Agricultural Values of Plant Genetic Resources.


The book is another effort to evaluate valuation of plant genetic resources in economic terms. As Hartwig de Haen of FAO expresses it in the foreword, the determining of the value, private and public, of genetic resources “is by no means a trivial task.” I would like to go a step further and say that it, at least at the moment, is a nearly impossible task. The question is also, is it a worthwhile task? Among the things that seems outside the commodity range, on which you can put a price tag, two take, in the opinion of the author of this review, an outstanding place: human health and plant genetic resources. This opinion squarely put me in the ‘existence’ group. However, as an old plant breeder I hold many opinions that should put me as squarely in the ‘utilitarian’ group, which, if nothing else, shows the limitations of any grouping.

Anyway, the contributors to this book, mainly north Americans, which puts its particular colour on the book, have a serious go at it, which makes the book very good reading for anyone interested in these matters. The book was actually derived from a symposium, ‘The Symposium on the Economics of Valuation and Conservation of Genetic Resources for Agriculture’, in May 1996. The reason was the difficulty for policymakers to decide where to put the money. Transferring the value of genetic resources to money would undoubtedly make it easier, at least if you are not deeply involved in the biological issues. The first chapter, Introduction and Overview, stresses the fact that estimating an economic value on PGR is a fairly recent, and therefore presently much uncertain, field of research. Following this statement is another, that is still open to discussion, namely the issue of property rights in PGR which is said to be important because they “endow PGR with value”. That may be correct but there is much more to be said about this issue, and that is said, actually, in Part IV of the book, which is about property rights.

The difference between the ‘existence’ group, arguing that PGR are priceless in an economic sense and that they have a value of their own just by existing, and the ‘utilitarian’ group, arguing that they have a value only in so far as they are useful to humanity, is not a trivial one, nor is it sharply delimited. On the other hand, all economists, maybe because they have to, work out from the utilitarian value of PGR. Thus, the main difference between economists and biologists is not really about the need to conserve but rather how much we need to conserve.

The fact is that humanity to-day relies on very few species to feed it, cloth it, etc. The book cites 150 species of plants out of 250 000. One may discuss the actual numbers, but not the fact that humanity uses very, very few species. This constitute one real difference between the ‘existence’ group, which mainly is concerned with inter-specific variation, i.e. very often natural preservationists, and ‘utilitarians’, very often economists and breeders, seed-companies, etc.

The Introduction & Overview chapter, by the editors of the book, R.E. Evenson, D. Gollin and V. Santaniello, gives a short presentation of the different parts of the book and offers also a broad presentation of different methods for measuring the value of PGR, such as the Willingness to pay-measure, the Willingness to pay for on-farm diversity, the Contingent valuation measures, Hedonic pricing, Option values and Production losses averted.

Part I is named ‘Modelling the role of genetic resources in plant breeding’, which provides rich stuff for thoughts for an old plant breeder. In Chapter 1, Evenson offers a highly scientific and mathematical view of gain versus input, where a variety is called an ‘induced innovation’. It relies, however, quite a bit on research, which is a scarce commodity in many of the third world countries. This can be turned around, however, to make an argument for the need for more research in these countries, which puts the problem squarely in the field of education.

Cooper continues in Chapter 2 by presenting a model to make it possible to assess the economics of public investment in agro-biodiversity conservation. He is, however, careful to point out that the policy underlying this model is strictly led by facts. Policies are, however, generally made up by governments which sometimes have other lead stars, and that makes the model less predictable. Anyway, the model predicts that the number of in situ accessions falls to the same level either public funding is available or not, but that public funding at least slows down the genetic
erosion by allowing more accessions into the \textit{ex situ} programmes before disappearance.

In Chapter 3 Simson and Sedjo try to find the value of genetic resources for use in agricultural improvement, i.e. plant breeding. After going through a number of mathematical models, making a number of statements rather strange to an old plant breeder, they end the chapter with a conclusion, not very surprising: The economic value, taken to be the monetary value, for society of conserving the current range of PGR is negligible. The fact is that so many parameters are important to a variety’s acceptance – or non-acceptance – that it seems futile to make models to catch them.

In the next chapter, 4, Swanson investigates the role of the public and the private sector in PGR conservation. It does so using mainly disease resistance as a base. The chapter is extremely informative, and comes to the conclusion that the private sector is forced, by demand on profit, among other things, to take a more short-term view on the value of PGR. 5 to 10 years is mentioned, than the public sector, which should have a wider time view due to many more parameters influencing its decision. It can, in fact, be taken as an indication that the private sector is not to be relied on in the field of PGR conservation. There is also an indication that for the particular field which the author discusses more in depth, disease resistance, \textit{in situ}, or on-farm conservation, may be more efficient than \textit{ex situ} conservation. The question for the future is, as I see it, if we can construct a system that unites the best parts of both.

Part II, then, is named ‘Empirical studies: Plant breeding and field diversity’. It starts with Smale treating ‘Indicators of varietal diversity in bread wheat grown in developing countries’ in Chapter 5. He concludes that the percentage of area planted to leading cultivars in major bread wheat producing zones of the developing world and industrialised world is high. It is, however, lower to-day than it was in the beginning of this century when the first results of plant breeding came on the market. It is also lower than it was during the high times of the ‘green revolution’. Interesting, but not new, is the conclusion that farmers choice of variety is based on socio-economic factors that have very little to do with diversity, factors that are too little studied.

In the next chapter, 6, Brush and Meng investigate the value of wheat genetic resources to farmers in Turkey. They come with the interesting, but far from new, argument for \textit{in situ} conservation that it, in difference to \textit{ex situ}, conserves also the evolutionary processes that yields new germplasm in the future and also that \textit{in situ} conserves the diversity in the agricultural systems. Thus they concentrate on what they call ‘the private value’, i.e. the value of PGR to the individual farmer. The conservation of \textit{in situ} type, therefore, in the future demands the upholding of an ancient form of agriculture – or not?!

In Part III, empirical studies of values of PGR to breeding, starting out with Chapter 7 on maize breeding by Salhuana and Smith, stresses the need for co-operation and openness to utilise fully genetic resources. Though it is based on maize, a crop with many peculiarities, the needs for close regeneration control and more funds and facilities to genebanks are valid for all crops. And, foremost, the long-term undertaking for making germplasm useful makes it necessary with public funding, because private industry will not take the risk involved in such long-term commitments. It also stresses the need, in that field, for co-operation in pre-breeding and a lot more effort in this field.

In the next chapter, 8, Bagnara and Santaniello investigate the ‘Role of international germplasm collections in Italian durum wheat breeding programmes’. They find that the progress of durum wheat breeding was mainly due to introduction of a better lodging resistance to the crop. This was found from diverse sources, germplasm collections and landraces being one and short straw from the CIMMYT collection the other. The higher lodging resistance was the main factor in making it possible for durum wheat to use, in Italy, the progress made in agricultural technologies.

In Chapter 9, ‘An application of hedonic pricing methods to value rice genetic resources in India’, by D. Gollin and R.E. Evenson, perhaps comes with an argument against core collections. The say that specifically wanted traits normally is quite rare and mostly found on the fringe of collections, indicating that conservation of such material has value. My own reflection is that the preservation of such material in core collections is then very important. They further come to the interesting conclusion that since most of the yield increase in Indian rice production comes from ‘fringe’ material, the price for increasing the Indian collection of rice is lower than the production increase, i.e., it will probably pay to increase the collection.

The next four chapters use rice as the material for study. Rao and Evenson, in Chapter 10, then look at ‘VARIETAL TRAIT VALUES FOR RICE IN INDIA’. One conclusion they reach is that resistances to diseases and insect pests have contributed to the increased yield, on the