Biodiversity Protection, Farmers and Breeders Right

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Lecture 27 : Concept,Definitions and Criteria for Plant Variety Protection

Welcome to the lecture 27, which is on the concepts definition criteria for plant variety protection. In the earlier lectures, you have gone through the aspects of the international aspects of biodiversity protection from the CBD perspective, the national implementation from the perspective of the Biological Diversity Act 2002. Plant agro biodiversity is one of the very important areas. The protection of plants also comes under the purview of intellectual property rights, and from lecture 27 onwards, we will deal with this particular aspect. So, in this lecture, we will cover the following concepts, plant genetic resources and improvement, how crop breeding and the agricultural sector are important to understand as a backdrop for understanding IP and plant variety protection, what are the definitional considerations in relation to plant variety protection, and what are the kind of plant varieties that can be protected. These are the keywords for the lecture.

So, before we begin to discuss the aspects of intellectual property in relation to plant variety, it is important for us to understand how plant breeding has contributed to the improvement of crops. So, when we look at the improvement of crops, we are looking at quantitative characteristics, we are looking at qualitative characteristics, we are looking at deriving value added product from plants. So, plants have always been improved. The area of agriculture has seen lot of improvements, not only from the traditional breeding techniques, but also from advances in the area of biotechnology, sequencing, and several other aspects have contributed to what we call modern techniques in relation to improvement of plants.

So, when we look at the aspects of improving plant genetic resources, we are looking at the traditional approaches to plant building, where good traits or characteristics as we call are brought in into a plant species, and how combining characteristics can always help in building multiple traits and improvements in the area of agriculture. So, when we look at the improvement of these characteristics, have a value from improving the economic value of crops. This is on one end in terms of yield improvement. On the other end, plants are also prone to stress in the form of abiotic and biotic stress. The abiotic stress is contributed from general environmental factors, there could be soil factors as well. Biotic stress is typically where we look at plants being prone to diseases and pest attack. So, overall the biotic and abiotic stress is a big burden to the entire realization of value with respect to plant species. Similarly in the area of agriculture, we see that it is not only that the yield characteristic needs to be improved, but also the environmental conditions

need to be improved in order for the yield to be realized. So, therefore, we are looking at the integration of not only the basic properties of the plant in terms of the characteristics, but also improving the plant to be able to grow under difficult circumstances. And today with the changes that we see in the environment, the area of abiotic stress, biotic stress has also received a lot of attention in terms of crop improvement.

So, traditionally when we look at plant breeding, we have always been looking at the area of breeding varieties which are resistant to these stress conditions. Some species have the natural characteristic of resisting pests or disease attack. So, how can those beneficial characteristics be introduced into the domestic domesticated crops. Therefore, the area of plant breeding typically involves bringing in desirable traits into crops. While this is so, generally you have come across possibly these terms which are typically used in the area of agriculture and into the modern aspects of agriculture.

So, we are looking at backcross or introgression breeding. We are looking at how in the first generation, you can look at bringing back the characteristics of one particular parent which are more useful. So, backcross breeding helps in building that background into the further generation. Then we also know that mutation breeding, creating mutations in a plant can alter the genetic makeup and therefore, wherever the genetic makeup is altered in respect of certain characteristics one may realize greater yields. So, mutation breeding has typically also been one area and one can envisage in the area of ornamental crops as well as horticulture crops.

We also have hybrid breeding where hybrids are created which have more vigor compared to the parents and therefore, hybrids are the ones which are also developed. When we look at the advances, how plant molecular biology advances have been considered, at least some of the terms that I mentioned here, we have ways in which one can actually identify whether or not a certain crop has a desirable trait by using what we call molecular markers. Today, it is not only molecular markers, but several other markers are also being used in order to assist in the process of selecting certain genotypes which are more desirable. The area of genetic engineering has revolutionized plant agriculture, because here we are looking at deliberate interventions into the plant genome. So, instead of combining two parents and waiting for the entire characteristic to be realized, if you can pinpoint to what are the genes that are involved in improvement, tinkering with those genes itself is the purpose of what we call genetic engineering in a very simple sense.

So, genetic engineering has also paved the way for site directed changes in the case of crop plants. So, a lot of genetically engineered crop plants have been created which are called transgenics, and transgenics are also one form in which we see a lot of improvement that has been brought into agriculture. Today, we talk about gene editing. So, there are

corrections to the genome that are possible, and undesirable traits can be corrected and therefore, that is another way in which one can realize improvement in relation to the plant species. So, ultimately the entire perspective is to look at enhancing agricultural productivity.

We all know that developing countries have are rich in biodiversity, and enhancing agricultural productivity has been one of the important areas and a lot of funding goes into it. Many of the countries in the developing context are also agriculture is their mainstay. That being the case, we also see the application of different agriculture techniques in these realms. So, improving agricultural techniques assess in identifying the structure and functional aspects of genomes, understanding gene expression in a better way, and what are the key genes that are involved in yield characteristics on one end, and how can one also utilize this information to improve stress response and stress resistance in plant species has always been an area of continuous interest to researchers. As you know, agricultural sector is a backbone of our economy and in several in and it is the case in most developing countries.

So, enhancing crop diversity is important in order to realize the potential, and it is that stage that we see the development or the creation of improved varieties. Such new varieties can be a subject matter of intellectual property rights. So, if one looks at the developments in relation to traditional breeding to today as we see the application of new techniques in agriculture, we see shifting points in relation to what are the techniques that have been utilized. So, if you look at traditional breeding, the objective has been the same, new or improved varieties. Genetic engineering has assisted in this entire process in terms of improving the ability to look at a particular genome, creating site directed changes and also reducing the timeline and resources use.

It is not only this that has made a change, but today we are able to look at genomes as it is, genomes, whole genomes and how whole genome information can be useful and that is where we look at the area of synthetic biology. So, though we have had different shifting points in terms of what are the techniques that have been used, ultimately the objective has been to look at how one can improve traits for yield or for improving stress resistance. So, this is where we see the evolution of the domain. Accordingly, we do see the variety development based on some of these techniques. So, when we come to the context of intellectual property and plant variety protection, it must be understood that plant variety protection in the realm of intellectual property can create exclusive rights.

So, this has been a big concern internationally right at the stage of the TRIPS agreement, where the debate was set off between the countries which wanted plant variety protection to those countries which were concerned on the creation of exclusivities could monopolize

agriculture. Therefore, options were available for countries to recognize plant varieties as patent protection or develop an effective sui generis legislation. So, the choice was given to the countries to member countries to develop in either of these ways or recognize protection. So, when we look at the protection of plant varieties, what is it that we are looking at? We are looking at protection of unique plant varieties, and this is expected to incentivize or promote innovation in plant breeding. The entire agricultural supply chain would be incentivized in the process of looking at the use of improved varieties.

So, this can also improve the licensing and the ability of breeders to collect royalties. When we look at varieties for protection under the intellectual property rights, there are certain criteria that need to be met. And typically when we compare them with other intellectual property rights, we find the distinctness, uniformity, and stability as certain criteria where plant variety protection is the varieties are looked at from this perspective. So, the criteria need to be met in order to be recognized under the law. So, I take you back to the TRIPS agreement 1994, when there were serious concerns in relation to the intellectual property claims in relation to plant and animal varieties.

Access to seed material for farmers is fundamental, plants are also used as source of medicine. Not an animal germplasm typically have been available through several sources for research. So, there are concerns in relation to if exclusivity is offered, then that would not only affect agriculture, it would affect several other areas of research as well. Article 27.3 indicates member countries may exclude from patentability plants and animals.

However, members shall provide for protection of plant varieties either by a patent system under the patent legislation or by an effective sewage and a system or a combination thereof. So, many countries chose to use an effective sewage and a system that is developed legislation in their individual countries, and in some cases patent protection was available. So, when we look at the realm of intellectual property rights, we look at it from this perspective. So, many countries have introduced a sui generis and its legislation for the protection of plant varieties. Let us examine the definition of variety.

When we look at intellectual property and plant variety protection, we are looking at the context of the international convention of plant variety protection UPOV. In UPOV article 1, the definition of variety indicates the plant grouping of a single botanical taxon of the lowest known rank, which is defined by expression of one or more characteristics for which it is known for, that is, it is an expression of a particular genotype. It is also, this is the characteristic which is the distinctive aspect between other plant groupings, and such a characteristic that we see is suitable for propagation and also is unchanged. So, this is the legal definition from the international perspective. The definition of breeder becomes important from the standpoint of identifying who is the one who is seeking the protection

in relation to plant varieties.

So, breeder is one who has bred or discovered or developed a variety. It can also mean a person who is an employer of a breeder, and successors in relation to breeders are also recognized as breeder. The term of protection with respect to plant species differs. Article 3 of the UPOV convention brings in the need for minimum number of plant genera that need to be looked at for protection, and also the need for recognizing specific duration in terms of the protection period. So, conditions for protection have also been laid down under the UPOV, where we look at novelty as an important characteristic, and then we have distinctness, uniformity, and stability DUS.

Typically what you deal with when you come to the context of plant variety protection, the testing of a plant variety follows the DUS norms. A plant variety is novel when we look at it from the point of view of the whether it is a propagating or a harvesting material, and the date of filing of the application becomes very relevant. At that point of time, it should not have been sold or otherwise disposed of. Also with respect to a given territory of a contracting party, it is said to be novel in relation to using the convention period that is one year from the priority period. So, if I file today within one year, I can actually seek the convention route, but secure the same date for the filing.

And in the case of trees and vines, there is a change with respect to the number of years recognized. So, article 6 of the UPOV recognizes this particular aspect. Now when we look at each of the criteria distinctness, uniformity, and stability, these are provided under article 7, 8, and 9 respectively of the UPOV. Distinguishability of the characteristic is important, because as a matter of common knowledge, people should be aware that this is the distinctive character at this stage of the filing. Uniformity in the characteristic is a requirement, and also stability over generations is also a requirement for the characteristic to be heritable.

One of the important aspect is also denomination. The use of a denomination provides an identifying name with respect to a particular plant variety. So, breeders, farmers, distributors, consumers recognize a plant variety with a name. As we all know, we consume several cereals, but we know them not as rice or wheat, but by the names when we buy them in the market. So, denomination is an important characteristic.

This is spelt out in article 20 of the YUPO convention. The designation of a denomination is for identification of a variety. It need not be solely figures unless it is an established practice in that given area, and it is possible that trademarks and trade names can have association with respect to a registered variety denomination. We have been discussing the aspect of breeder. So, what does it mean when we say a breeder is right? A breeder

would have an exclusive right with respect to the propagating material for the following production, offering for sale, selling, exporting, importing, stocking up for any other purposes.

These are the exclusive rights by which others are prevented from doing these activities, which means the breeder can authorize these activities in the supply chain. There are exceptions to this from the point of view of research exemptions or experimental purposes. Farmer exception is available, farmers are free to use breeder material, but ought not use the trade name. Private non-commercial purposes also is another exemption. Then we come to the understanding of how do we look at intellectual property rights in relation to plant varieties, if you are working in an institution or an industry.

What is the scope of intellectual property rights? And when we deal with plant variety protection, is that one part of the intellectual property management that we see? Let us examine that. So, when we look at intellectual property rights in relation to plant varieties, the process of improvement of a particular variety, the definite steps that are involved, the novel processes could be subject matter of patents. There are several varieties that are coming out of tissue culture, there are several varieties that have been developed based on mutation breeding. So, those things, those processes that are used can be part of patent protection. The name that is given or rather the variety is sold with a particular name that can be form of protected in the form of a trademark.

The distinguishing characteristic that has been used to improve and that improved variety is known for it, for that one can file for a plant variety protection which we have been discussing. And the management of that particular variety, what are the conditions that provide optimal growth, those can also be part of what we call know how or trade secrets that enterprise enterprises also hold. So, this is where we look at the entire intellectual property management scenario when it comes to the intellectual property rights in plant varieties. So, plant variety protection is one aspect of this entire part of the management. We come now to the conclusion, plant variety protection regime recognizes the efforts of commercial breeders and farmers who have been involved in the area of agriculture and have been systematically improving plant varieties through time.

Countries who are the member to the TRIPS agreement have look have two options of recognizing them as patent or recognizing them under a separate legislation for protection of plant varieties. The criteria for registration of a plant varieties is different when it comes to other intellectual property forms. So, understanding what are the eligible conditions, eligibility is a requirement and the distinct criteria their novelty, distinctness, uniformity, stability. Denomination is an important characteristic when it comes to plant varieties and there are several criteria for that also. Exceptions to plant breeder rights is a very important

aspect of the law, because this provides the important opportunity for researchers to continue to access germplasm.

And importantly, farmer rights are recognized as an exception to the, because farmers have also been involved in not only variety development, but traditionally use them for their livelihood and hence this exception is also important for farmers. These are the few references for the lecture. Thank you.