TK in agriculture

Interplay between biological variation and selection make crop and natural evolution similar to one another, but the two differ by virtue of the role of ―conscious‖ selection by humans in crop evolution. Conscious selection implies knowledge systems about the crop and its environment, which are subsets of the more general traditional knowledge and indigenous knowledge (e.g., Ellen et al. 2000). While
―traditional knowledge‖ and ―indigenous knowledge‖ are not synonymous, they share many attributes, such as being unwritten, customary, pragmatic, experiential, and holistic. The terms are frequently used in the same context to distinguish the knowledge of traditional and indigenous communities from other types of knowledge, such as the knowledge of scientific and industrial communities (Ellen et al. 2000). Indeed, the primary distinction between traditional and indigenous knowledge pertains to the holders rather than the knowledge per se. Traditional knowledge is a broader category that includes indigenous knowledge as a

type of traditional knowledge held by indigenous communities (Mugabe 1999). While traditional knowledge has emerged in international discourse on new legal mechanisms (Wendland 2002), indigenous knowledge is a term long in use by anthropologists and other investigators of non-industrialized societies (Ellen et al. 2000), and because of this history, indigenous knowledge enjoys a more elaborated discussion and definition than the more inclusive term. While Kongolo (2001, 357) observes that ―(t) traditional knowledge is rarely defined within the national, regional, and international frameworks,‖ indigenous knowledge has been extensively analyzed by ethnobotanists and others (e.g., Berlin 1992), so it behooves us to utilize the analysis of indigenous knowledge to grapple with traditional knowledge.

Traditional knowledge is associated with folk nomenclatures and taxonomies of plants (Berlin 1992) and the environment (Ellen et al. 2000) and in practical domains such as 11 disease etiology (Berlin and Berlin 1996), and agricultural practices (Brush 1992). Distinguishing between indigenous knowledge and other knowledge systems has proven to be problematic (Agrawal 1995), but anthropologists and others have argued that a number of criteria

can be used to differentiate the two forms. Indigenous knowledge's characteristics include (1) localness, (2) oral transmission, (3) origin in practical experience, (4) emphasis on the empirical rather than theoretical, (5) repetitiveness, (6) changeability, (7) being widely shared, (8) fragmentary distribution, (9) orientation to practical performance, and (10) holism (Ellen and Harris 2000).

These same characteristics apply to traditional knowledge

The primary development of crops and cropping systems occurred with traditional knowledge before the relatively recent discoveries of agricultural chemistry and crop biology, and most of the world's farmers still rely on traditional knowledge. The current hyperbolic growth of agricultural production may rely on formal science, but it is built on foundations developed by traditional farmers. While the accomplishments of traditional knowledge are unquestioned, its characteristics pose severe obstacles for its valuation and protection by indigenous people and outside interests such as conservationists, indigenous rights activists, and rural development agencies. Indeed, outside efforts to value, promote, and protect traditional knowledge appear inevitably to distort it and its social context (Dove 1996).

A severe obstacle to valuation and protection is the disarticulation of different types of knowledge when that information is local, orally transmitted, practical, and fragmentary in distribution. Agricultural knowledge is comprised of numerous substantive domains - soil types, pests, pathogens, environmental conditions such as rainfall and temperature patterns, and crop genotypes – as well as management domains – irrigation techniques, soil amendments, planting patterns, pest control, weed control, and, crop selection to name a few. Brookfield (2001) adds organization as a third domain that includes tenure arrangements, resource allocation, and dependency on alternative production spheres. These domains are demarcated by distinct lexicons and nomenclatures such as crop variety names or terminology for management practices. Traditional knowledge is rife with ―covert categories‖ (Berlin 1992) and unlabeled, intermediate domains (Brush 1992) that may link substantive and management domains but require intensive research to understand. The fact that traditional knowledge is orally

transmitted and changeable creates problems in identifying truly local and autochthonous knowledge (Dove 2000).

The fact that traditional knowledge is local, empirical, and holistic suggests that indigenous people don‘t have to worry about consistency over wider areas, as plant collectors and geneticists 12 must. Since variety names are orally transmitted, repetitive, widely shared, and fragmentary, name lists cannot be used directly to estimate genetic diversity or population structure above the farm level (Quiros et al. 1990). Capturing the knowledge in a single domain by collecting its nomenclature, such as crop variety names, is relatively easy but of limited use. Linking nomenclatures of substantive domains to one another and to management domains is complicated by the inherent qualities of localness, oral transmission, and fragmented distribution. The best studies showing linkage between different domains (e.g., crop diversity and local ecological conditions) are executed in single communities or micro-regions (e.g., Bellon and Taylor 1993). Linking multiple domains, such as crop type, soils, and plant diseases, or showing how domains are linked across regions is daunting and generally not attempted in research on traditional agricultural systems.

Awareness of indigenous/local knowledge (IK/ LK) has been steadily gaining ground in the academic world, both within the social as well as in the natural sciences. ―A growing number of scientists and policy makers are aware of the contribution indigenous knowledge (IK) can make to a more sustainable development‖ (Viergever 1999: 341). IK also seems to be relevant to the scientific world for a number of reasons including issues of protection of biodiversity (Iwanaga 1998), the effects of Intellectual Property Rights (IPR) over the rural communities (RAFI 2000, RAFI/ UNDP 1995), and the fact that IK could be used as the starting point in the construction of a truly alternative agriculture (Flora 1992, Kloppenburg 1991). Due to these reasons, research and development institutions (R&D) started to include in their agendas not only the term, but also all its implications.

Some centers have become involved in looking at IK as a key component of sustainable agricultural practices; others have been in

charge of researching and cataloguing existing IK. The Center for Indigenous Knowledge for Agriculture and Rural Development (CIKARD), established in 1987 at Iowa State University, is an example of the latter. CIKARD ―focuses its activities on documenting and preserving the indigenous knowledge of farmers and other rural people around the globe‖ (Warren and McKiernan 1995:426). Inside of the Consultative Group on International Agricultural Research Centers (CGIAR), the incorporation of local/indigenous knowledge in the generation of technology started when some technologists from the International Potato Center (CIP) in Peru, worked with local farmers to develop storage technologies for potato seed (Fujisaka 1995). IUCN (The World Conservation Union)
―concludes that indigenous people who live in intimate contact with their major resources could provide much of the intellectual raw material for a shift to sustainable societies‖ (McNeely 1995:448). This ―raw material‖ cited by McNeely is nothing different than indigenous knowledge, 13 the knowledge resulting from the co evolution -‖intimate contact‖ in the author‘s words between human beings and their resources.

Some authors remark that it is important to pay attention to the fact that: ―Actually existing science is bound to capitalism ideologically, epistemologically and financially‖ (Kloppenburg 1992:104). This
―science‖ bound to capitalism in different forms could threaten the survival of the local/indigenous knowledge. In this paper, i will use the definition of indigenous knowledge as the knowledge that is inside of the agricultural workers and that is related to a given locality (Kloppenburg 1991, Maurial 1999, Warren and McKiernan 1999). As Viergever (1999:333) states ―some of the knowledge held by indigenous peoples may lead to commercial applications.‖ Many authors argue that indigenous/local knowledge is the starting point in the ―construction‖ of an alternative agricultural science. ―Material resources for the reconstruction of a ―successor science‖ are to be found in the ―local knowledge‖ that is continually produced and reproduced by farmers and agricultural workers‖ (Kloppenburg 1991:519). Kloppenburg (1991) also argues that there must be a ―deconstructive‖ process in the ―reconstruction‖

of an alternative science applied to the agricultural process. A truly alternative agriculture ―would move farmers into knowledge creators‖ (Flora 1992:95). In order to achieve a ―truly just and sustainable agriculture‖, it is necessary to recognize that knowledge has multiple sources (Flora 1992, Kloppenburg 1992). Prakash (1999) proposes the ―deconstruction‖ of modern knowledge system or ―modern Science‖ and the inclusion not only of the well-known ―science for the people‖ term, but ―science by the people‖ which includes the traditional or indigenous systems of knowledge. Mwadime (1999) devotes attention to terms such as ―reconstruction‖ and ―deconstruction‖ of knowledge. He argues that the only way to curb the crisis in food production in Africa is through the deconstruction of the current ―education systems‖ and the reconstruction including local knowledge systems and farmers in the whole knowledge generation system. In Latin America, biodiversity fairs are evidence that IK not only maintain an important level of biodiversity but assure food security and sustainability of farmers‘ agriculture (Scurrah et al., 1999).