

# Organic Agriculture and Food Security in East Africa

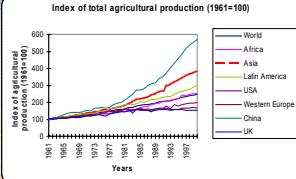
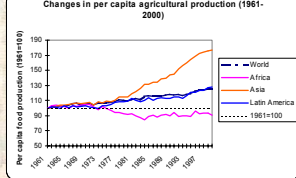

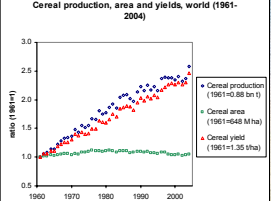
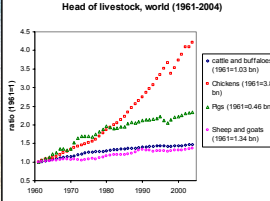
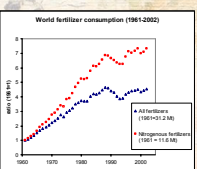
Rachel Hine and Jules Pretty  
University of Essex, UK

CBTF Organic Agriculture Regional Workshop:  
Promoting Production and Trading  
Opportunities for Organic Agricultural Products  
in East Africa  
Arusha, Tanzania 6<sup>th</sup> – 10<sup>th</sup> March 2006




## Great Progress

- Past 50 years
  - World cereal production up from 420 to 1176 Mt
  - more cereals and animals per ha
  - more meat and milk per animal
- scale of production
- fertilizer, pesticide and other input use
- environmental harm

Pretty J (2006). Agricultural sustainability: concepts, principles and evidence. *Phil Trans R Soc Lond B* (in press)



## World context

- Food availability increased dramatically in last 30 years
- World now produces 354 kg cereal per person - enough for all (in theory)





But

- 800 million people hungry
  - 31% in E and SE Asia; 31% in S Asia
  - 25% in Sub-Saharan Africa
  - 5% L. America / Caribbean
  - 5% North Africa/ Near East
- 500+ million people now clinically obese
  - the food they eat is making them ill



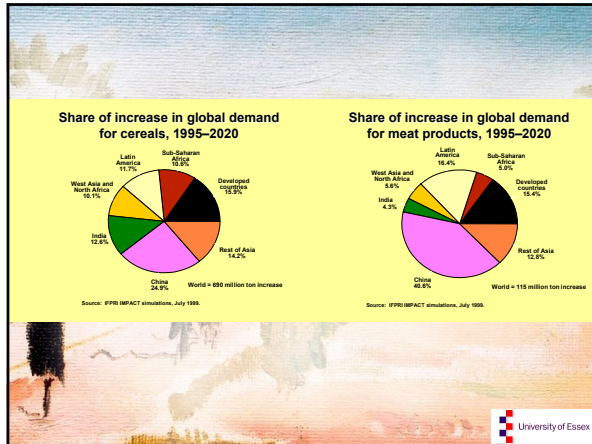
- Number of food-insecure people has fallen from 959 million in 1970 to 800+ million today
- Percentage of food-insecure people has fallen from 37% to 17%
- Progress has been uneven
  - major reduction in East and Southeast Asia
  - slight increase in South Asia
  - number of hungry people in Sub-Saharan Africa has increased by 20% since 1990
- Average food consumption per capita in 2003 2780 kcal per day yet in 33 countries still less than 2200 kcal per day
- 2000-2002 Proportion of undernourished people in Kenya 33%, Uganda 19% and 44% Republic of Tanzania

## The future?

- World population set to increase to 9 billion by next generation
- 84% people will be in those countries currently making up the developing world
- Pressure on land and water resources
- Shift in demand to meat and cereals as countries become more 'developed'





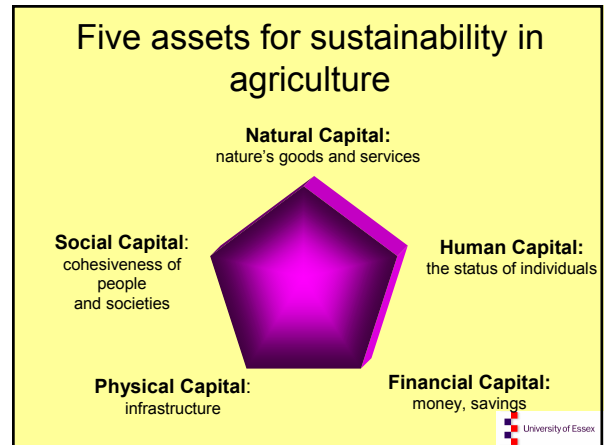
## Three agricultural options

- expand the area of agriculture - by converting new lands to agriculture, but losing forests, grasslands and other areas of important biodiversity
- increase per hectare production in agricultural exporting countries - mostly industrialised, so that food can be transferred or sold to those who need it
- increase total farm productivity in developing countries which are going most to need the food
  - by purchasing inputs/technologies?
  - by using locally-available assets and resources - switching to more sustainable and organic agriculture?

- Africa faces greatest challenge of any continent with respect to food security, poverty and the environment
  - Low agricultural production, economic stagnation, political instability, persistent environmental damage

**Need to ask - what are the best options for the poorest, for food security and the environment?**

- Not increased production in industrialised countries
- Not expanding agricultural frontier (lose environmental services)
- Key questions:
  - to what extent can farmers improve food production with low-cost and locally-available technologies and inputs?
  - can they do this without causing further environmental damage, or even by improving natural resources?



## Natural capital

- food, wood and fibre;
- water regulation and supply;
- waste assimilation and treatment; nutrient cycling and fixation;
- soil formation;
- biological control of pests;
- climate regulation and carbon sequestration;
- wildlife habitats;
- storm protection and flood control;
- pollination;
- recreation and leisure

Value of world's natural capital - \$33 trillion (equivalent to twice the size of the world's formal economy)

Costanza R et al. (1997 and 1999). The value of the world's ecosystem services and natural capital. *Nature* 387, 253-260;

## Social capital

- New term, but old idea
  - Social bonds and norms are important for sustainable livelihoods
  - "The structure of relations between and within actors" that encourages productive activities
  - Social capital lowers the cost of working together - so facilitates cooperation

Healthy communities have higher levels of social capital  
Greater interaction between people in the community = greater sense of "community spirit"  
WHO evidence that having strong social networks benefits health

## Human capital

- stock of health, nutrition, education, skills and knowledge of individuals;
- access to services that provide these - schools, health services, adult training;
- the ways individuals interact with productive technologies



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## Physical & Financial capital

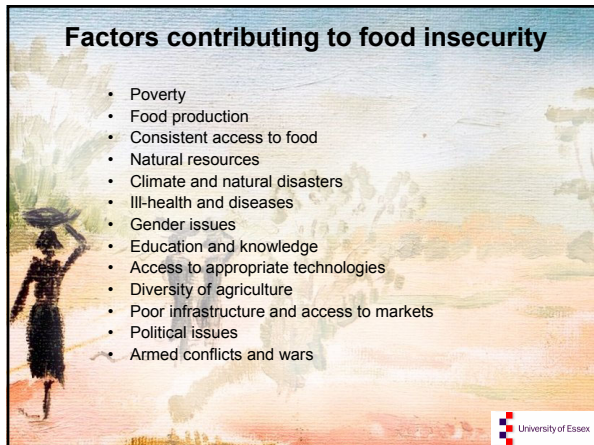
- Physical
  - local infrastructure; roads and bridges; energy supplies; housing and other buildings; markets; transport; land
- Financial
  - savings; access to credit; pensions; remittances; grants and subsidies



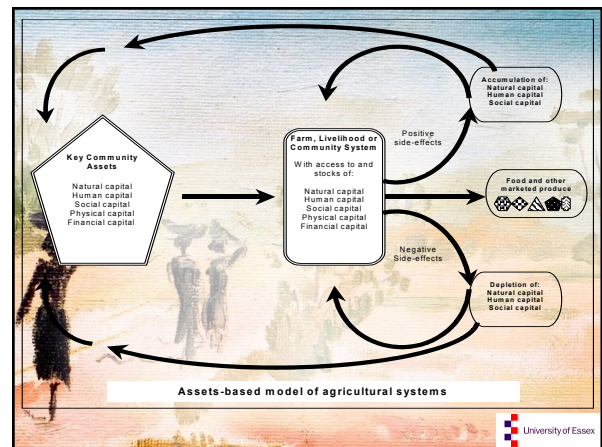
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## Factors contributing to food insecurity

- Poverty
- Food production
- Consistent access to food
- Natural resources
- Climate and natural disasters
- Ill-health and diseases
- Gender issues
- Education and knowledge
- Access to appropriate technologies
- Diversity of agriculture
- Poor infrastructure and access to markets
- Political issues
- Armed conflicts and wars

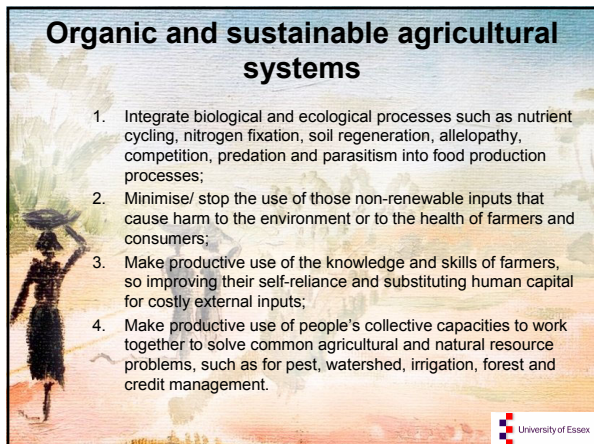


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## Organic and sustainable agricultural systems

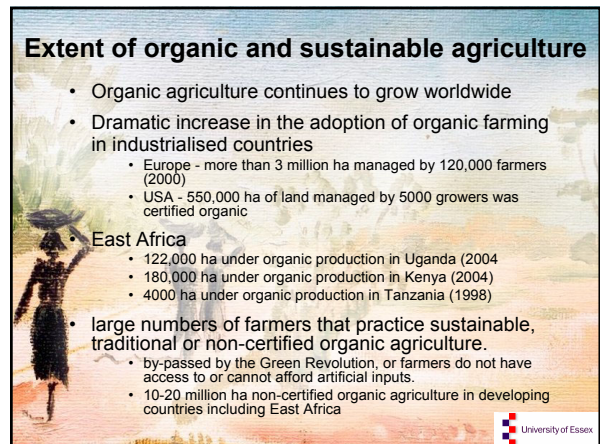
1. Integrate biological and ecological processes such as nutrient cycling, nitrogen fixation, soil regeneration, allelopathy, competition, predation and parasitism into food production processes;
2. Minimise/ stop the use of those non-renewable inputs that cause harm to the environment or to the health of farmers and consumers;
3. Make productive use of the knowledge and skills of farmers, so improving their self-reliance and substituting human capital for costly external inputs;
4. Make productive use of people's collective capacities to work together to solve common agricultural and natural resource problems, such as for pest, watershed, irrigation, forest and credit management.



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## Extent of organic and sustainable agriculture

- Organic agriculture continues to grow worldwide
- Dramatic increase in the adoption of organic farming in industrialised countries
  - Europe - more than 3 million ha managed by 120,000 farmers (2000)
  - USA - 550,000 ha of land managed by 5000 growers was certified organic
- East Africa
  - 122,000 ha under organic production in Uganda (2004)
  - 180,000 ha under organic production in Kenya (2004)
  - 4000 ha under organic production in Tanzania (1998)
- large numbers of farmers that practice sustainable, traditional or non-certified organic agriculture.
  - by-passed by the Green Revolution, or farmers do not have access to or cannot afford artificial inputs.
  - 10-20 million ha non-certified organic agriculture in developing countries including East Africa




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### Extent of organic and sustainable agriculture in Africa



- University of Essex study (2005)
- 286 organic and sustainable agriculture projects, 57 countries
- 37 million ha

Region	No. of countries represented	No. of projects analysed	No. of farmers in project (million)	No. of ha under organic and sustainable agriculture (million ha)	Average change in crop yield since start of project/transition
Africa (all countries with data)	24	114	1,900,000	2.0	+116%
West Africa	7	71	1,600,000	1.4	+128%
East Africa (Kenya, Uganda, Tanzania)	3	44	1,300,000	1.2	+120%
Kenya	1	18	1,000,000	0.5	+179%
Uganda	1	9	27,000	0.06	+67%
Tanzania	1	17	241,000	0.68	+54%



### Better land husbandry, Kenya

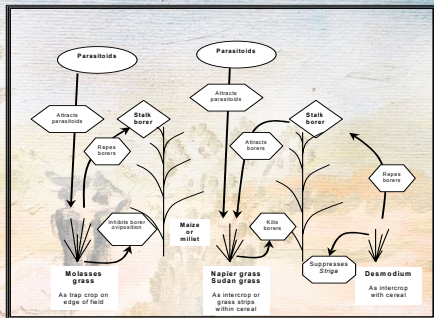
- ABLH using double-dug beds with composting, green and animal manures ~ last 4-6 seasons
- Better water holding capacity and higher organic matter ~ beds more productive, more diverse and are able to sustain vegetable growth into dry season
- Benefits for women and children
  - 75% of households free from hunger during the year;
  - Households buying vegetables during year fell from 85% to 11%;
  - Proportion selling vegetables up from 20% to 77%;


### International Centre for Insect Physiology and Ecology, Kenya

- Novel habitat management approaches to suppress cereal stem borer and *Striga* in maize/sorghum.
- 'Push-pull' strategies
  - repel stem borers from the cereal crop
  - attract them to intercrop or barrier forage grasses
  - Extra-ordinary multi-functionality in a range of fodder grasses and legumes in cereal systems

Participation with farmers

The positive functions of Napier grass (*Pennisetum purpureum*), sudan grass (*Sorghum vulgare sudanese*), molasses grass (*Melinis minutiflora*) and silver leaf (*Desmodium*) for control of stalk borer and *Striga* infestation in cereal systems in Africa





### Environmental Action Team, Kenya

- Soil and crop productivity enhancement project
- North Rift and western regions of Kenya
- soils that are inherently low in fertility, low crop productivity, low diversity in the crops grown, household food insecurity
- aim to enhance household food security
- Field days, demonstrations, farmer verification trials, farmer to farmer visits
- More than 1000 farmers trained
- maize yields 71% increase, bean yields 158%
- Increased crop diversity
- Food security increased
- Surplus produce is sold
- Formation of farmer groups



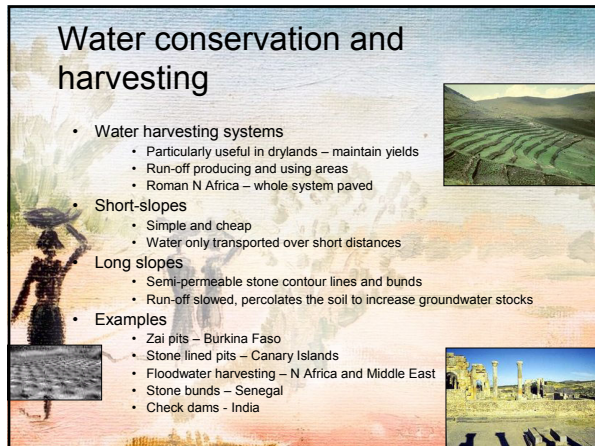

### Organic Agriculture, Iganga District, Uganda

- Poverty Eradication through Environmentally Sustainable Technologies (PEEST) project
- aim of the project is to combat environmental degradation by promoting ecologically sustainable development for improved livelihoods - smallholder farmers
- 10,000 farmers reached in the first phase of the project,
- 99% reported increased food supplies
- many reported increased income
- second phase of implementation with the aim of reaching a total of 50 000 households

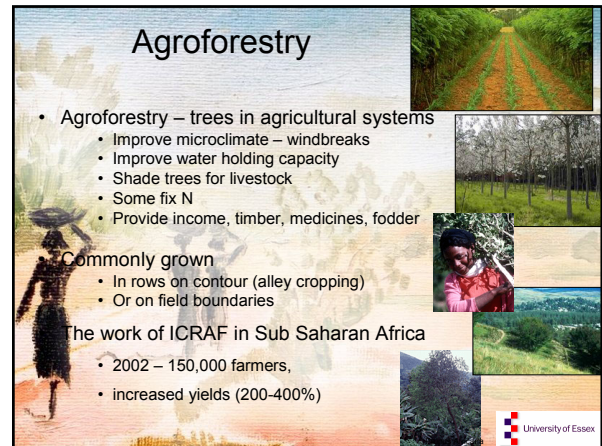
## Water conservation and harvesting

- Water harvesting systems
  - Particularly useful in drylands – maintain yields
  - Run-off producing and using areas
  - Roman N Africa – whole system paved
- Short-slopes
  - Simple and cheap
  - Water only transported over short distances
- Long slopes
  - Semi-permeable stone contour lines and bunds
  - Run-off slowed, percolates the soil to increase groundwater stocks
- Examples
  - Zai pits – Burkina Faso
  - Stone lined pits – Canary Islands
  - Floodwater harvesting – N Africa and Middle East
  - Stone bunds – Senegal
  - Check dams - India

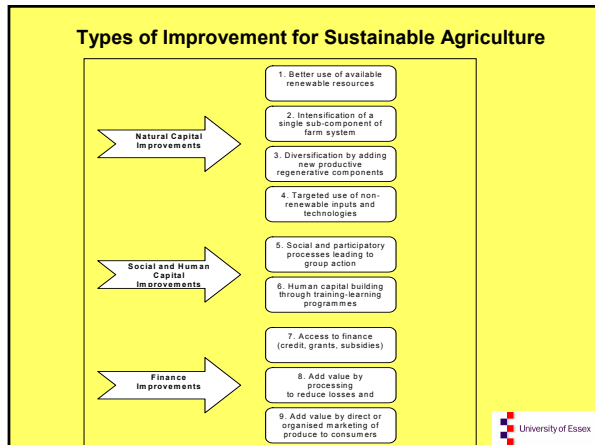


## Agroforestry

- Agroforestry – trees in agricultural systems
  - Improve microclimate – windbreaks
  - Improve water holding capacity
  - Shade trees for livestock
  - Some fix N
  - Provide income, timber, medicines, fodder
- Commonly grown
  - In rows on contour (alley cropping)
  - Or on field boundaries
- The work of ICRAF in Sub Saharan Africa
  - 2002 – 150,000 farmers,
  - increased yields (200-400%)



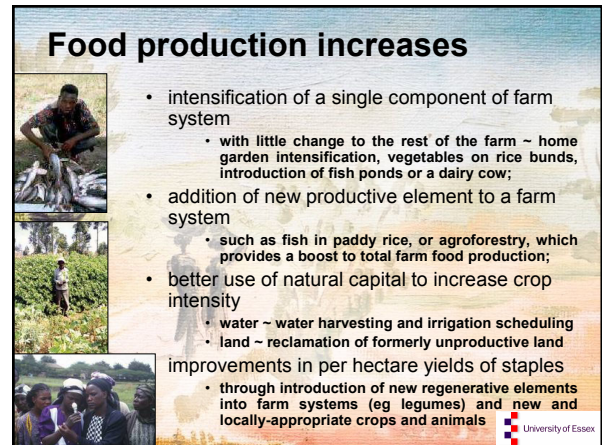
## Types of Improvement for Sustainable Agriculture



- Natural Capital Improvements
  1. Better use of available renewable resources
  2. Intensification of a single sub-component of farm system
  3. Diversification by adding new productive regenerative components
  4. Targeted use of non-renewable inputs and technologies
- Social and Human Capital Improvements
  5. Social and participatory processes leading to group action
  6. Human capital building through training-learning programmes
- Finance Improvements
  7. Access to finance (credit, grants, subsidies)
  8. Add value by processing to reduce losses and
  9. Add value by direct or organised marketing of produce to consumers

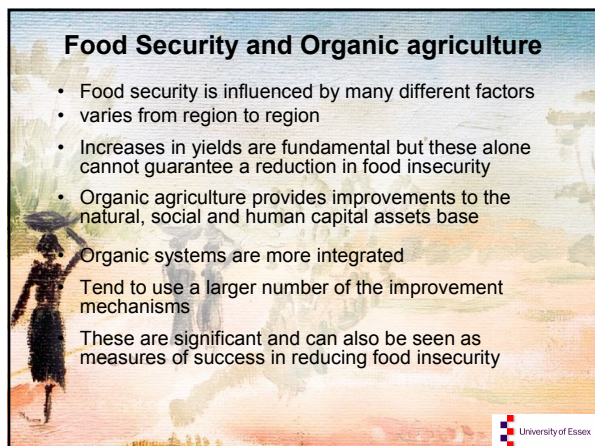
## Food production increases

- intensification of a single component of farm system
  - with little change to the rest of the farm ~ home garden intensification, vegetables on rice bunds, introduction of fish ponds or a dairy cow;
- addition of new productive element to a farm system
  - such as fish in paddy rice, or agroforestry, which provides a boost to total farm food production;
- better use of natural capital to increase crop intensity
  - water ~ water harvesting and irrigation scheduling
  - land ~ reclamation of formerly unproductive land
- improvements in per hectare yields of staples
  - through introduction of new regenerative elements into farm systems (eg legumes) and new and locally-appropriate crops and animals



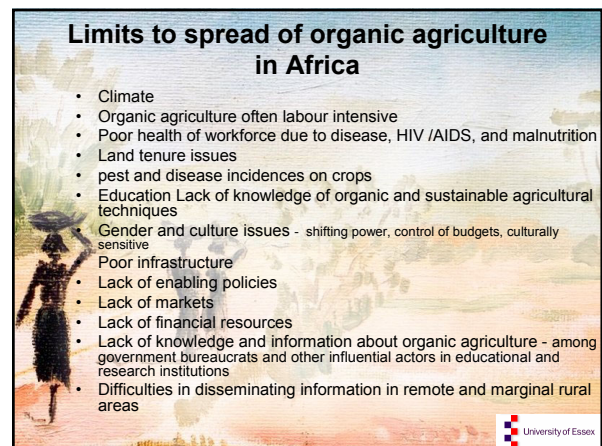
## Food Security and Organic agriculture

- Food security is influenced by many different factors
- varies from region to region
- Increases in yields are fundamental but these alone cannot guarantee a reduction in food insecurity
- Organic agriculture provides improvements to the natural, social and human capital assets base
- Organic systems are more integrated
- Tend to use a larger number of the improvement mechanisms
- These are significant and can also be seen as measures of success in reducing food insecurity



## Limits to spread of organic agriculture in Africa

- Climate
- Organic agriculture often labour intensive
- Poor health of workforce due to disease, HIV /AIDS, and malnutrition
- Land tenure issues
- pest and disease incidences on crops
- Education Lack of knowledge of organic and sustainable agricultural techniques
- Gender and culture issues - shifting power, control of budgets, culturally sensitive
- Poor infrastructure
- Lack of enabling policies
- Lack of markets
- Lack of financial resources
- Lack of knowledge and information about organic agriculture - among government bureaucrats and other influential actors in educational and research institutions
- Difficulties in disseminating information in remote and marginal rural areas



## Further Threats and Constraints?

- **Critical trade-offs between assets**
  - roads for markets and loss of forests?
  - land closed for rehabilitation - poor sell livestock?
  - more work for women? additional incomes go to men?
- **Increasing assets**
  - may tempt the powerful to take over?
- **Aspirations**
  - rural people may want to get away from rural parochialism?
- **Backlash**
  - greater decentralisation of power to local communities and groups ~ means reduced opportunities for rent-seeking and other corruption
- **Changing markets for inputs**
  - reduced demand for agro-chemicals?
  - limited role for agro-chemical, seed and genetic engineering companies ~ so fewer markets
- **Further constraints:**
  - land tenure or security
  - civil disorder and wars
  - institutional inertia
  - macro-economic decline
  - climatic change and disruption



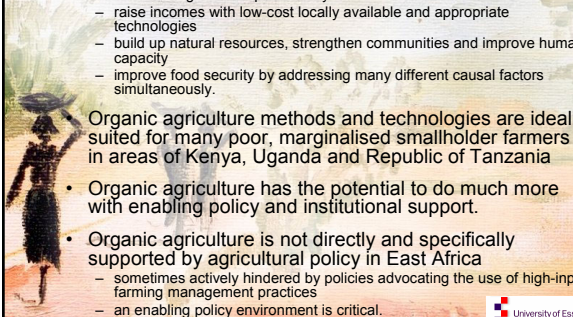
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## Conclusions 1

- **Organic agriculture can**
  - increase agricultural productivity
  - raise incomes with low-cost locally available and appropriate technologies
  - build up natural resources, strengthen communities and improve human capacity
  - improve food security by addressing many different causal factors simultaneously.

Organic agriculture methods and technologies are ideally suited for many poor, marginalised smallholder farmers in areas of Kenya, Uganda and Republic of Tanzania

- **Organic agriculture has the potential to do much more with enabling policy and institutional support.**
- **Organic agriculture is not directly and specifically supported by agricultural policy in East Africa**
  - sometimes actively hindered by policies advocating the use of high-input farming management practices
  - an enabling policy environment is critical.



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## Conclusions 2

- **Organic agriculture is more management and knowledge intensive**
  - requires building the learning and cooperative capacity of individuals and groups
  - requires investment in social capital development at local level if organic agriculture is to spread
- **Partnerships foster successful certified and non-certified organic agriculture**
  - between farmers, farmer groups, NGOs and CSOs, organic movement organisations, Governments and certifying bodies at all levels
  - need to work from local to national and international levels, as well as encourage links between government, NGOs, and the private sector
- **We cannot be sure that a transition to organic agriculture will result in enough food to meet the current or future food needs in East Africa but evidence shows room for optimism**



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