b) a thorough examination of the role and interests of the various actors involved in the controversy, such as governments, industry, consumers, non-governmental organizations, farmers, indigenous peoples, etc. It is often assumed that the conflicts are international and North-South in nature, while the transnational dimensions of the conflict are hardly considered.

The focus in this book is agro-food production. It examines the causes of the international controversy over plant genetic information as far as genes are used for the development of new plant varieties. Two main antagonistic positions can be distinguished. The first claims that genetic information that is derived from landraces or wild plants is just ‘raw’, a natural resource, hardly representing any economic value. Value is added by professional breeders and geneticists, who are able to detect, define, isolate, and use the specific information contained in the resources to develop new crops. No compensation is therefore required for the source person, community, or country from which the raw material was first obtained. The second, opposing position holds that genetic information does represent economic value in itself, irrespective of its further application. Consequently, the end-user of the genetic information has an obligation to compensate the original source person or source country. Scientists who freely take biological organisms out of developing countries are depriving these countries of natural resources with an economic value.

This perception of the controversy over genetic information as a matter of compensation has induced a growing number of non-governmental organizations and scholars to calculate the commercial value of plant genetic information. Whether such calculations are useful is doubtful, however, because the opposition to the free collection of plants and IPR protection in developing countries is not just
based on a desire to obtain a share in industrial benefits.

In our view, the controversy over the exploitation of plant genetic information is much more than a distribution problem; it results from a complex combination of socio-economic differences, political relations, technological advancements and juridical changes. This assumption was confirmed during the research we carried out in Chile and Colombia. For example, in 1996 we had a meeting with representatives of the Sociedad Mapuche Newen in Temuco, 500 km south of Santiago de Chile. The Mapuche Newen, an indigenous community, cultivate potato varieties of which the genetic characteristics are frequently used by potato breeders around the world. The breeders have often been accused of biopiracy, since the indigenous people have never received any compensation for the genetic information contained in the landraces that have been collected. This situation aroused much anger among the Mapuche, and confirmed their idea that foreigners, including Chileans with Spanish roots, turn to them only to capture resources. However, the perceived injustice did not stand alone but was intrinsically related to daily, and more pressing problems which we were informed of extensively, including discrimination, violation of their ethnic and territorial rights, poverty, and unemployment. This reaction indicated that it is not just the remuneration of lost property that is at stake, but rather the general socio-economic marginalization to which peasant and indigenous communities in developing countries are subjected. Hence, the roots of the conflict over the exploitation of plant genetic information should first be sought in social, economic, and cultural circumstances.

Our approach is therefore interdisciplinary in character, located at the crossroads of science, law and political science. In a nutshell, our argument is that agro-food production can be organized in various manners, each manner bringing along a specific view on the function and the design of plant varieties and consequently also on their resources and exploitation rights. Thus, conflicting views on how agro-food production should be produced provoke conflicting perceptions of how genetic resources should be handled.

Before we map out the basic structure of the book it is necessary to explain two terms we use throughout: genetic information and crop development. Contrary to conventional usage in most of the literature on the present subject we prefer to speak of plant genetic information rather than 'plant genetic resources'. The term "genetic information" refers to the material of inheritance, DNA (deoxyribonucleic acid) consisting of adenine, cytosine, guanine, and thymine (Abercrombie et al. 1980:123,124). In this definition, a gene, a tissue, a plant, or even a whole population can be considered as a source, or carrier of genetic information. The term is deliberately chosen since 'plant genetic resources', normally defined as all living material “with an actual or potential value” (IBPGR, 1991:74; UNEP, 1992), has the disadvantage that it inherently carries a political meaning, because it presupposes that genetic information has economic value.

The second term, crop development, comprises all research and other activities that have the purpose to alter the performance of crop plants. These activities may
be directed at changes in the genetics of plants by means of, for example, selection, cross breeding and genetic engineering, or may focus on external inputs that influence the growth of plants. We prefer the term crop development over the conventional terms such as 'plant breeding', or 'crop improvement'; the first has a much narrower connotation than crop development and usually refers to crossing, while the second has the disadvantage that it positively colours the products of the techniques. A newly released variety is always denoted as improved by its creator. By using the term crop development, we underline the fact that crop development strategies may lead to varieties with qualities that may be praised by one and challenged by another.

Crop development is thus not a neutral, technological activity, but a subject of political decision-making in respect of agricultural production. Private and public plant breeders continuously deal with questions such as: what crops should be focused on; where and to what extent new plant varieties should be marketed; which genetic information should be conserved; how and to what extent the resulting varieties should be protected against reproduction by competitors. Answers to these questions depend on the strategies employed by farmers, public breeding institutes, private breeding enterprises, and governments to adjust crop development to a preferred type of agro-food production. In the course of this century, these strategies have evolved into 'crop development policies' on the use, conservation and protection of plant genetic information.

The complexity of the research subject has induced us to design an analytical framework that explores both the historical and spatial variation of agricultural production. In order to explain historical variation we go back to the emergence of the crop development industry in the early 20th century in the USA and several Western European countries. The more it was realized that agricultural competitiveness could be influenced by crop development, the louder the call became for specific governmental policies in this field. In most OECD countries, plant conservation and IPR protection for plant-related innovations have gradually become a prerequisite for further crop development. In developing countries, where the 'success' of industrializing agriculture varies greatly, the call for new crop development regulation is much less unanimous. This point illustrates the need for spatial variation in our analysis. Where little industrialization of agricultural production has taken place, the interest in adopting new conservation and IPR policies is low. Differences in the degree of agro-industrialization occur among countries, but also within countries, especially in the developing world. The assessment of the conservation and IPR policies differs accordingly.

In order to collect original data on conservation and IPR policies in developing countries, we carried out research in two Latin American countries, Chile and Colombia, in 1994 and 1996. We selected these two countries for a case study because both of them maintain a considerable degree of biological diversity within their borders. Colombia is even regarded as a country of 'mega-biodiversity'. Its tropical forests harbour a wealth of plant species with actual or potential commercial value, such as mango, melon, papaya, and numerous ornamental plants. Chile
is rich in strawberry and potato species. In both countries this asset has turned the implementation of new conservation policies into a political event with both national and international dimensions. Moreover, Chile and Colombia are among the first developing countries adopting legislation for plant-related IPR protection, which in both countries has triggered considerable public debate.

The first chapter provides an overview of the controversy over the exploitation of plant genetic information. The most common analytical approach for explaining the controversy is discussed, as well as our alternative approach.

Chapters two, three and four have a strong historical dimension in that they explore how, throughout the past 100 years, crop development policies have gradually been anchored in the process of agricultural industrialization in Western Europe and the USA. Chapter two describes the early governmental initiatives in these countries to regulate crop development in the period 1870-1930. A relation is established between specific conservation and IPR regulation and the specific position of the countries in the international division of labour. Chapter three is entirely dedicated to the 1930s. It was in this decade that two countries, Germany and the USA, were able to establish a close link between crop development policies and long-term strategies for agriculture. Chapter four examines how, after the Second World War, the USA managed to ‘export’ its crop development policy to Western Europe, and later, under the flag of the Green Revolution, to developing countries. Special attention is given to the role of the FAO in this process.

Chapters five and six deal with the present period, from the 1980s onwards. In the fifth chapter, the focus is on the latest stage in the process of agricultural industrialization: the emergence of the transnational biotechnology industry and the growing demand for global conservation and IPR regulation. The final chapter is devoted to the question of how agricultural producers in Chile and Colombia respond to new global conservation and IPR regulation. It is argued that the root of the conflicts should be sought in the frictions between those who support an industrialization of agriculture and those who do not.