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IMPLICATIONS OF PLANT BREEDERS' RIGHTS:  
A CANADIAN PERSPECTIVE

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**Abstract:** In recent years, plant breeders' rights (PBR) has become a controversial subject worldwide. This paper reports the results of a survey of the seed distribution industries in the nine member countries of the International Union for the Protection of New Varieties of Plants (UPOV) as well as the seed trade in the United States (U.S.) and Canada.

The general consensus of the UPOV members was that PBR had resulted in increased private investment in plant breeding and that there had been a shift toward more basic research in the public sector. The findings in the U.S. were similar except that there the changes were perceived to be more crop specific with less funding available for public sector research. In Canada, the major concern centered around the potential effects of PBR legislation with strong arguments both for and against being put forward. The introduction of PBR into Canada would likely have neither strong positive nor strong negative economic effects on the grain and oilseeds sectors, particularly in the prairie grain growing region.

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IMPLICATIONS OF PLANT BREEDERS' RIGHTS FOR  
PRAIRIE GRAINS

Plant breeders' rights (PBR) is a system whereby patent-like protection is granted to the developers or discoverers of "new" varieties of plants. During the past few years an ongoing heated debate over PBR has been taking place. Bill C-32, a Bill to provide for a system of PBR<sup>1</sup> in Canada, was first introduced by Parliament in 1980. Subsequently, this Bill was reintroduced in 1983 but did not pass. A new Bill, C-107, has recently been given first reading in the House of Commons.

One recommendation made in a September 1985 report by the Science Council of Canada was that "Agriculture Canada should reintroduce a plant breeders' rights bill to Parliament."<sup>2</sup> A similar viewpoint was expressed in 1986 when the Agricultural Institute of Canada released a position statement "... AIC believes plant breeders' rights legislation should be put into place to tap the potential of private breeding programs."<sup>3</sup>

The arguments for the proposed legislation have been made largely without rigorous analysis or documentation despite years of committee discussions, lobbying, discussion in the media, and the, as noted, stated positions by establishments such as the Science Council and AIC. The purpose of this paper is to report the findings of a wide ranging study on the economic issues of PBR (both pro and con).

The arguments which have been used on the proposed PBR legislation can be summarized in the following 10 statements:

1. PBR could increase private investment in plant breeding;

2. Royalties could accrue to Canadian plant breeders from other countries who use new Canadian varieties;

3. PBR could ensure the best varieties produced worldwide would be available to domestic growers;

4. Seed prices could increase;

5. Royalties paid for use of protected foreign varieties could negatively affect Canada's balance of payments;

6. Multinational firms could dominate the seed industry resulting in increased concentration and reduced competition;

7. The outflow of multinational profits could negatively affect Canada's balance of payments;

8. There could be an increased risk of "genetic wipeout;"

9. Public plant breeding activity could eventually decline or at least be directed away from varietal development to more basic research; and

10. The exchange of information and germ plasm between plant breeders could be adversely affected.

All of these statements have either direct or indirect economic implications.

### **Methodology**

Given the abstract nonquantitative nature of much of the subject matter<sup>4</sup> to be dealt with in this article, the methodological approach would best be described as a descriptive policy analysis.

An attempt was made to identify changes that have taken place in the seed industries in countries where PBR regulation already exists. This involved a survey of members of the International Union for the

Protection of New Varieties of Plants (UPOV), with special attention given to the United Kingdom (U.K.) and the United States (U.S.). In the U.S., the study focused on the impacts of protection on the grains and oilseeds sectors in those areas of the northern U.S. which have geographic and climatic conditions similar to the Canadian prairies in order to determine those changes most likely to apply to Canada if PBR legislation were adopted. As a consequence of the sampling frame, the findings of this study can be generalized only to the Canadian grains and oilseeds sector, although this represents a large portion of the plant breeding activity to which PBR would apply.

#### Survey of International Experience on Plant Breeders' Rights

The Plant Variety Offices (PVO) of various UPOV countries<sup>5</sup> were contacted through the offices of Dr. Heribert Mast, Vice-Secretary General of UPOV, to obtain information by means of a questionnaire, about the effects of PBR. Members of the plant breeding communities (private and public) and the seed trade in the U.K. and U.S. were contacted directly in order to obtain their views on the effect which PBR had in their respective countries.<sup>6</sup> In addition, members of the Canadian seed industry were consulted to ascertain the effects that PBR would have on plant breeding and the seed trade.

The UPOV experience. The view of most UPOV members who responded to the questionnaire was that PBR had led to increased private investment in plant breeding. A number of respondents indicated that private investment had definitely increased since the advent of PBR but that the increase was not necessarily due to PBR alone.

All but one UPOV respondent felt that there had been a shift toward more basic research in the public sector, although a number felt that this was totally unrelated to PBR. Respondents were unanimous in the belief that PBR had not adversely affected germ plasm exchange at the international level and some even felt that it had enhanced exchange. Most respondents indicated that the number and quality of new varieties had increased since PBR, while a minority felt that PBR was not the cause of this increase. A large majority of UPOV respondents felt there had been no discernible change in seed industry structure or multinational participation in their respective countries since PBR was introduced. Most respondents did not appear to know what effect PBR has had on net royalty flows on imported and exported seed. While seed prices have gone up in all countries since PBR were adopted, almost all respondents felt that the increase was due to a general price rise rather than being attributed to PBR and that the relative increase in seed prices was generally lower than for other farm inputs. There was unanimous agreement that PBR did not lead to an increase in the genetic vulnerability of cereal and oilseed crops. Respondents were unanimous in stating that the perceived overall effects of PBR were positive for their countries. The only negative effect which was mentioned by one respondent was the cost of operating the system. None of the respondents recommended any changes be made to the UPOV convention.

The experience of the U.K. and U.S. Contacts in the U.S. and U.K. strongly supported the view that there has been a significant increase in private investment in plant breeding since plant protection was

introduced in their respective countries, although the distribution among crops was far from uniform. There is, however, some disagreement about whether the increased investment is due to PBR or merely coincidental with it. There has been little private interest in breeding for crops with smaller market size or to breed for small geographic areas. Experts in the U.S. especially argued that this identifies the need for a strong public program to maintain crops with smaller market penetration.

The level of funding for public breeding in the U.S. and U.K. was generally reported to have remained constant or to have declined slightly. It is unclear whether public breeders are shifting toward more basic research and away from varietal development.

Seed prices have increased in both countries, but no more than other farm inputs. The evidence from the U.S. indicated, however, that private varieties usually sell at higher prices than equivalent public varieties.

There is little fear that multinationals will gain control of the seed industry in either country. However, many public sector plant breeders in the U.S. expressed the view that publicly released varieties are required to provide a strong competitive force in order to maintain this situation.

Information on net royalty flows was not available for either country. Royalty collection was not considered to be a problem in either the U.K. or U.S.

The rate of germ plasm exchange is believed to have remained unchanged in the U.K., while there is more concern that it has

declined in the U.S. The increase in monoculture throughout the world, due to the advent of high yielding varieties, is cited as the main threat to genetic diversity.

Plant breeders and seed trade members in the U.K. were of the opinion that PBR has had a positive net effect, whereas in the U.S. the views expressed seem to indicate that plant variety protection (PVP) has not had a dramatic positive or negative impact overall.

Finally, but perhaps most pertinent to our study, were the responses to questions which were asked only of those who were interviewed in and around Fargo, North Dakota and Minneapolis, Minnesota.<sup>7</sup> When asked whether they would retain PVP legislation or abolish it if they had the choice, a large majority of those in the public sector said that since the system was in place they would retain it; but if it were not yet in place, they would have genuine reservations about setting it up. Those in the private sector were unanimous in the view that they would retain it. It should be noted, that since PVP has only been in existence in the U.S. since 1970, the results of any increased plant breeding activity which it inspired may be just starting to be realized. In considering the negative effects of PVP, the majority of concerns expressed relate more to the future than to the present. These concerns focused on germ plasm exchange and the future of public plant breeding, with special concern about the impact on variety improvements and seed prices if a strong public presence is not maintained. The conclusion of this part of the study, based on interviews with both the public and private sectors, was that the overall impact on the U.S. of PVP have not been particularly

strong. This conclusion is further emphasized by the findings of Butler and Marion<sup>8</sup> when they state:

Balance of Benefits and Costs: Overall, one must weigh the benefits of increased R & D in the seed industry, and particularly in soybeans and wheat, against several social costs--none of which are very substantial by themselves at the present time. There is no evidence that PVPA has triggered massive investments in R & D. Based upon available evidence, the impact has been very crop specific. However, there is also little evidence of substantial public costs from PVPA. Increases in prices, market concentration and advertising, and declines in information exchange and public plant breeding--the feared costs of PVPA--have either been nil or modest in nature. Thus the evidence presented in this report indicates the Act has resulted in modest private and public benefits at modest public and private costs. If a reasonable balance is maintained between the public and private sectors in the breeding of most crops, the present balance of benefits and costs should continue.

When asked whether the adoption of PBR would stimulate private plant breeding research in Canada, we were told by both private and public sector people that there were more important considerations, such as the Canadian varieties registration system and the small size of the Canadian market, which would mitigate against any positive stimulus of PBR. While interest was expressed in testing new varieties which were developed in the U.S. for registration in Canada, there was little enthusiasm for establishing breeding programs in, or specifically for, Canada.

#### Prospects for Canada

In order to learn what members of the Canadian seed industry thought about PBR, public and private plant breeders as well as seedsmen in Canada were contacted. While we were interested in their

opinions about the potential effects which PBR would have on Canada, we were more interested in learning about any negative effects on the Canadian seed industry which were due to not having PBR legislation.

Like their counterparts in UPOV member countries, many seed industry members in Canada believed that PBR would lead to increased private expenditure on plant breeding in certain crops. Despite federal government assurances to the contrary, a good deal of concern was expressed, both in the public and private sectors, about the possibility of reduced government support for public plant breeding in the future, especially for variety development. There does not seem to be any great opposition to the introduction of PBR provided there is a guarantee of continued government support for public plant breeding.

There was little concern expressed about the acquisition of Canadian seed companies by multinationals.<sup>9</sup> It was felt that the market share which these seed companies represented was very low and did not pose a threat to the competitive structure of the industry.

There was unanimous agreement among plant breeders that there had been no change in the rate of germ plasm exchange with breeders in countries which had adopted PBR. Similarly, there was almost complete agreement that Canadian growers are not being deprived of varieties due to lack of PBR. This is due, in part, to the fact that very few European varieties are suited for western Canadian growing conditions. As well, the Canadian registration system does not permit some European and U.S. varieties, which are adapted to conditions here, to be grown in Canada.

The Canadian registration system ensures that many new varieties (wheat and barley) are visually distinguishable from existing varieties as well as meeting all and exceeding at least one existing quality standard. This registration system imposes a more stringent requirement than the UPOV system where new varieties need only be distinct, uniform and stable (DUS). The view of most experts contacted was that the present varieties registration system, combined with the SeCan Association, could fulfill most of the domestic requirements of PBR.

#### Conclusions and Implications

The results of our investigation indicate that the introduction of PBR into Canada would likely have neither strong positive nor strong negative economic effects on the grains and oilseeds sectors in Canada, particularly in the Prairie grain growing region. This conclusion appears to be at odds with conventional wisdom since the arguments put forward on PBR are either strongly in favour or strongly opposed to their introduction. This conclusion is consistent with that of Butler and Marion on the counterpart system of plant protection in the U.S.

What is posed as the strongest argument for PBR--significant increased private investment in plant breeding--is doubtful. The Canadian market for seed is relatively small and diverse; crops produced on the prairies are very specialized. The present registration system decreases the probability of acceptance of a new variety. As a consequence, the potential payoff from private plant breeding is limited.

## Notes

1. Although there is some variation among countries, PBR essentially comprises a system of patent-like protection which is afforded to the breeders or discoverers of "new" varieties of plants.
2. Science Council of Canada. Seeds of Renewal: Biotechnology and Canada's Resource Industries, Report No. 38, 1985, p. 38.
3. Agricultural Institute of Canada. Plant Breeders' Rights, A Position Statement, 1986, p. 1.
4. This abstract nonquantitative condition has perhaps been best stated by Butler and Marion (L.J. Butler and B.W. Marion. The Impacts of Patent Protection on the U.S. Seed Industry and Public Plant Breeding, Monograph 16, N.C. Project 117, Studies of the Organization and Control of the U.S. Food System, North Central Regional Research Publication 304, September 1985, p. 10) "... we will frequently qualify our report with phrases such as "it appears" or "in our judgment." We have included discussions of some important issues on which there is very little solid evidence to remind the reader and ourselves that these are legitimate considerations in evaluating PVPA (Plant Variety Protection Act). ... our analysis is in part scientific but also in part the result of the judgments and art developed in researching a particular subject."
5. Countries which provided information were: Belgium, Denmark, France, the Federal Republic of Germany, New Zealand, South Africa, Sweden, Switzerland, and the United Kingdom.
6. Contact with the U.S. and U.K. was in the form of a questionnaire which was mailed to various individuals and organizations. In addition, a series of direct personal interviews were conducted with public and private plant breeders, and members of the U.S. seed industry in North Dakota and Minnesota.
7. Interviews included plant breeders at the two State Universities and United States Department of Agriculture employees, as well as a number of large and small private plant breeders and seed distributors.
8. L.J. Butler and B.W. Marion. op. cit., p. 3.
9. A similar conclusion was drawn in an Agriculture Canada report (Pamela Cooper. Plant Breeders' Rights: Some Economic Considerations, Agriculture Canada, Economic Working Paper, 1984, p. viii). This working paper followed an industrial organization approach and attempted to cover the entire seed industry in Canada. The conclusions drawn in this report reinforce the findings of the above survey. A very significant observation made in that report (p. viii) coincides with our viewpoint, "Quantitative consideration of the probable effects of breeders' rights were greatly restricted by the lack of data and by the limited hard documentation of other countries' experience with similar legislation."

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