Global Chapter 3 Figures

Figure 3.1 Global trends between 1961 and 1999: (a) per capita cereal and meat production [kg], (b) total use of nitrogen and phosphorus fertilizer [million tonnes, excluding former USSR], (c) area of irrigated land [billions of hectares], and (d) pesticide production [million tonnes]. Source: Tilman et al., 2002.

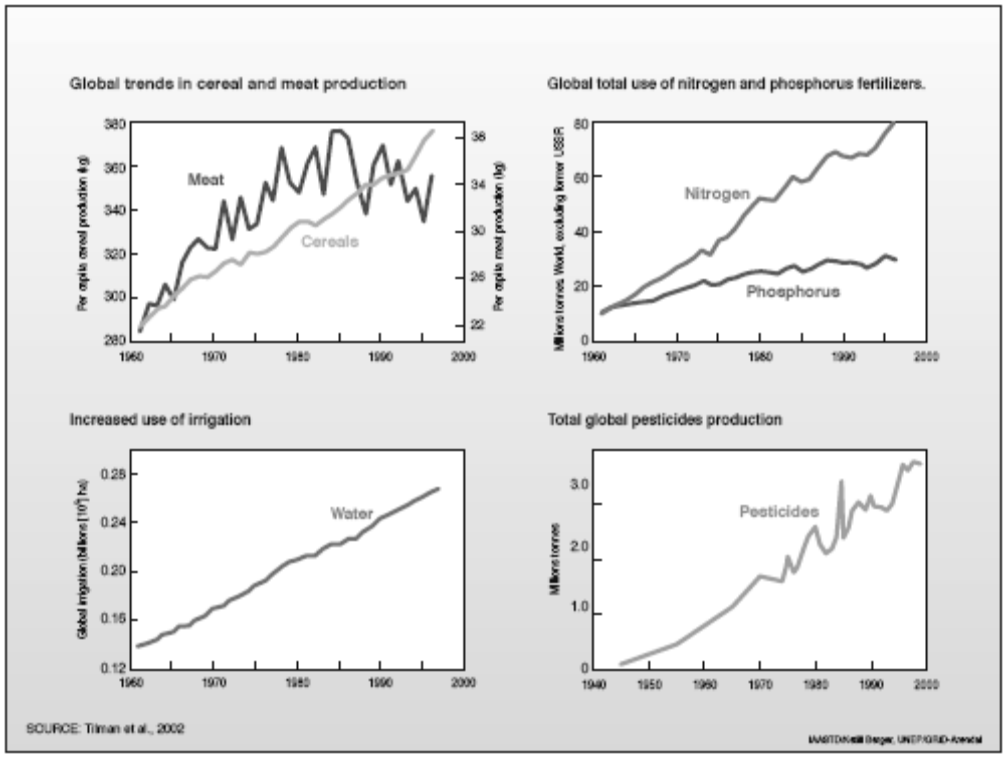


Figure 3.2 Root and tuber (a), vegetable (b), pulse (c), and cereal (d) yield (tonnes ha^{-1}) trends from 1961 to 2004. Source: FAOSTAT, 2007.

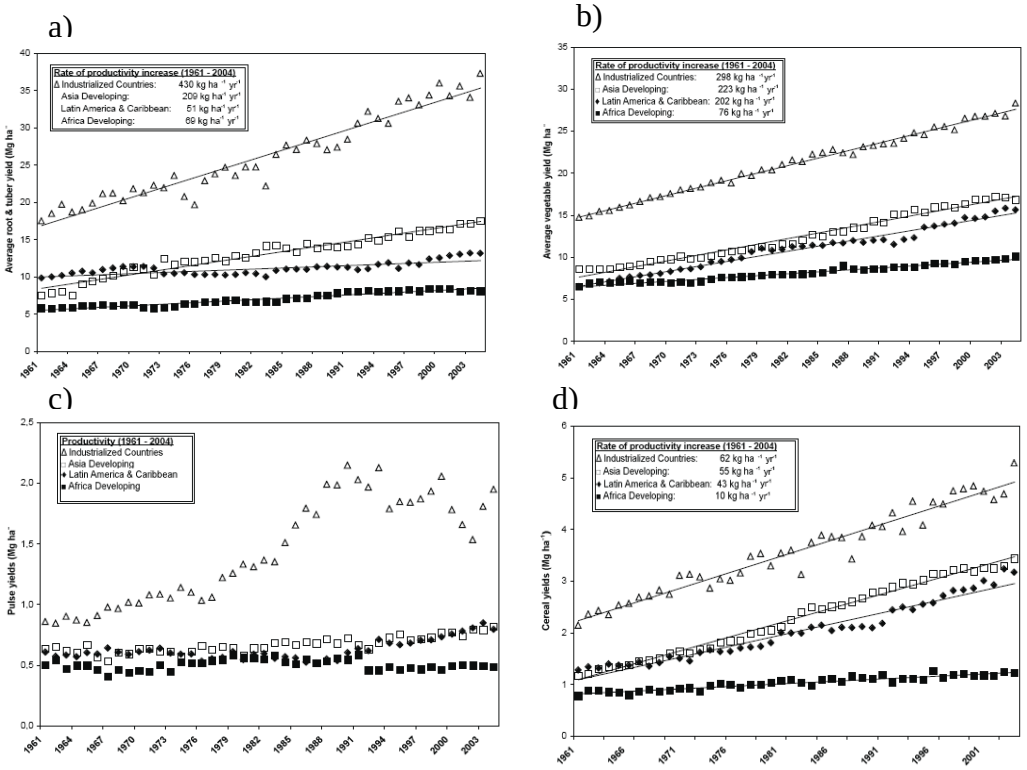


Figure 3.3 Extent and severity of land degradation worldwide.

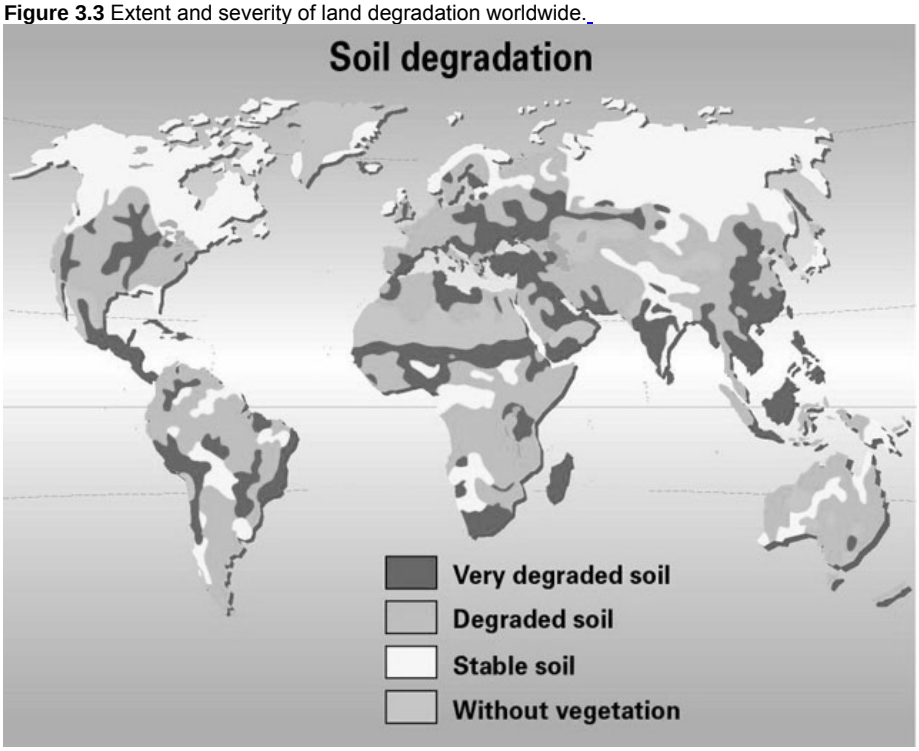


Figure 3.4 Agricultural water withdrawal as percent of total water withdrawal for agricultural, domestic and industrial purposes worldwide. Source: FAO AQUASTAT, 2007.

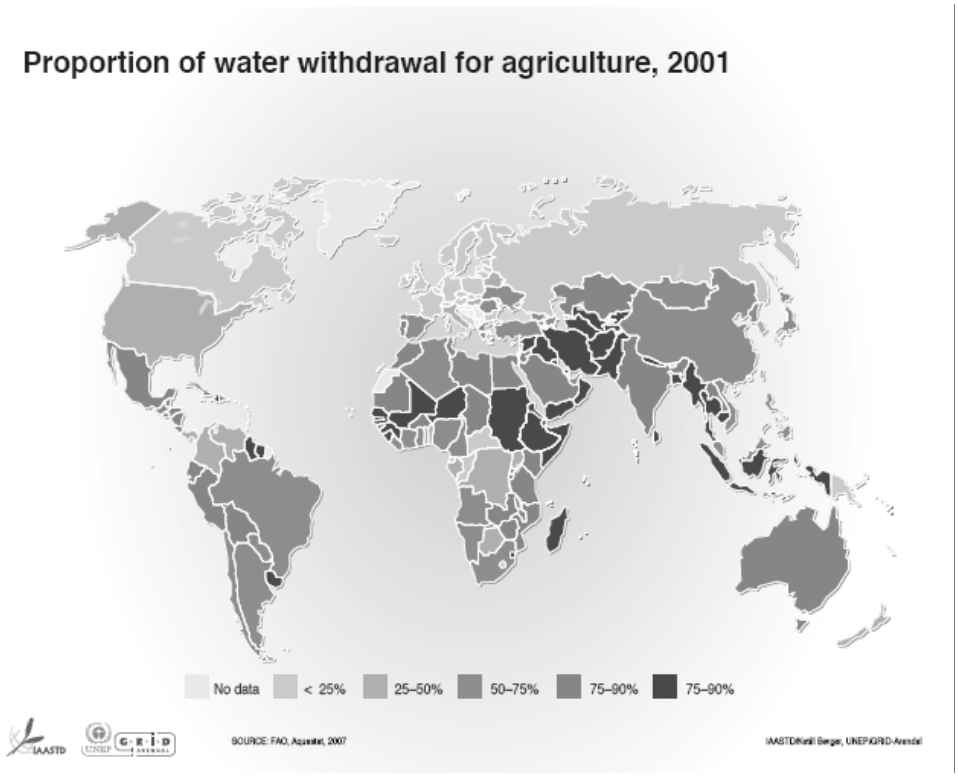
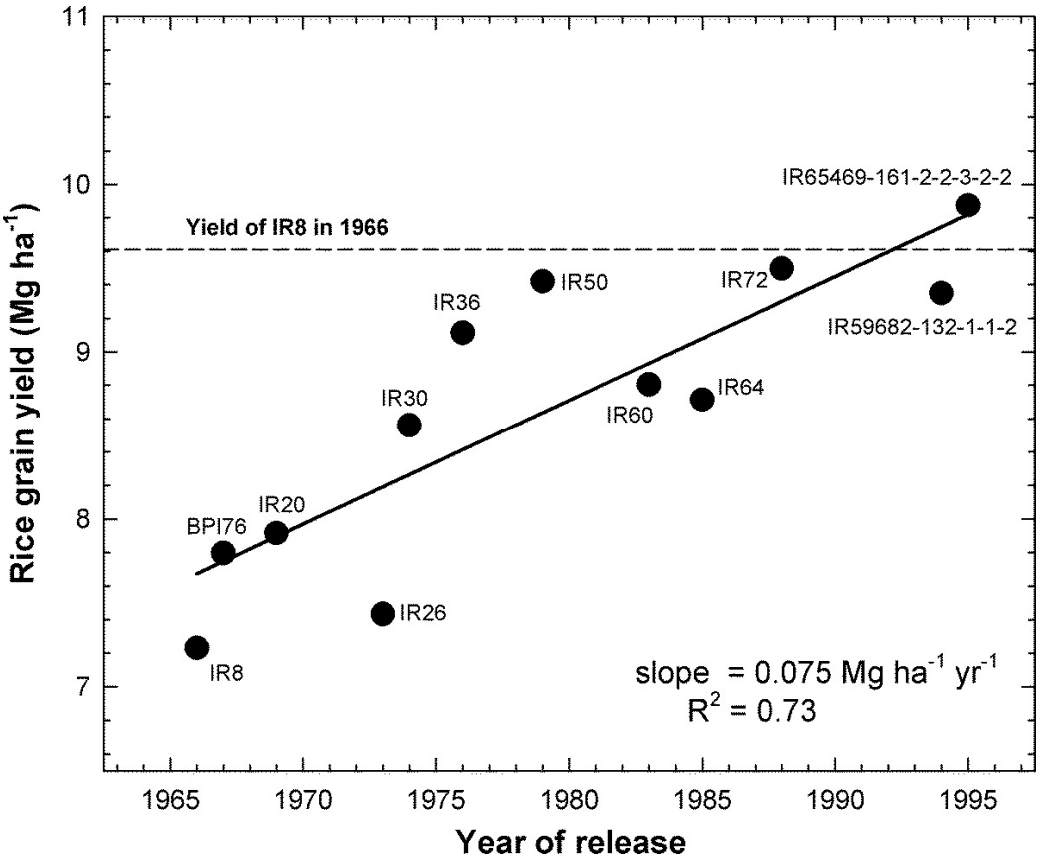


Figure 3.5 Present-day yield potential of rice MVs as a function of year of release. Source: Cassman et al., 2003.



Dashed line indicates the yield potential of IR8 when it was released in 1966. Graphic illustrates the importance of "maintenance breeding" and of stagnating yield potential.

Figure 3.6 The effects of agroecosystem management and associated cultural practices on the biodiversity of natural enemies and the abundance of insect pests (after: Altieri and Nicholls, 1999).

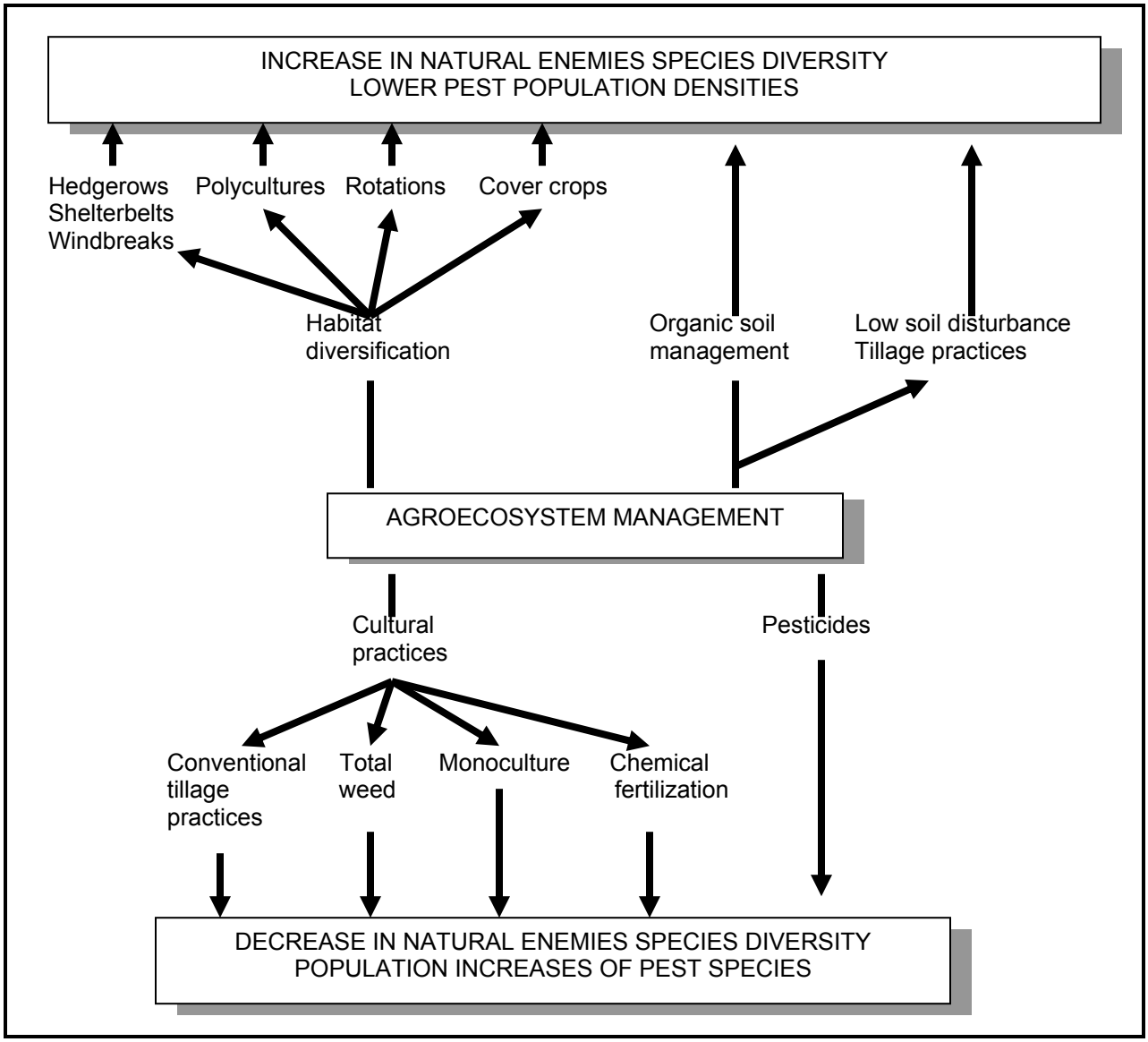
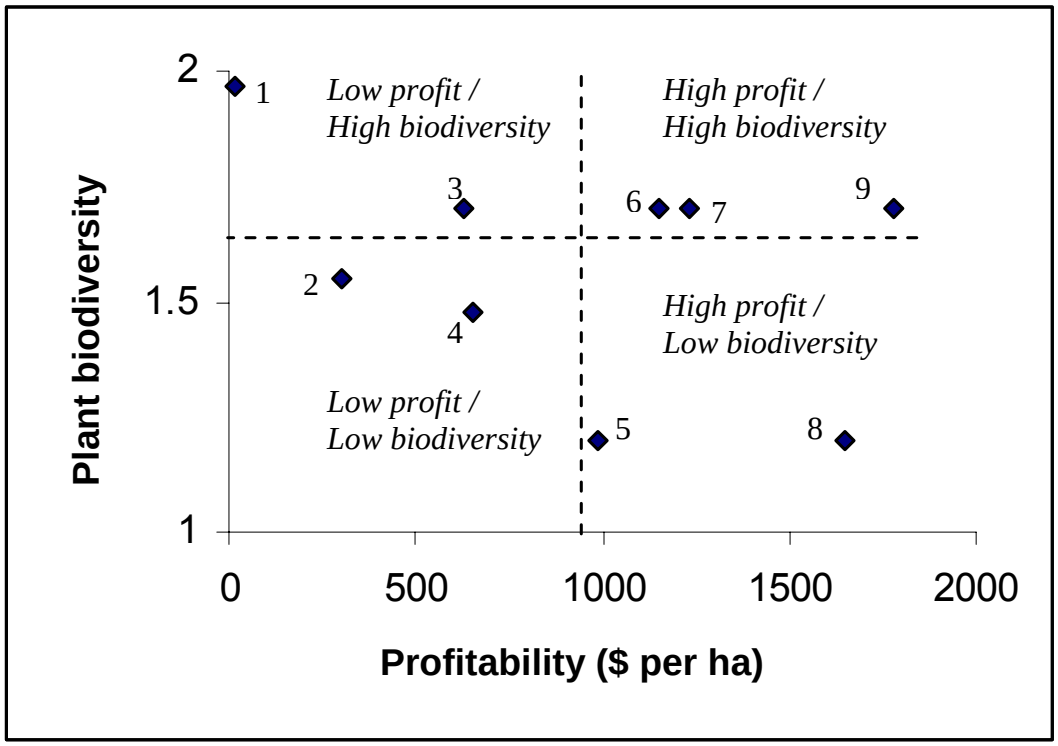


Figure 3.7 The relationships between landuse systems in the humid zone of Cameroon in terms of profitability and plant species diversity. Source: Izac and Sanchez, 2001.



(1= Community forest; 2 = Long fallow farming; 3 = Extensive cocoa farm; 4 = Short fallow farming; 5 = Short fallow oil palm; 6 = Extensive cocoa with fruits; 7 = Intensive cocoa; 8 = Forest oil palm; 9 = Intensive cocoa with fruits)

Figure 3.8 Frequency distribution of impact scores from this Assessment

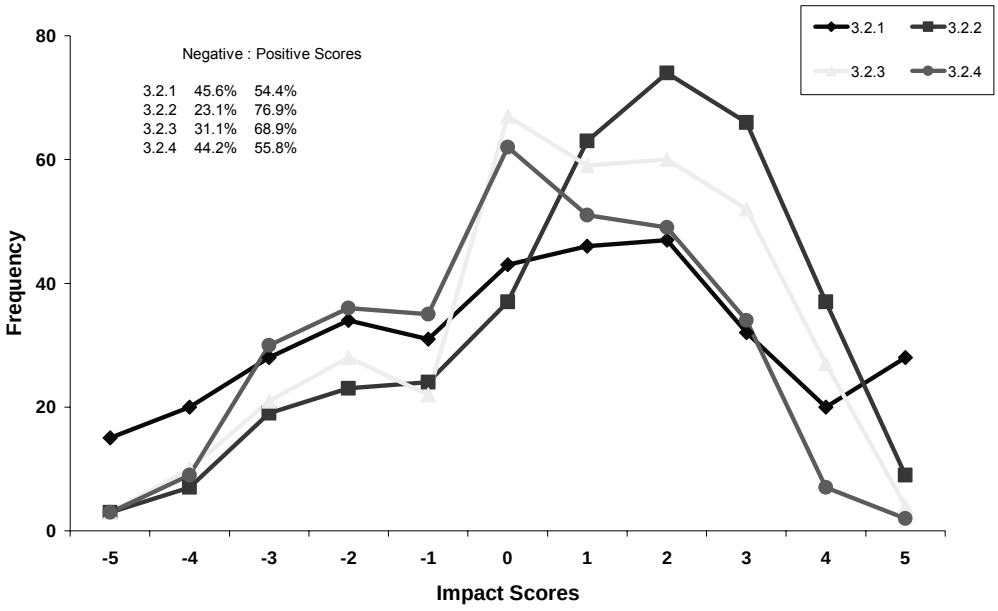


Table 3.1 Criteria used in the analysis of data

GOALS	CERTAINTY	RANGE of impacts	SCALE	SPECIFICITY
Enhancement of: N = Nutrition (reduced hunger) H = Human health L = Rural livelihoods E = Environmental sustainability S = Social sustainability D = Sustainable economic development	A = Well established B = Established C = Competing explanations D = Expected, but to be confirmed E = Long-term impacts not yet available F = Speculative	- ve 5 to + ve 5	G = Global R = Regional N = National M-L = Multi-locational L = Local E = Experimental / pilots	Examples:- • Wide applicability, • Applicable in dry areas, • Occurs throughout tropics, • Especially in Africa, • Mainly in subsistence agriculture, • Negative in poor and positive in rich countries.

Table 3.2 Techniques being used to elucidate the genetic structure of populations for conservation or utilization within crop/livestock breeding programmes

1. Haploid/conservative single gene markers - Polymerase Chain Reaction - Restriction fragment length polymorphism (PCR-RFLP) - Single Strand Conformation Polymorphism (SSCP) - PCR sequencing
2. Codominant single locus markers - Allozymes/isozymes - Microsatellites or simple sequence repeats (SSRs) - Single nucleotide polymorphism (SNP)
3. Dominant multilocus markers - Random amplified polymorphic DNA (RAPD) - Inter/anchored SSRs (iSSRs) - Amplified fragment length polymorphism (AFLP)

Table 3.3 Examples of land areas under agroforestry

Country	Area (hectares)	Specific information	Reference
Indonesia	2.8 million	Jungle Rubber agroforests‡	Wibawa et al., 2006
Indonesia	3.5 million	All multistrata agroforests†	van Noordwijk (pers. com.)[1]
India	7.4 million	National estimate	Zomer et al, in press
Niger	5 to 6 million	Recently planted	Gray Tappan (pers. com.)[2]
Mali	5.1 million	90% of agricultural land	Cissé, M.I. 1995; Boffa, 1999.
C. America*	9.2 million	Silvopastural systems	Beer et al., 2000
C. America*	0.77 million	Coffee agroforests	Beer et al., 2000
Spain/Portugal	6 million	Dehasa agroforestry	Gaspar et al., 2007
Worldwide	7.8 million♠	Cocoa agroforests	van Grinsven[3] (pers. com.)

‡ = 80% of Indonesian rubber = approximately 24% of world production

† = Including jungle rubber (above), durian, benzoin, cinnamon, dammar, and others.

* = Costa Rica, Nicaragua, Honduras, El Salvador and Guatemala.

♠ = 5.9 million ha in West and Central Africa, 1.2 million ha in Asia and 0.7 million ha in South and Central America

[1] = Meine van Noordwijk, World Agroforestry Centre, Bogor, Indonesia.

[2] = Gray Tappan, Science Applications International Corp. (SAIC), USGS Center for Earth Resources Observation and Science, Sioux Falls, SD 57198, USA.

[3] = Peter van Grinsven, Masterfoods BV, Veghel, The Netherlands.

Table 3.4 Conservation Strategies and Techniques.

Methods of Conservation		
Strategies	**Techniques**	**Definition**
***Ex situ* conservation**	Seed Storage	Dried seed samples in a gene bank kept at sub-zero temperatures
	In Vitro Storage	Explants (tissue samples) in a sterile, or cryopreserved/frozen state
	Field Gene Bank	Large numbers of living material accessions transfered and planted at a second site.
	Botanic Garden / Arboretum	Small numbers of living material accessions in a garden or arboretum.
	DNA / Pollen Storage	DNA or pollen stored in appropriate, usually refrigerated, conditions.
***In situ* conservation**	Genetic Reserve	The management of genetic diversity in designated natural wild populations.
	On-farm	Sustainably managed genetic diversity of traditional crop varieties and associated species within agricultural, horticultural or other cultivation systems.
	Home garden conservation	Sustainably managed genetic diversity of traditional crop varieties within a household's back-yard.

Table 3.5 Globalization and Localization activities

GLOBALIZATION	LOCALIZATION
Tropical plantations for export markets International commodity research by CGIAR Green Revolution Agribusiness for fertilizers/pesticides and seeds Multinational companies for commodity trade WTO trade agreements Biopiracy Biotechnology	Traditional subsistence agriculture National research by NARS National extension services NGOs and CBOs Farmer training schools Participatory Rural Appraisal Participatory domestication and breeding Fair trade Water-user associations Promotion of indigenous species/germplasm Equity and gender initiatives Recognition of farmer/community IPR Agroforestry for soil fertility management