Foreword

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The first perspective

In international discussions, much less attention has been paid to agricultural biodiversity than to (non-agricultural) biodiversity. Yet, by domesticating and maintaining a variety of species, and by maintaining genetic diversity within each species, farmers and herders make a major contribution to the sustainability of our food systems. They contribute to the future resilience of food production in the face of climatic shocks and attacks from nature, which are by definition unpredictable and which require that we encourage diversity in farming systems (Swanson 1997: 52; Esquinas-Alcázar, 2005). They maintain the kind of diversity of crops or livestock that will allow us to support, in each specific agro-ecological environment, the reliance on the variety that will be best suited to that environment. And of course, they provide important nutritional benefits: while Green Revolution approaches in the past have primarily focused on increasing calorie availability by boosting cereal crops – particularly rice, wheat and maize – we have now come to realize that the shift from diversified cropping systems to simplified, cereal based systems has contributed to micronutrient malnutrition in many developing countries (Demment et al., 2003): of the over 80,000 plant species available to humans, only three (maize, wheat, rice) supply the bulk of our protein and energy needs (Frison et al., 2006), and nutritionists now increasingly insist on the need for more diverse agro-ecosystems, in order to ensure a more diversified nutrient output of the farming systems (Alloway, 2008; Burchi et al., 2011; DeClerck et al., 2011).

This message is not easy to get across. It runs against the tide. 'Green Revolution' approaches, in which farmers are supported by being given access to the main inputs (improved varieties of seeds, fertilizers and pesticides), are still dominant. This is understandable, since one of the reasons why small-scale farmers are poor and cannot move beyond subsistence farming is because of the high prices of inputs and the lack of access to credit. And input-intensive agriculture is still considered by many as the only realistic pathway towards its modernization, which we often equate to its industrialization.

But this form of support, it is increasingly recognized, can create its own problems. Commercial seed varieties may be less suited to the specific agro-

ecological environments in which farmers work, and for which landraces (traditional farmers' varieties) may be more appropriate. Even where hybrid seed varieties (developed by professional plant breeders, in particular commercial seed companies) improve yields in the short term, their higher performance often has been a response to inputs (fertilizers) and to water availability, making it difficult for farmers unable to access such inputs and conditions to reap their benefits. Those who acquire inputs with their own means, often encouraged to do so during an initial period of subsidized inputs, may find themselves trapped in the vicious circle of debt as a result of a bad harvest and consequent impossibility to reimburse input loans. This may occur particularly when they have switched to mono-cropping, leading to revenues which may be higher in certain seasons but less stable across the years, and diminish resilience in the face of climate change: indeed, there exists a correlation between the switch to specialized and uniform varieties on the one hand and increased variability in productivity on the other (Duvick, 1989; Hazell, 1984, 1985).

The broader concern however, is that the expansion of agricultural areas cultivated with commercial seeds accelerates crop diversity erosion, as an increasing number of farmers grow the same crops, using the same, 'improved' varieties on their fields. It is this consequence that the authors of this book focus on, emphasizing in particular the links between the reduction of agricultural biodiversity linked to the spread of genetically uniform crops and the reduction in the range of species cultivated, on the one hand, and poorer nutrition for the rural communities concerned, on the other.

In order to redirect this trajectory, a number of measures should be taken. First, farming and herding practices that maintain and enhance diversity of species and genetic variability within species are more knowledge-intensive than practices that are based on uniformity and homogenization. Support for such practices therefore requires the development of both ecological literacy and decision-making skills in farmers' communities. Investments in agricultural extension and agricultural research are key in this regard. While agricultural spending is among the three top contributors to increasing rural welfare, along with public spending in education, health and roads, agricultural research in particular has the greatest overall impact on poverty and agricultural productivity in developing countries: it was found that it had 'the largest impact on agricultural production and second-largest impact on poverty reduction (after rural education) in China, and the second-largest impact on poverty reduction in rural India (after investment in roads)' (Fan, 2008). Research in agro-ecological practices in particular should be prioritized, because of the considerable, and largely untapped, potential of such practices. The role of the public sector here is particularly vital, since sound agricultural and herding practices that maintain and enhance agricultural biodiversity are generally not supported by the private sector, as the improvements in such practices are not rewarded by patents of plant breeders' rights (Vanloqueren and Baret, 2009).

Second, the social organization of farmers is also vital. Almost by definition, because of the localized nature of the knowledge that is to be mobilized, practices

that support agricultural biodiversity and can help maintain and enhance it cannot be imposed top-down: they should be shared, rather, from farmer to farmer, in farmer field schools or through farmers' movements, as in the Campesino-a-Campesino movement in Central America and Cuba (Degrande et al., 2006: 6; Rosset et al., 2011). An improved dissemination of knowledge by horizontal means transforms the nature of knowledge itself, which becomes the product of a network (Warner and Kirschenmann, 2007). It should encourage farmers, particularly small-scale farmers living in the most remote areas and those on the most marginal soil, to identify innovative solutions, working with experts towards a co-construction of knowledge that ensures that advances will benefit them as a matter of priority – rather than only benefiting the better-off producers (Uphoff, 2002: 55).

Thirdly, farmers' seed systems must be supported (De Schutter, 2011; Santilli, 2012). In South Asia and sub-Saharan Africa, the overwhelming majority of farmers still rely on traditional farmers' seed systems in order to grow their crops. Reliance by farmers on farmers' seed systems, by the exchange and use of local 'landraces', allows them to limit the cost of production, and to preserve a certain degree of independence from the commercial seed sector. The system of unfettered exchange in farmers' seed systems ensures the free flow of genetic materials, thus contributing to the development of locally appropriate seeds and to the diversity of crops. In addition, these varieties are best suited to the difficult environments in which they grow. They result in reasonably good yields without having to be combined with other inputs such as chemical fertilizers. As already mentioned, because they are genetically diverse, such local varieties may be more resilient to weather-related events or to attacks by pests or diseases.

Allowing such farmers' seed systems to develop is not only in the interest of the poorest farmers. It is also in the long-term interest of professional plant breeders and seed companies themselves, who depend on the development of these plant resources for their own innovations. In order to achieve this, we must combine the discussion on intellectual property rights on seeds and the debate on access to genetic resources under the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture. By rewarding farmers for their contribution to the enhancement of agricultural biodiversity seen as a global public good, we also promote innovations through farmers' seed systems. The protection of farmers' rights, as stipulated under Article 9 of the International Treaty, and the gradual strengthening of the Benefit-Sharing Fund under the same instrument, have a key role to play in this transformation. And at local level, support for seed banks and seed fairs, and the adaptation of seed regulations in order to allow for an improved distribution of farmers' varieties, can also make an important contribution.

The implementation of such measures requires a serious commitment from states. This is why this book is important and deserves a wide readership. Only once governments are convinced of the importance of agricultural biodiversity, shall they implement the policies as outlined above, which are urgently required to move away from the direction of agricultural development that is dominant

today – one that favors uniformity over diversity, top-down research and development on new crops rather than bottom-up and participatory approaches to plant breeding, and mono-cropping over integrated farming systems.

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