



LIVING IN HARMONY WITH NATURE

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TRADITIONAL MANAGEMENT PRACTICES IN THE WORLD

- The *Satoyama* Concept
 - Traditional practice
 - Optimizes benefits derived from the local ecosystem
 - Supplies food, fuel, and source of income
 - *Use* and continuous human-nature *interactions* can lead to maintenance of biodiversity
- Similar situations have been identified elsewhere:
 - The *Kebun-Talun* and the *Pekarangan* in Indonesia
 - The *Dehesa* in the Iberian Peninsula
 - The *Chitemene* in Zambia, Mozambique and Malawi

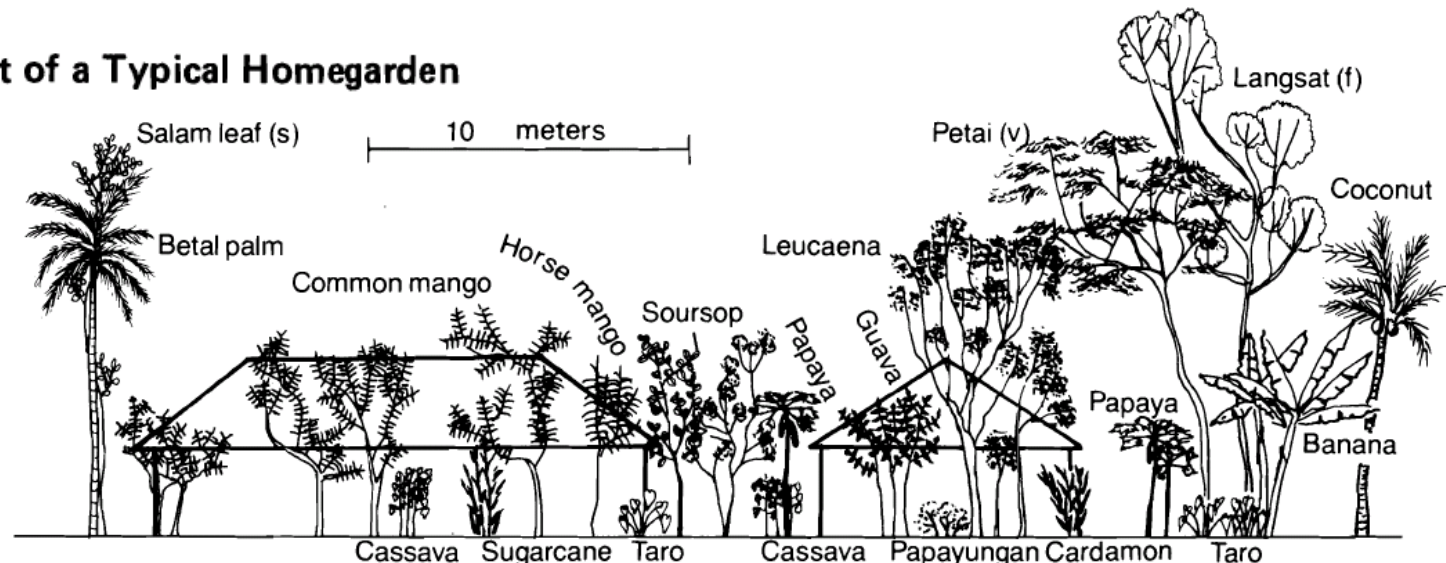
KEBUN-TALUN AND THE PEKARANGAN

- The *Pekarangan* or homegarden in Indonesia
- A mixture of annual crops, perennial crops, and animals surrounding a house
- Field crops planted beneath the trees
- Serves economic, biophysical, and sociocultural functions



(Source: Gerald G. Marten (1986), *Traditional Agriculture in Southeast Asia: A Human Ecology Perspective*)

Layout of a Typical Homegarden



Source: Iskandar 1980.

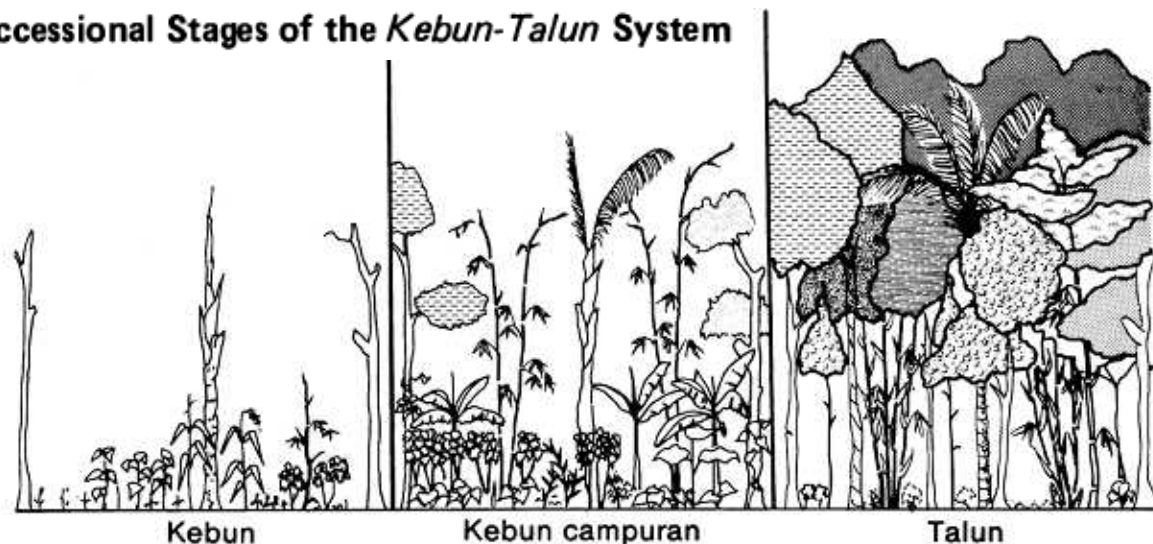
KEBUN-TALUN AND THE PEKARANGAN

- The *Kebun-Talun*
 - Shifting cultivation in a man-made forest
 - The *talun* is a privately owned forest
 - Mixture of economic tree species with various annual plants.
 - A genetic resource
 - Protection against soil erosion

- The kebun is a shifting garden planted within the talun
 - A mixture of cash crops
 - Cycle of the shifting rotation: about 8 years
 - Created by harvesting trees and bamboo by selective cutting and pruning



Successional Stages of the *Kebun-Talun* System



Source: Isnawan 1980.

DEHESA

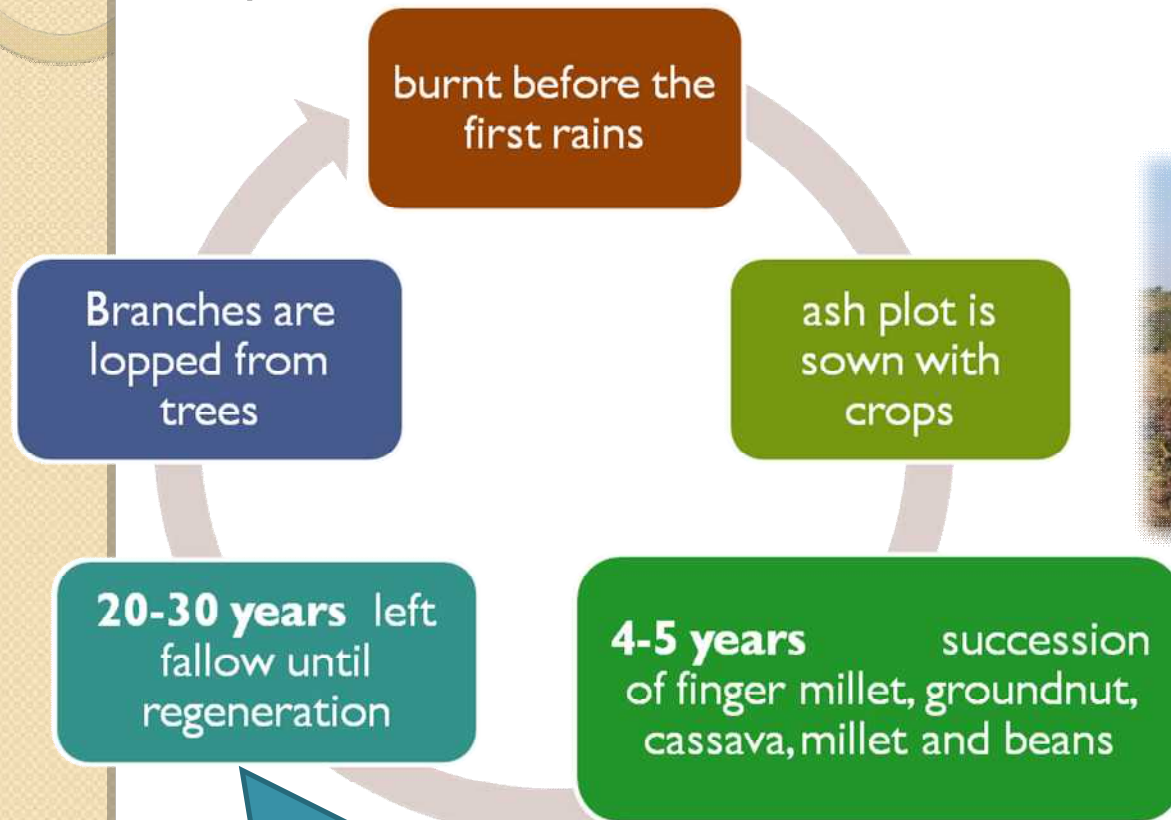
- Wooded pastureland of the Iberian peninsula
- Sparse pasture parkland, combined with evergreen cork, forming a man-made, managed and biodiverse ecosystem
- Used for the grazing of livestock
- Supplies non-timber forest products such as wild game, mushrooms, and firewood
- Plays an essential role for the economy
- Vital to the survival of migratory as well as endemic species



L Olea, A San Miguel-Ayanz - Grassland Science in Europe, 2006

Chitemene

- A form of sustainable 'slash-and-burn' cultivation practiced in areas of Malawi, Zambia and Mozambique



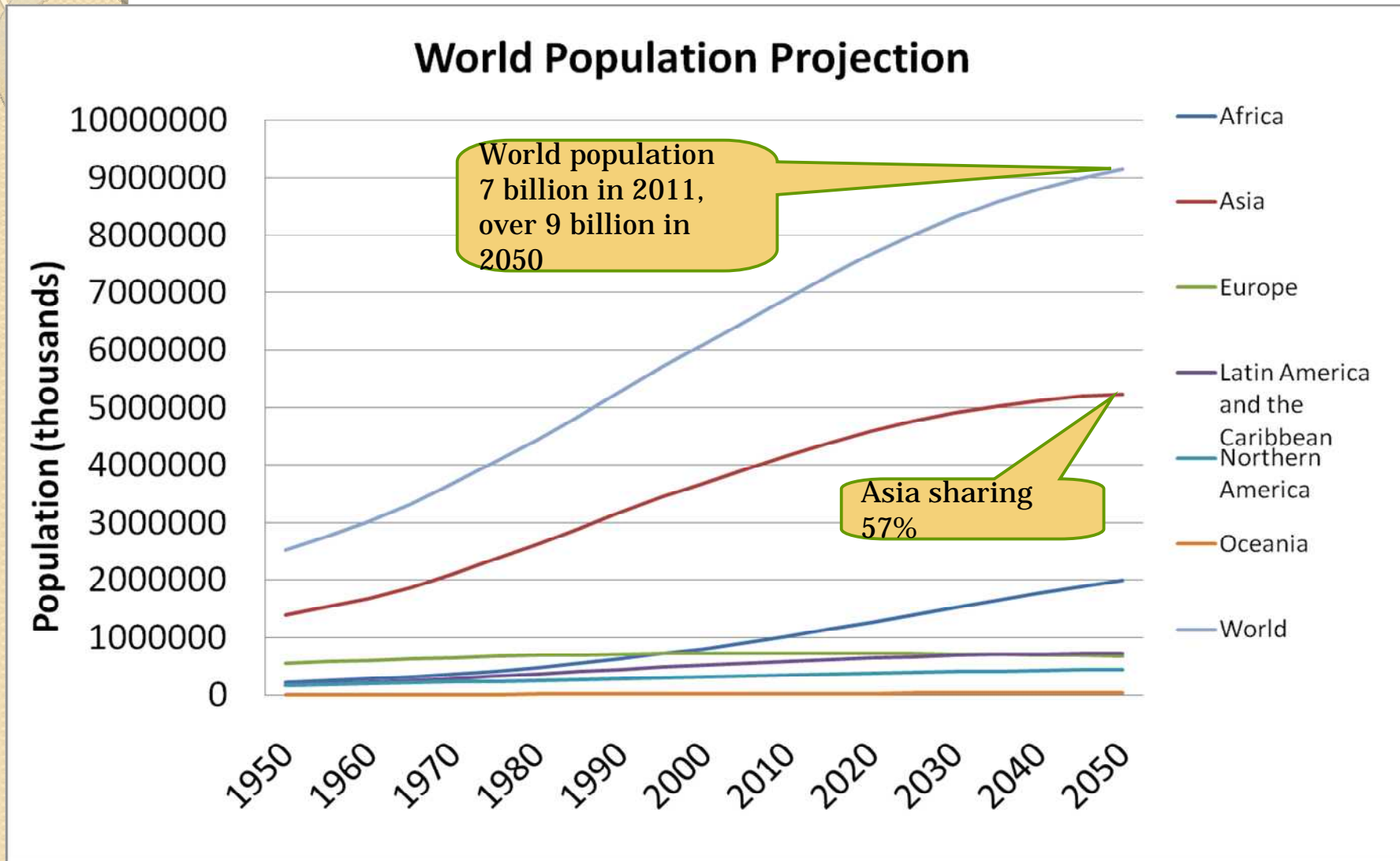
Adequate regeneration is a key to sustainability

Source: EN Chidumayo -
Agroforestry Systems, Volume 5,
Number 1, 1987

Changing Society and future challenges

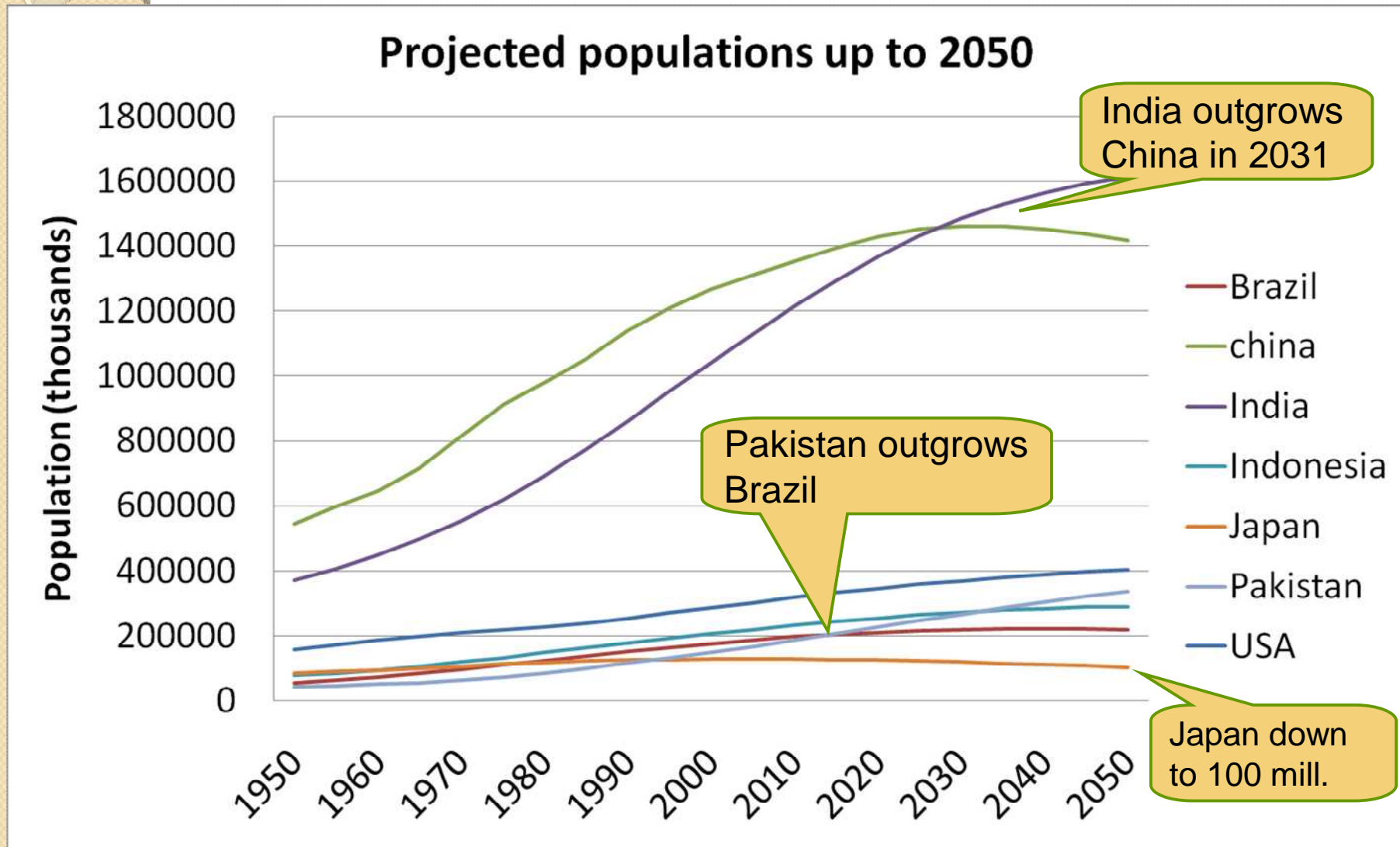
- All these practices enhance ecosystem productivity and sustain biodiversity if undertaken following principles of sustainability, but:
- *Pekarangan* and *Kebun-talun* may suffer the pressure from population growth
 - Fragmentation of landholdings → insufficient to support households
→ forced to switch to off-farm employment
- *Dehesa* may be devastated by climate change
 - Increased frequency of droughts but greater numbers of heavy rain events
→ dramatically affects the ecological equilibrium seen in the *Dehesa*
- *Chitemene* had existed as an ecologically sound system because land pressure from population demands was low and ample woodland was present
 - Population growth due to improved health care and nutrition
→ farmers let their fields lie fallow for a shorter period of time
→ ecological effectiveness of the *chitemene* system has suffered.

Future Challenges: Population Growth



Developed from: 2008 World Population Prospects, UNESA

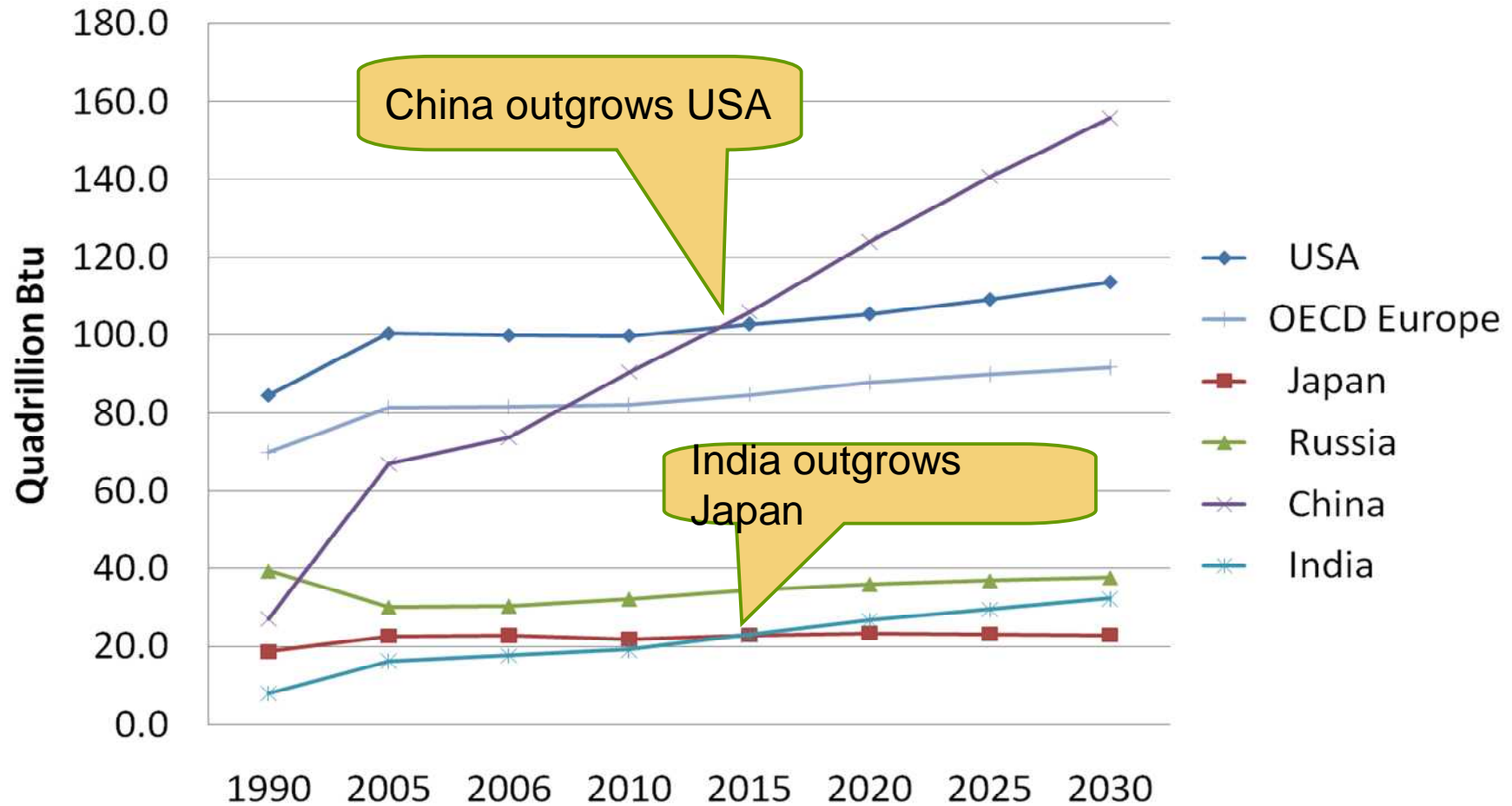
Future Challenges: Population Growth



Developed from: 2008 World Population Prospects, UNESA

Future Challenges: Energy demand

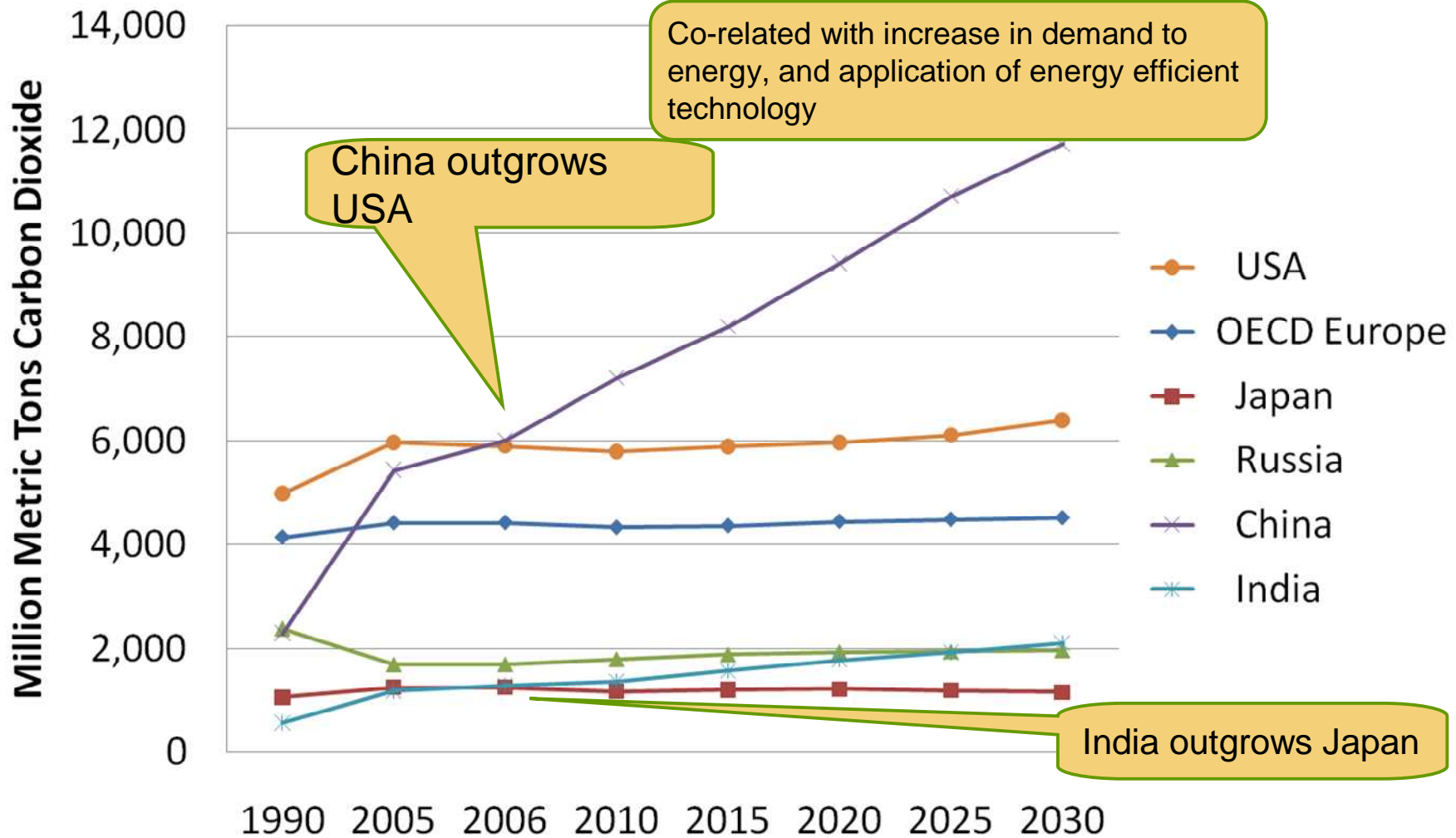
World Total Primary Energy Consumption by Region/Country



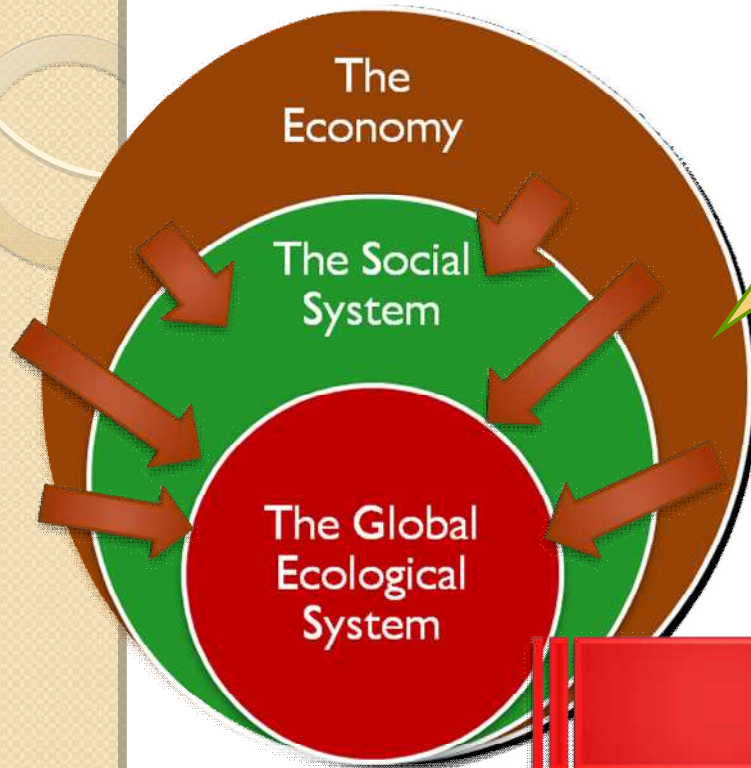
Developed from: US Energy Information Administration (2009)

Future Challenges: GHG Emissions

World CO2 Emissions by Region/Country

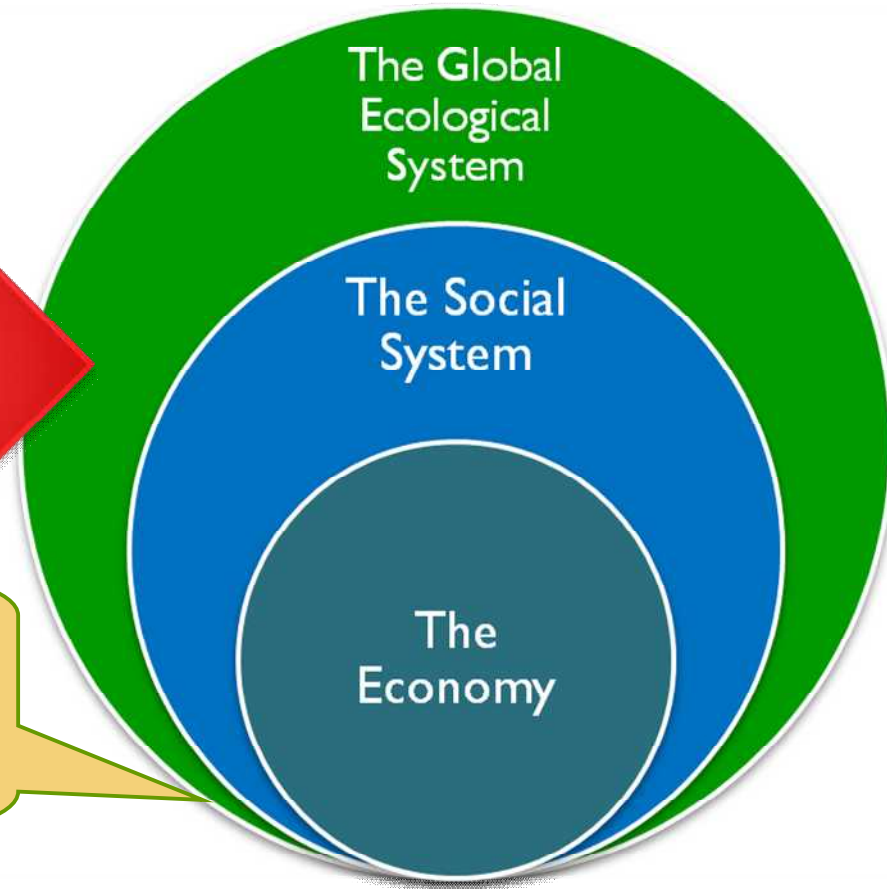


MARKET FAILURE



Market Failure to account for the benefits derived from and the negative pressure imposed upon the global ecological system.

The value of services derived from the global ecological system must be integrated within the economy.





COMBINING INNOVATIVE TECHNOLOGIES WITH TRADITION - EXAMPLES

- A focus on innovative technologies with a high potential to support the sustainability of human activities, and to adapt to the impacts of climate change
- *Grafting techniques for crop resistance*
 - Adapting to increasing soil salinity by grafting fruit-yielding plants onto salt-tolerant rootstocks
 - Has been shown to increase the productivity of melon, tomato, watermelon and cucumber under salt stress

Source: Y. Huang et al. / Scientia Horticulturae 122 (2009) 26–31

Combining innovative technologies with tradition - Examples

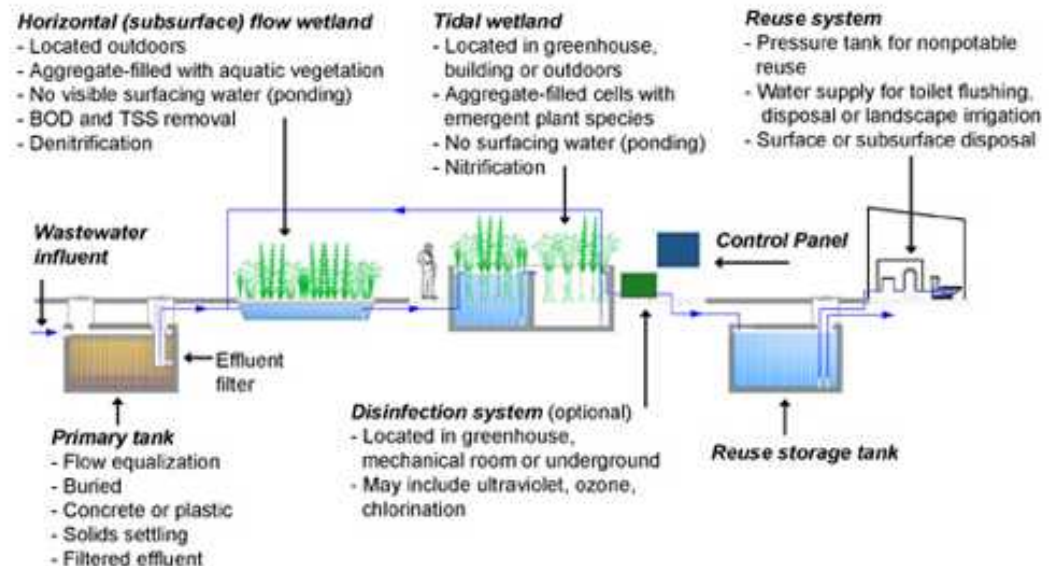
- *'deficit irrigation'- reduced irrigation*



- Application to cultivation of cotton, maize, groundnut, wheat, sunflower and sugar beet has shown increased economic benefit and environmental sustainability
 - 25-75% water saving in wheat cultivation without significant loss of yield and profits
- *'partial root zone drying'- half kept dry & half watered*
 - In addition to deficit irrigation, partial root zone drying (PRD) is also a promising practice for inducing stress tolerance in fruit trees

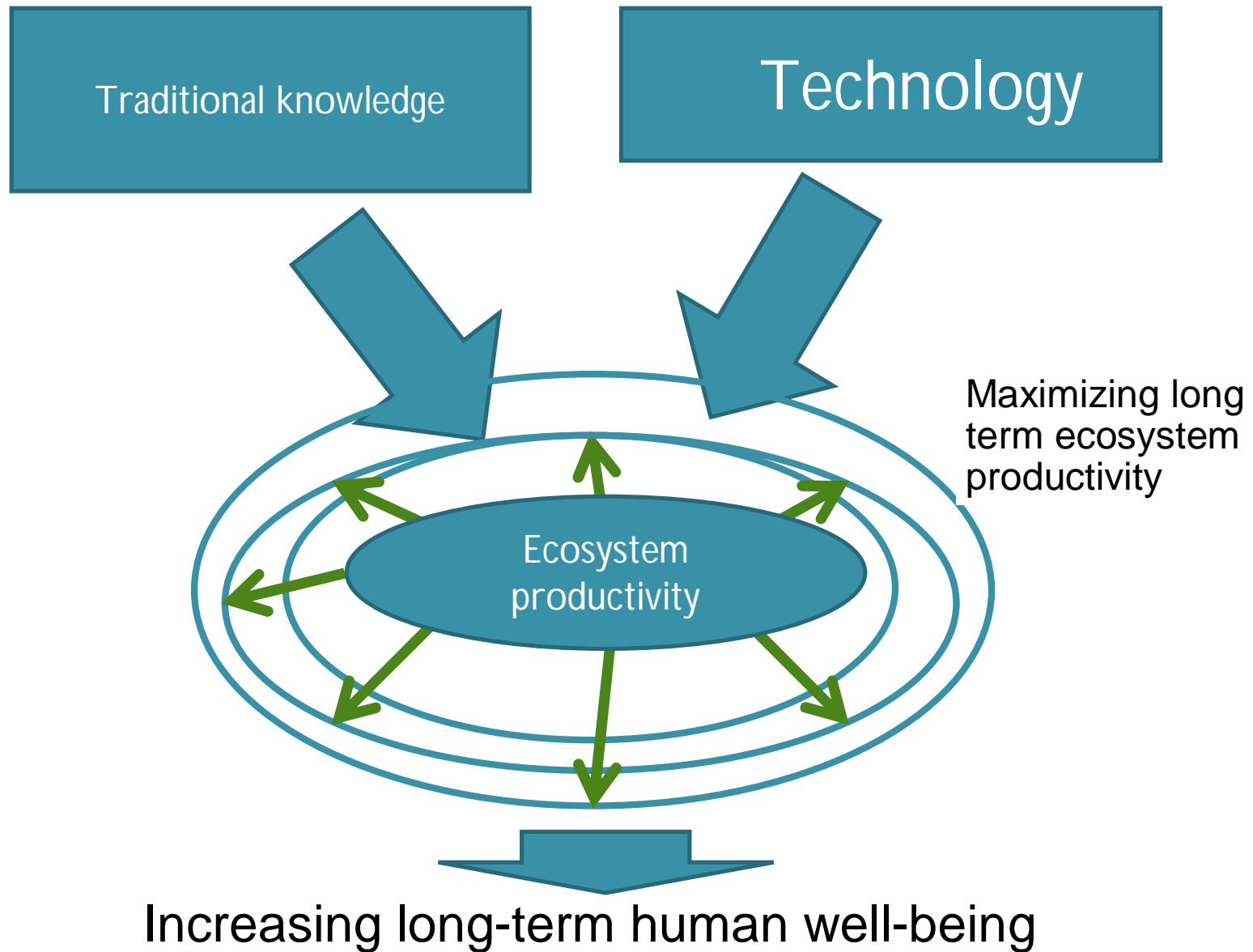
Combining innovative technologies with tradition - examples

- ***Worrell Water Technologies' Living Machine[®] system***
 - Uses living plants and beneficial microorganisms to turn wastewater into clean water
 - Produces water that is cleaner and greener than conventional water treatment methods—and with huge savings in energy and infrastructure costs



Source: Worrell Water Technologies, 2009 (<http://www.worrellwater.com/>)

Maximising ecosystem productivity

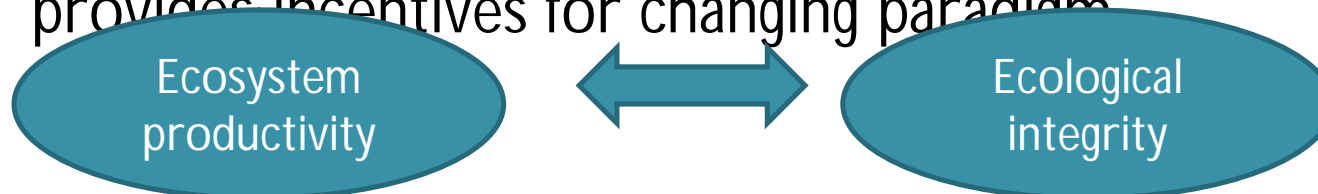


Dealing with trade-off to build a sustainable society

- Excessive focus on innovative technology and reduced ecological integrity may contradict the essence of the Satoyama concept
- Purely traditional practice failed to generate :
 - Income
 - Attractiveness

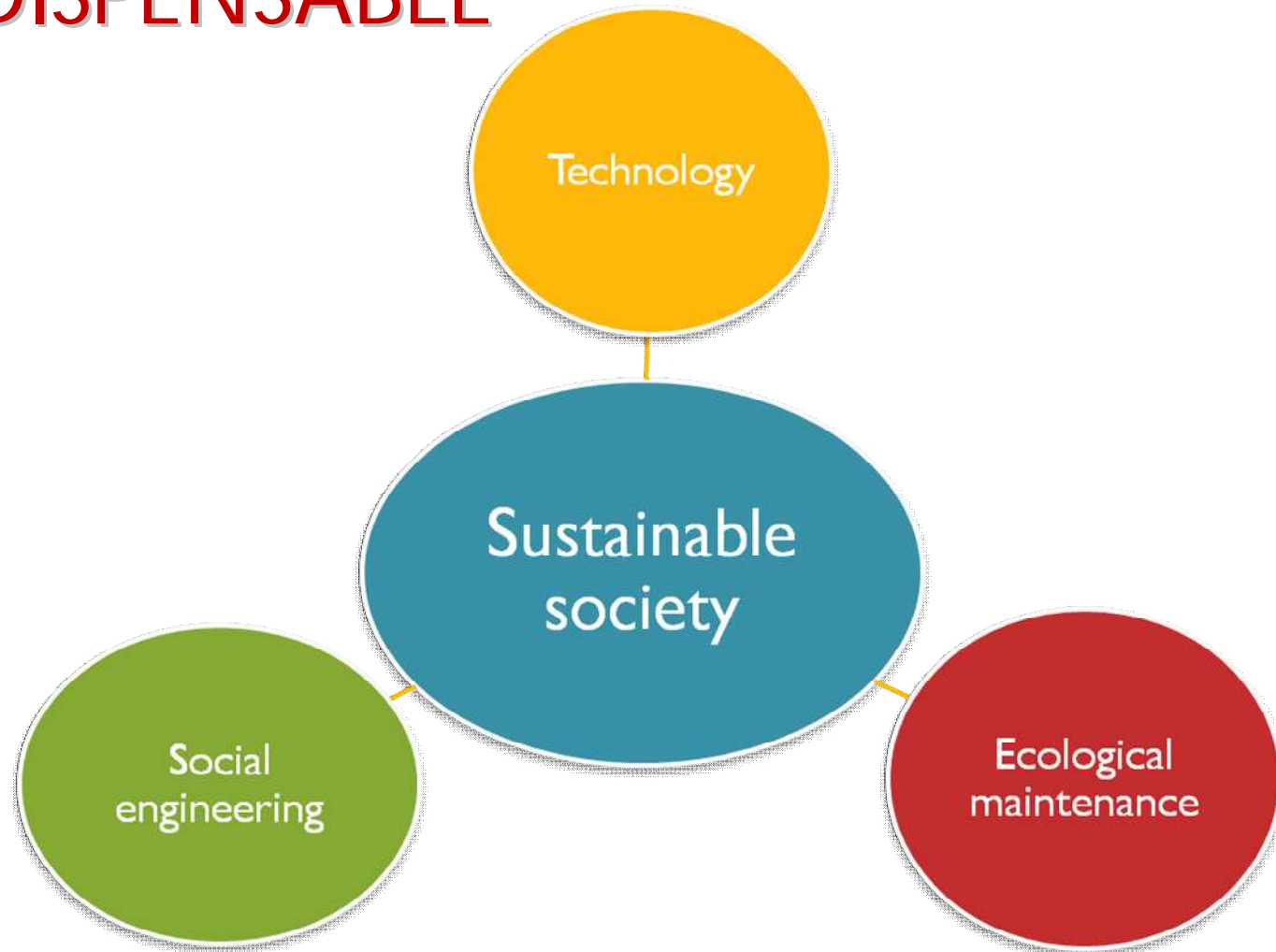
to sustain increasing populations

Innovative practice including technology application provides incentives for changing paradigm



There can be trade-off

AN INTERDISCIPLINARY AND FORWARD-LOOKING APPROACH IS INDISPENSABLE





FUTURE CHALLENGES

1. **Population** increase from 6 billion (now) to 8 billion (2030), increase demand for land for food, infra-structure and growing urbanization;
2. **Climate change** and its impacts on sea level rise, water scarcity, unpredictable seasons;
3. Increase income with **rising poverty**, income disparities, & the struggle to reach for MDG;
4. Increase **conversion** of natural habitat to agriculture, increase use of chemicals;
5. **Pressures** on forests, water and biodiversity;



STRATEGIC PLAN FOR C.B.D

1.Strategic Plan for the Convention on Biological Diversity 2001 purpose is:

- To **halt** the loss of biodiversity;
- To **secure** its beneficial uses through conservation and sustainable use of its components;
- The fair and **equitable sharing** of benefits arising from the use of genetic resources;

2.Parties commit themselves to achieve by 2010 a significant **reduction** of the current rate of biodiversity loss;



“MESSAGE FROM ATHENS” 2009

European Ministers concluded in April 2009:

- The target of halting biodiversity loss in Europe by 2010 will **not** be achieved. The policy response is not adequate to halt the general decline;
- Ecological footprint of Europe has grown progressively since 1960, with overall demand **exceeding** total capacity for biological production;

WWF *Living Planet Report 2008*: Our global footprint exceeds world's capacity to regenerate by 30%, we will need by 2030s **two planet** to maintain our lifestyles;



LESSONS FROM SATOYAMA

1. Japan is experiencing a steady decline of population. Recent studies report the relationship between the **loss of traditional management** and changes in the habitats for indigenous species (*Kamada & Nakagoshi 1990*);
2. Agricultural Systems need to adapt to "Satoyama" or *Eco-agriculture*, integrating production biodiversity conservation at a landscape scale;
3. The strong demand for recreation and nature observation requires a **new** Satoyama landscape management system (*Fukamaci, Oku, Nakashizuku, 2001*)



ACKNOWLEDGEMENT AND REFERENCES

ACKNOWLEDGEMENT:

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2. S.J.Scherr and J.A.McNeely, *Farming with Nature*, Island Press, 2007;
3. Ahmed Djoglaf, Executive Secretary of CBD, Statement at the Fifth Intergovernmental Conference on Biodiversity in Europe, 23 September 2009, Liege, Belgium;
4. E-forum on the Post 2010 Strategic Plan of the CBD.