

## TABLES

**Table 3.1. Criteria used in the analysis of data**

GOALS	CERTAINTY	RANGE of impacts	SCALE	SPECIFICITY
Enhancement of: 1 = Nutrition (reduced hunger) 2 = Human health 3 = Rural livelihoods 4 = Environmental sustainability 5 = Social sustainability 6 = 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:- <ul style="list-style-type: none"> <li>• Wide applicability,</li> <li>• Applicable in dry areas,</li> <li>• Occurs throughout tropics,</li> <li>• Especially in Africa,</li> <li>• Mainly in subsistence agriculture,</li> <li>• Negative in poor and positive in rich countries.</li> </ul>

**Table 3.2 Total maize area, number of varieties releases by public (1966-98) and private (1990s) sectors and seed sales in 1996/97 by region. Source: Morris (2002)**

	Latin America	East, South & SE Asia	Eastern & Southern Africa
Total area maize (m ha)	26.1	42.9	21.4
Public sector maize releases (no.)	708	366	98
Private sector maize releases (no.)	498	330	25
Seed sales (t) 1996/97			
– public sector	9,200	96,100	19,700
- private sector	295,100	71,000	71,800

1 **Table 3.3 Main food processing innovations (AKST) currently used in developing countries and their positive**  
2 **impact on micronutrient, protein, lipid and carbohydrate availability; on food safety; on competitiveness of**  
3 **tropical products.**

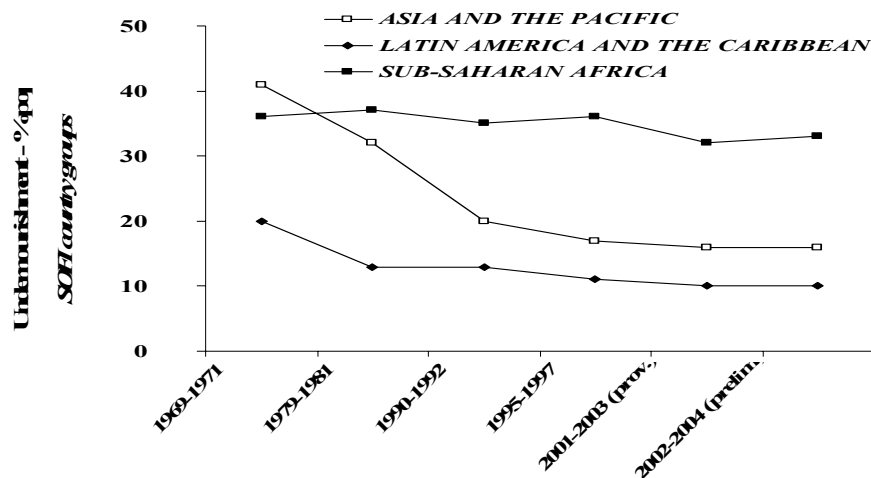
Products/technologies/sectors	Operating scale	Positive impacts on :
<b>Fruits and vegetables</b> - Fresh storage Controlled atmosphere , coating, packaging, irradiation... - Dehydration Optimized air drying, candying, osmotic dehydration - Juice extraction, concentration Enzyming, refining, vacuum evaporation, membrane techniques, Cryoconcentration. - Pasteurization/sterilization Flash (HTST) Aseptic filling, - Frying	→ SME / Industrial Export → SME /Industrial Export → SME/Industrial Export → All, Local + Export Industrial Export → All, Local + Export	<ul style="list-style-type: none"> <li>• Sensory attributes,</li> <li>• Food safety</li> <li>• Micronutrients,</li> <li>• F&amp;V availability local/regional,</li> <li>• Competitivity on international markets</li> </ul>
<b>Fish and seafoods</b> - Onboard handling Chilling Freezing - Drying, salting, smoking - Freezing (cryoprotectants, plastic bags, IQF, ) - Cracking, texturization (surimi, pulp, proteinic isolates, concentrates) - Fermentation (Asia) - Food safety assurance systems (HACCP, GMP)	→ Traditional, industrial → Industrial → SME, local, export → Industrial → Industrial, export → SME, industrial, local, → Export → SME/industrial; Export	<ul style="list-style-type: none"> <li>• Waste reduction,</li> <li>• Food safety (pest control, reduced HAP contents, reduced oxidation/lipolysis),</li> <li>• energy savings (wood saving),</li> <li>• local/regional availability (protein)</li> <li>• competitivity on international markets</li> <li>• local market valuation.</li> </ul>
<b>Meat</b> - <i>Postmortem</i> ageing and tenderness (optimized temperature control, electrical stimulation, hanging, ...) - Irradiation - VP/ MAP Packaging - Drying, salting, smoking, curing - Food safety assurance systems (HACCP, GMP)	→ Industrial, Export → Industrial; export → Industrial Export → SME, local → Industrial, export	<ul style="list-style-type: none"> <li>• Waste reduction</li> <li>• Food safety</li> <li>• energy savings</li> <li>• sensory attributes</li> <li>• local/regional availability (protein)</li> <li>• competition on international markets</li> <li>• local market valorization</li> </ul>
<b>Cereals &amp; Pulses</b> - Post-harvest technologies	→ Craft/SME /Industrial, from	<ul style="list-style-type: none"> <li>• Waste reduction</li> <li>• Food safety</li> </ul>

Dehulling, dehusking, drying, milling, flour mill, storage - Breadmaking, pastry  - Pasta, - Malting and brewery - Starchy beverages - Weaning foods, gruels, instant. foods - Pulses processing (tofu, miso, tempe, soy sauce)	local & imported raw material → SME, Industrial/from imported raw material → SME Industrial → SME, local → SME, industrial, relief, local → SME, Industrial, local, export	<ul style="list-style-type: none"> <li>• micronutrients</li> <li>• local/regional availability (carbohydrates/calories)</li> <li>• local market valorization.</li> </ul>
<b>Roots and Tubers, plantains</b> - Fresh storage and packaging - Drying of roots, slices - Instant fufu, semola, pastes formulation  - Starch valorization (non gluten starchy flours)  - Frying	→ SME, local, export → Craft, local → SME, industrial, local, export → SME, industrial, local, export → SME, industrial, local, export	<ul style="list-style-type: none"> <li>• Waste reduction</li> <li>• local/regional availability</li> <li>• competition on international markets</li> <li>• local market valorization.</li> </ul>

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## FIGURES

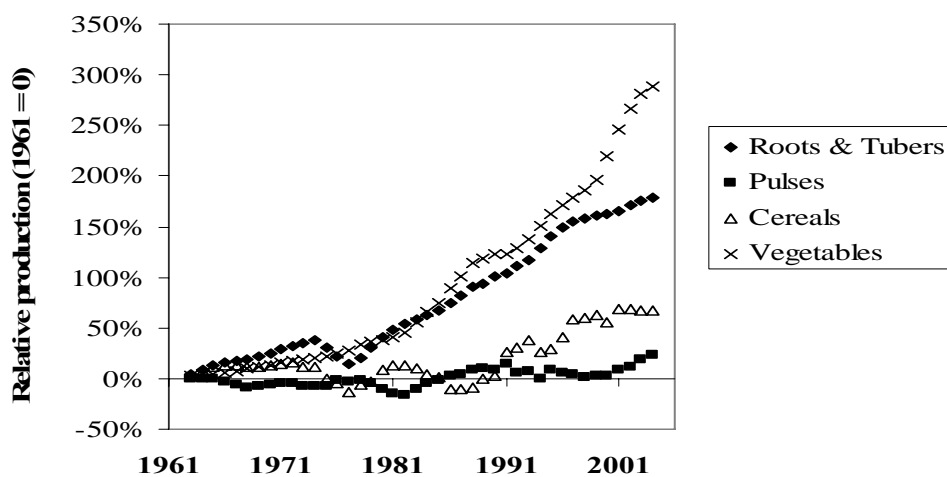


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Figure 3.1. Undernourishment rates (% of population) for selected regions of the world (FAO Statistics Division, 2007).

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Figure 3.2 Global production of agricultural commodities relative to 1961 (FAOSTATS, 2007). Each point represents a three-year rolling average.

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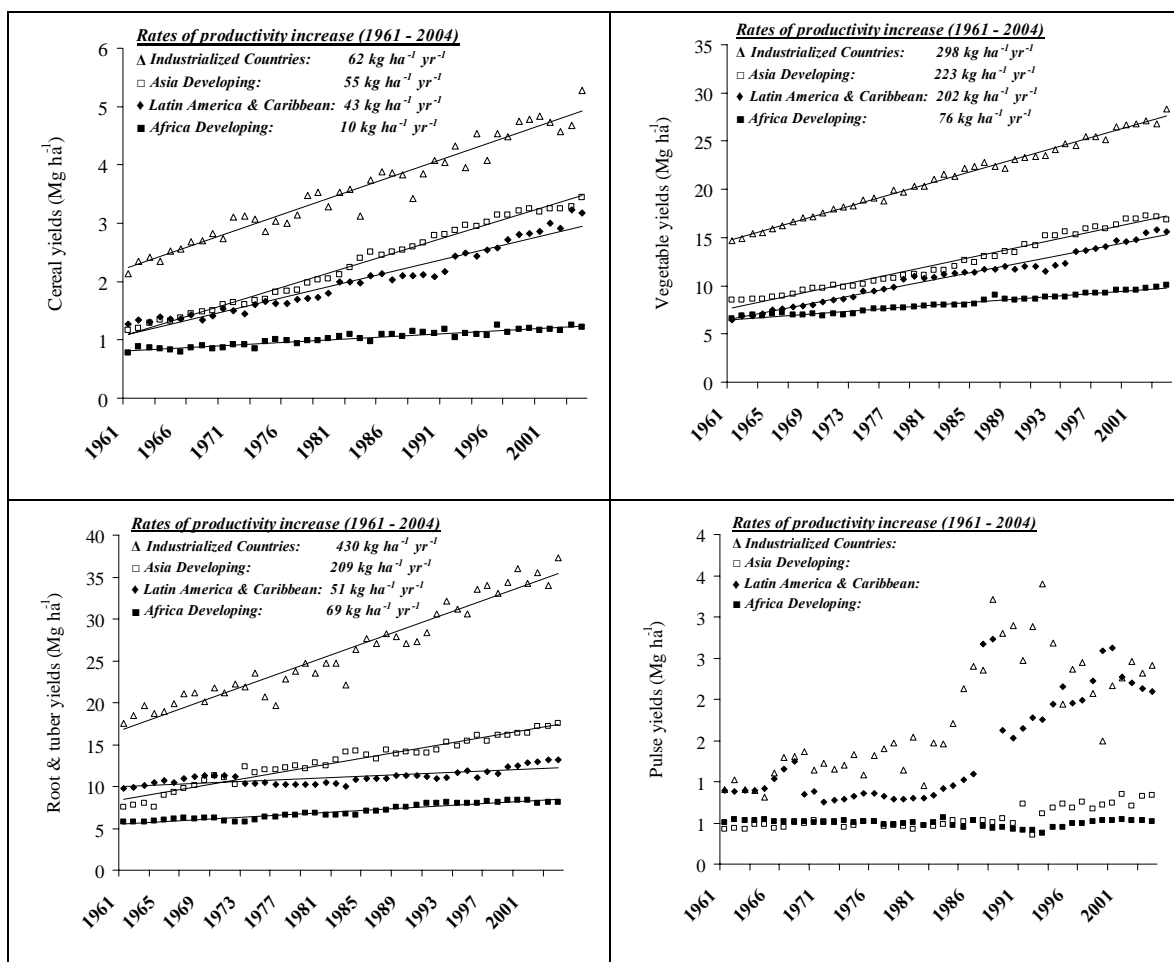


Figure 3.3. Cereal, vegetable, root and tuber and pulse yield (Mg ha<sup>-1</sup>) trends from 1961 to 2004 (FAOSTATS, 2007).

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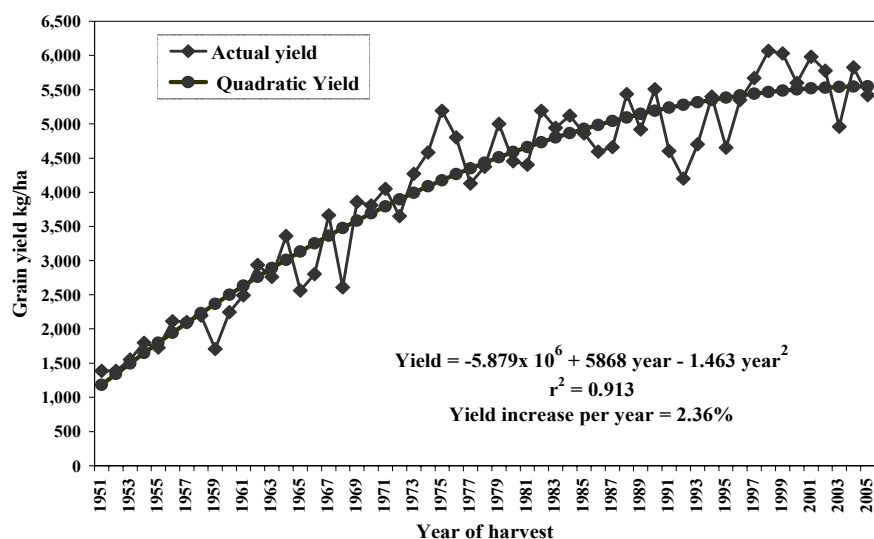


Figure 3.4 Spring wheat yields in farmers' fields in the Yagui Valley of Sonora, Mexico (adopted from Sayre, 2006).

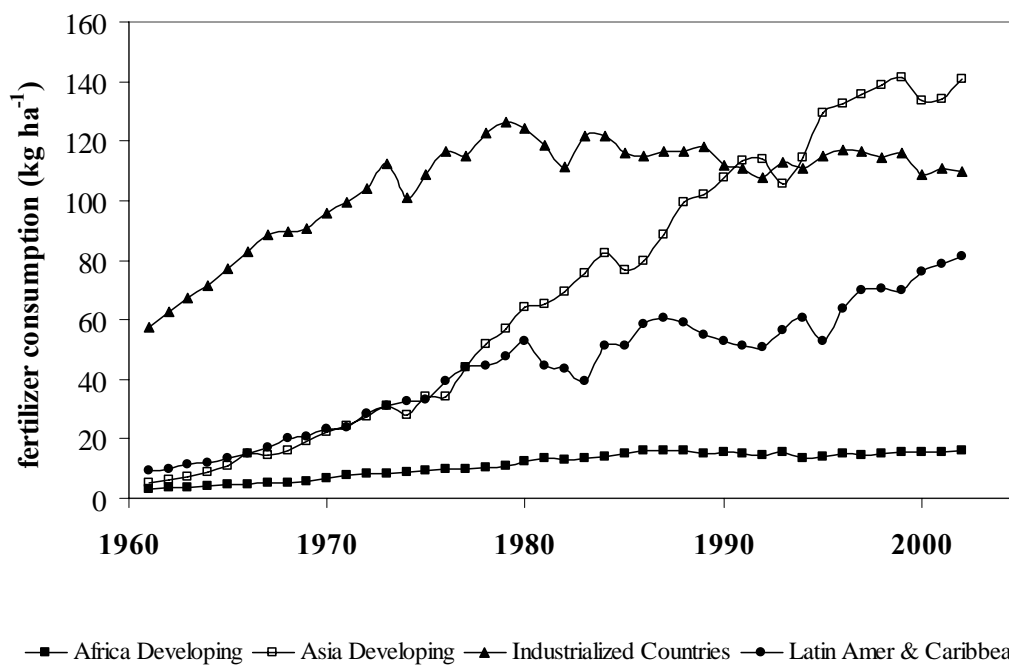


Figure 3.5 Aggregate fertilizer use per unit of cultivated land from 1961 – 2005 (FAOSTATS, 2006).

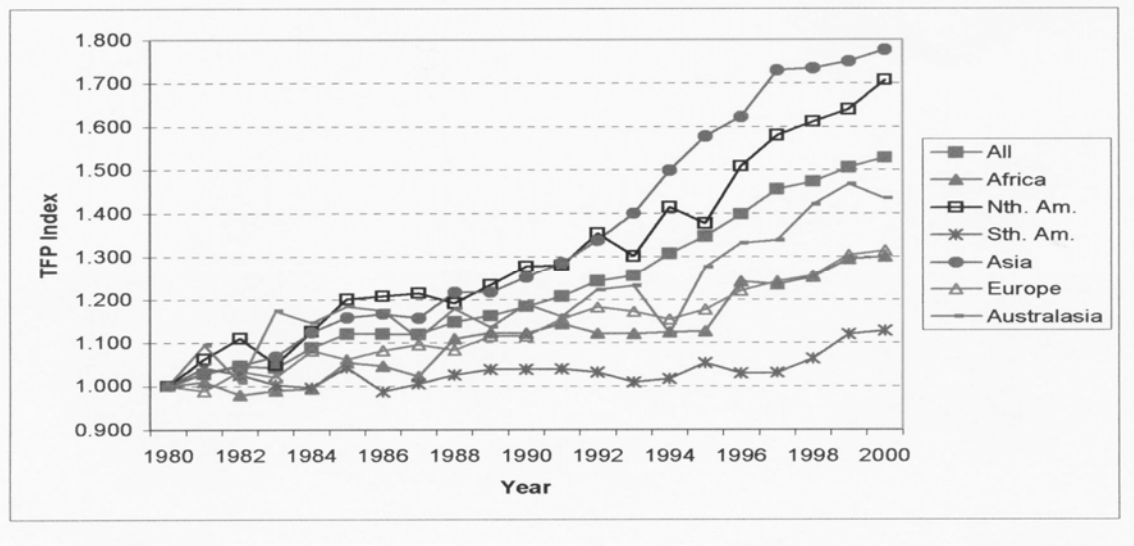


Figure 3.6 Cumulative Total Factor productivity indices from 1980 to 2000. Source Coelli and Prasada Rao (2003)

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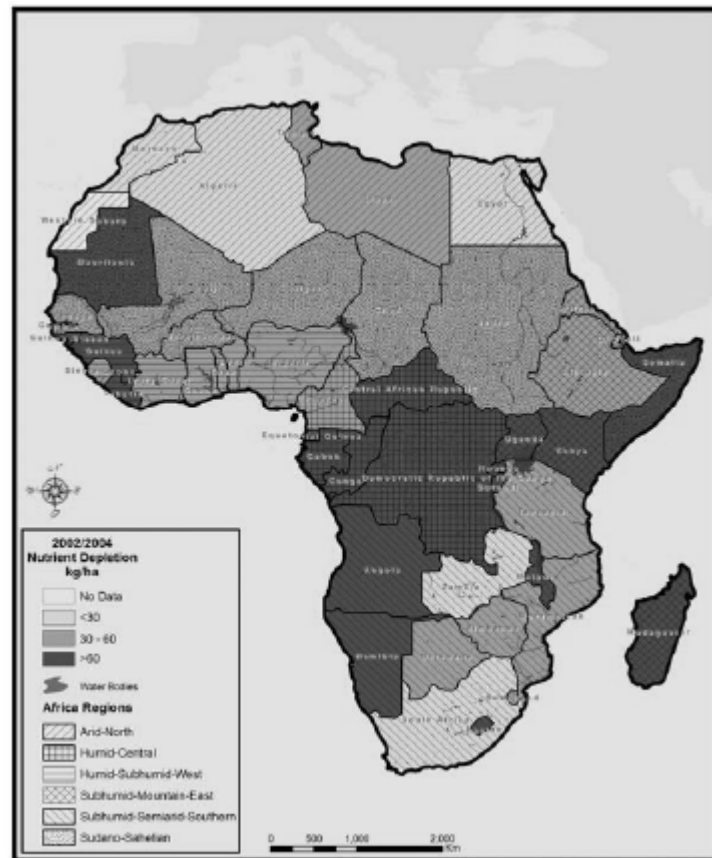


Figure 3.7 Net annual rates of macronutrient (NPK) depletion for Africa (adopted from Henao and Baanante, 2006).



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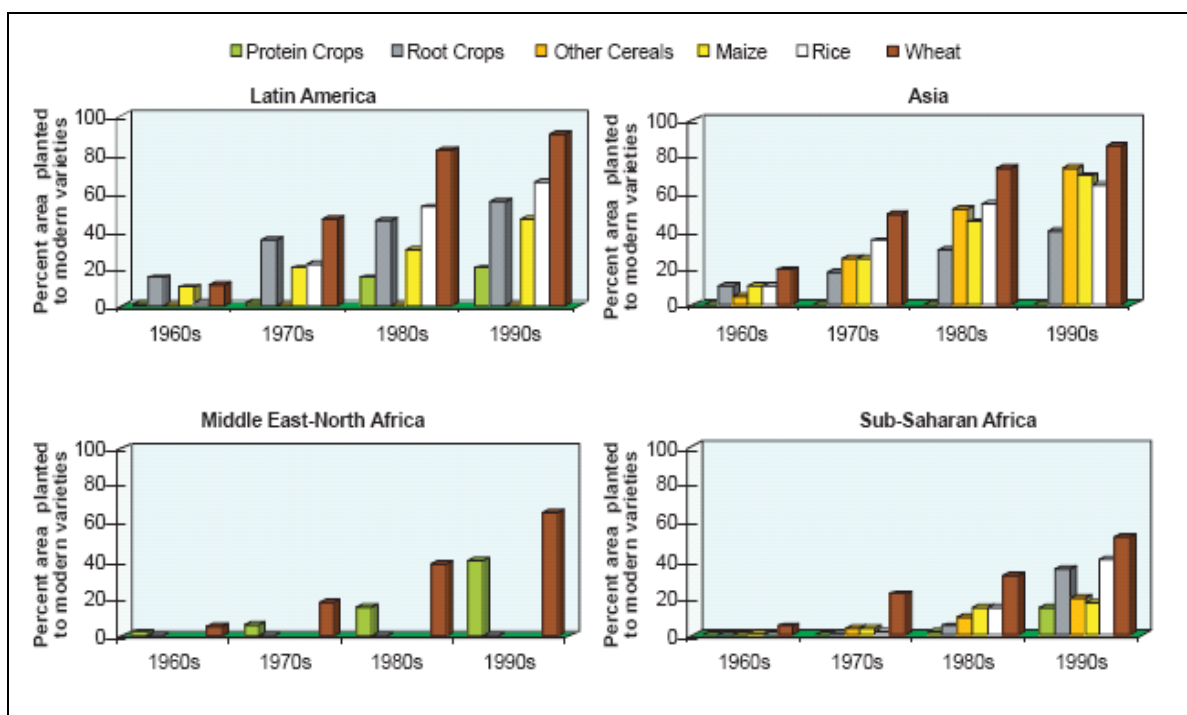
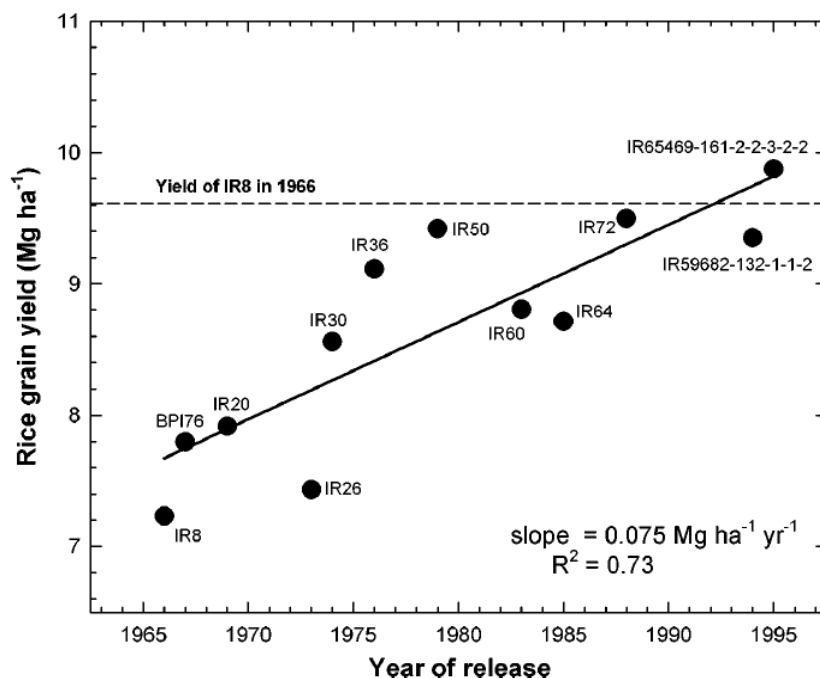


Figure 3.8 Modern variety diffusion by decade and region. Source: Evenson and Gollin, 2003a

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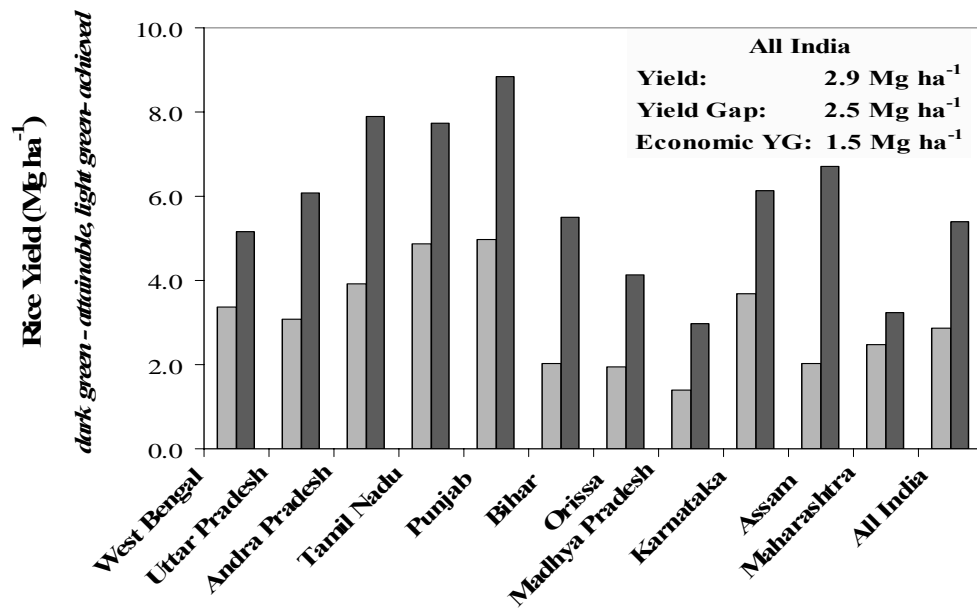
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Figure 3.9. Present-day yield potential of rice MVs as a function of year of release (from Cassman et al., 2003 – derived from Peng et al., 1999). Dashed line indicates the yield potential of IR8 when it was released in 1966. Graphic illustrates the importance of “maintenance breeding” and of stagnating yield potential.

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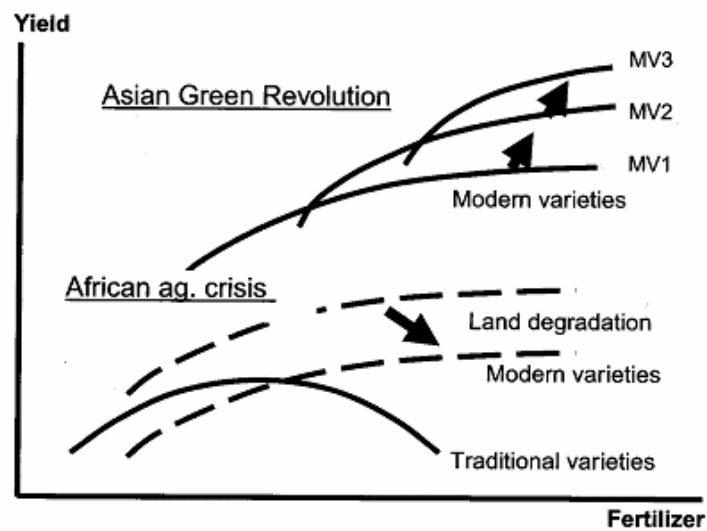
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Figure 3.10 Yield gap analysis of attainable (dark green) and achieved (light green) rice yields in India. Derived from Bruinsma (2003).



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Figure 3.11 Conceptual figure of effect introducing MVs (source: Cassman, ????)

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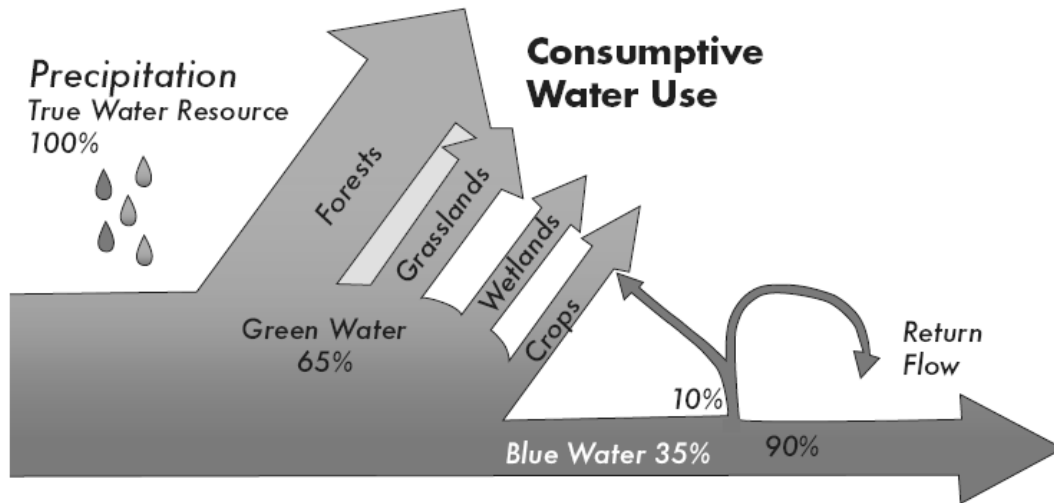


Figure 3.12 The partitioning of 'blue' and 'green' water resources by landuse (adopted from: Falkenmark and Rockström, 2005).

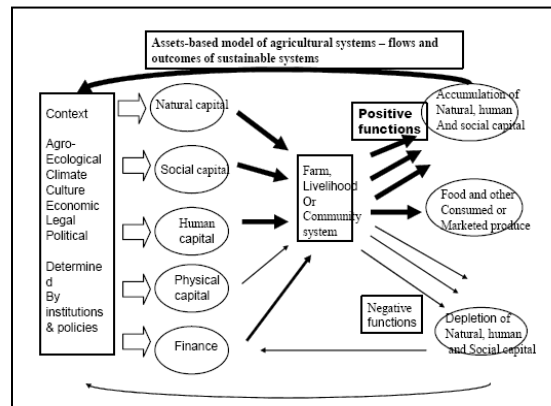
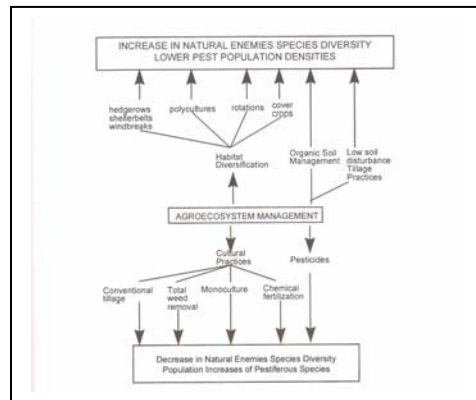


Figure 3.13 The concept of INRM (Thomas: in Place and Were, 2003)



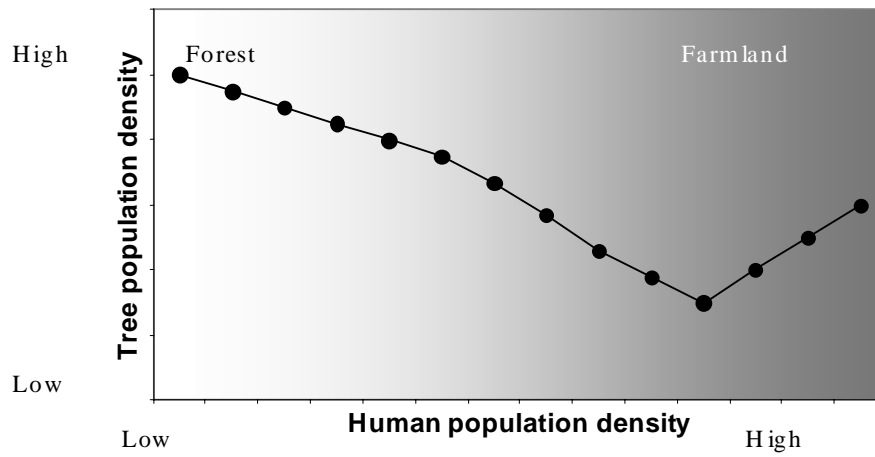
**Figure 3.14 The effects of agroecosystem management and associated cultural practices on the biodiversity of natural enemies and the abundance of insect pests (After: Altieri and Nicholls, 1999)**

Effects	Evidence		Source
	Direct	Indirect	
1. Increased productivity	+	+	Ong, 1991
2. Improved soil fertility	+	+	Kang <i>et al.</i> , 1990
3. Nutrient cycling	+	+	Szott <i>et al.</i> , 1991
4. Soil conservation	+	+	Lal, 1989; Wiersum, 1991
5. Microclimate improvements	+	+	Monteith <i>et al.</i> , 1991
6. Competition	—	—	Ong <i>et al.</i> , 1991
7. Allelopathy	0, ?	—	Rizvi, 1991; Tian and Kang, 1994
8. Weed control	0	+	Rizvi, 1991
9. Sustainability and stability	0	+	Sanchez, 1987; Young, 1991
10. Pests and diseases	0	—, +	Zhao, 1991

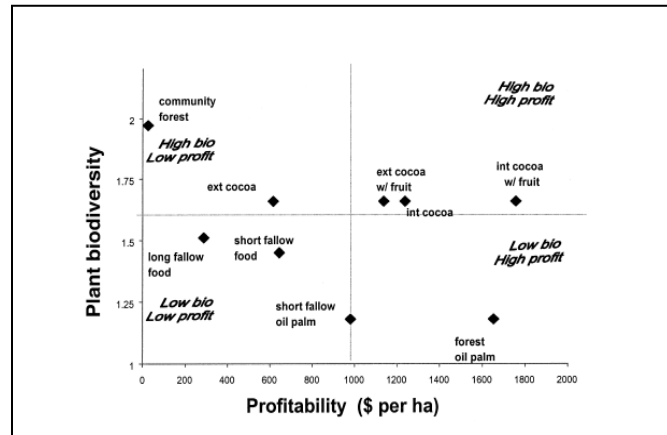
Positive effects are indicated by ( + ) and negative by ( — ); where evidence is not available it is indicated by (0). Only key or recent sources are quoted.

**Figure 3.15 Main effects of tree-crop interactions (Ong, 1996) - for details see: Ong and Huxley, 1996; Noordwijk *et al.*, 2004**

1 Figure 3.16. The relationship between human population pressure and tree populations in the landscape



2 (after Shepherd and Brown, 1998).



16 Figure 3.17 The relationships between landuse systems in the humid zone of Cameroon in terms of profitability  
17 and plant species diversity (Izac and Sanchez, 2001)

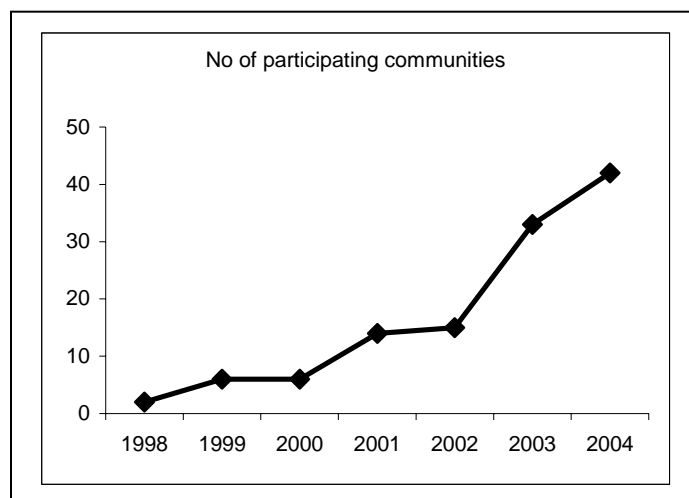


Figure 3.18. No of communities in southern Cameroon engaged in the Participatory Domestication of indigenous fruit trees (Tchoundjeu *et al.*, 2006)

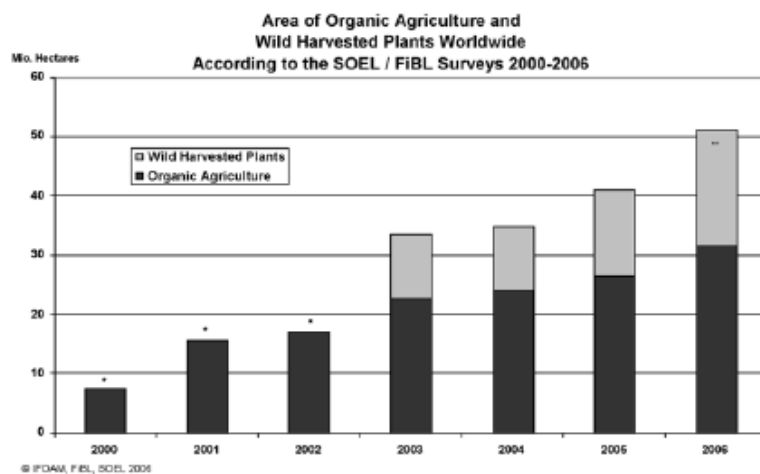


Figure 3.19. Area of organic agriculture and wild harvested plants 2000-2006 (SOEL and FiBL Surveys 2000-2006).

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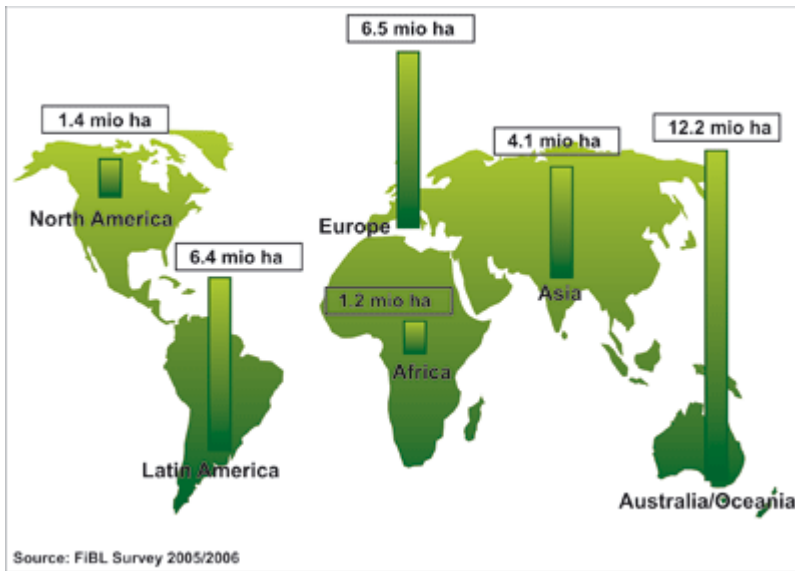


Figure 3.20. Geographic distribution of organic agriculture (FiBL Survey 2005-6)

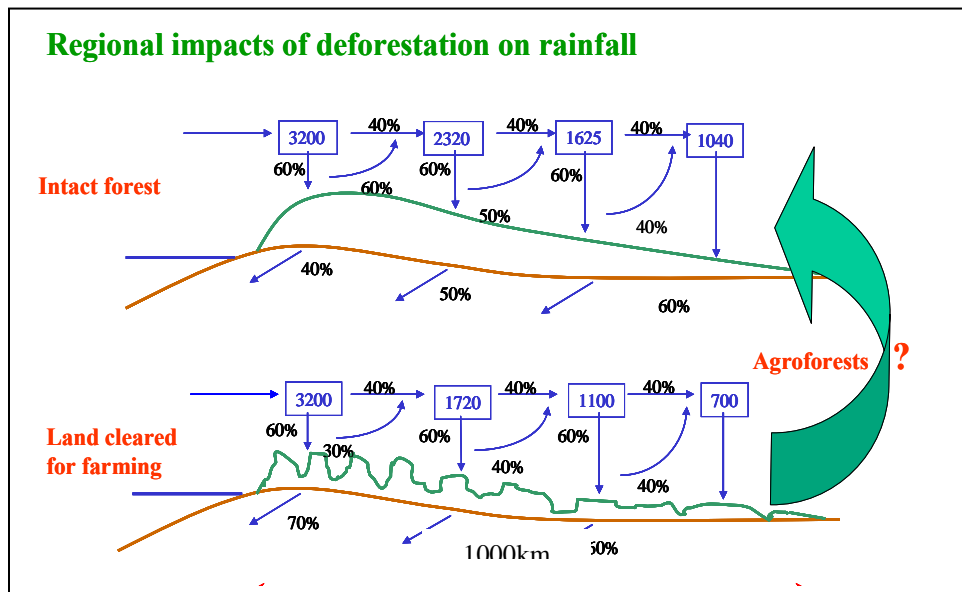
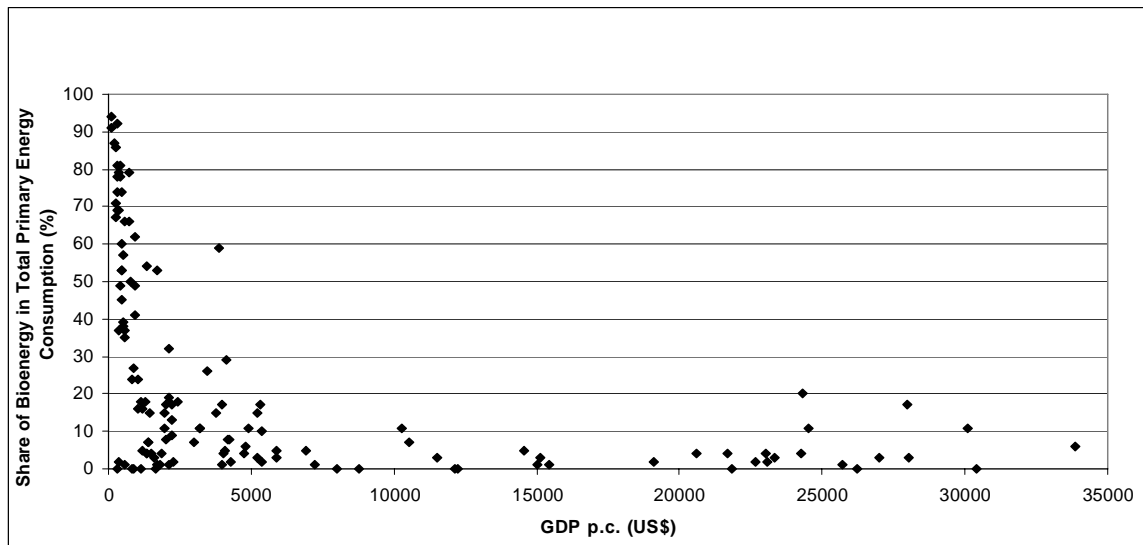


Figure 3.21 Representation of the impacts of the advection of moisture across a landscape, with and without deforestation, on rainfall (after: Salati and Vose, 1984)

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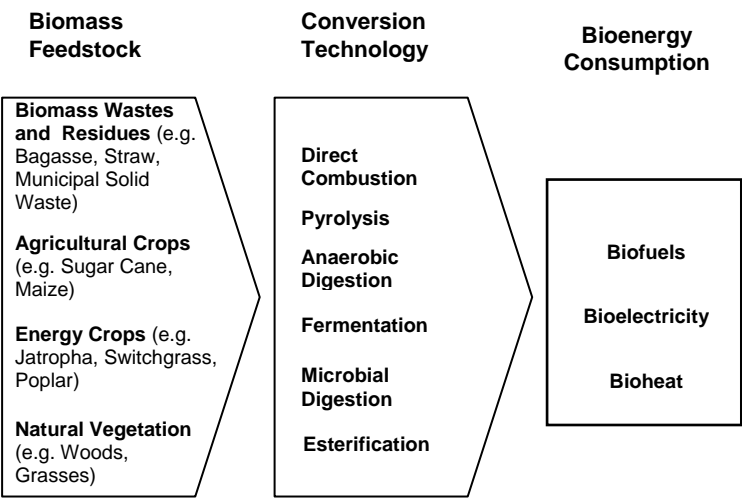
Figure 3.22 – Bioenergy consumption and income levels (2003)



Source: World Bank data

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Figure 3.23 – The production of modern bioenergy



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