



**The Abdus Salam
International Centre for Theoretical Physics**



2242-1

**Joint ICTP-IAEA Workshop on Uncovering Sustainable Development
CLEWS; Modelling Climate, Land-use, Energy and Water (CLEW)
Interactions**

30 May - 3 June, 2011

Introduction to related activities in IIASA

FISCHER Guenther

*International Institute for Applied Systems Analysis IIASA
Risk, Policy and Vulnerability Program RPV
Schlossplatz 1, 2361
Laxenburg
AUSTRIA*



International Institute for
Applied Systems Analysis
www.iiasa.ac.at

science for global insight

IIASA and the Institute's Research for 2011-2020

ICTP-IAEA Workshop,
Trieste, 30 May - 3 June 2011

Günther FISCHER
fisher@iiasa.ac.at



IIASA, International Institute for Applied Systems Analysis

CONTENTS

1. Major Global Challenges
2. IIASA's Approach
3. IIASA's Strategy 2011 to 2020

MAJOR GLOBAL CHALLENGES

MAJOR GLOBAL CHALLENGES



FOOD

- 925 million people were undernourished in 2010 (FAO)
- By 2030, the world's population will have increased by one billion (IIASA)
- Agriculture accounts for 70% of freshwater withdrawals (UN Water)



MAJOR GLOBAL CHALLENGES



WATER

- 884 million people have inadequate access to safe freshwater (WHO & UNICEF)
- Water use has been growing at more than twice the rate of population increase in the last century (FAO & UN-Water)
- Hydropower supplies about 20% of the world's electricity (ICOLD)



MAJOR GLOBAL CHALLENGES

ENERGY



ENERGY

- 2.5 billion people are without access to modern energy (IIASA/GEA)
- World primary energy demand expected to increase by 36% between 2008 & 2035 (IEA)
- Energy production and consumption contributes over 80% of global GHG emissions (IIASA)



MAJOR GLOBAL CHALLENGES



CLIMATE CHANGE

- Eleven of the last twelve years (1995-2006) rank among the twelve warmest years in the instrumental record of global surface temperature (since 1850). (IPCC)
- Average temperatures predicted to increase by 1.1 to 6.4°C by 2100 (IPCC)
- 70 million Africans could suffer from devastating floods as a result of climate change (IPCC)



MAJOR GLOBAL CHALLENGES



POVERTY & EQUITY

- Over 24,000 children die each day due to poverty (UNICEF)
- 80% of humanity lives on less than \$10 a day (World Bank)
- “Hunger is a cause of poverty, not just a consequence of it.” (FAO)



INEXTRICABLY LINKED



RESEARCHING GLOBAL CHALLENGES

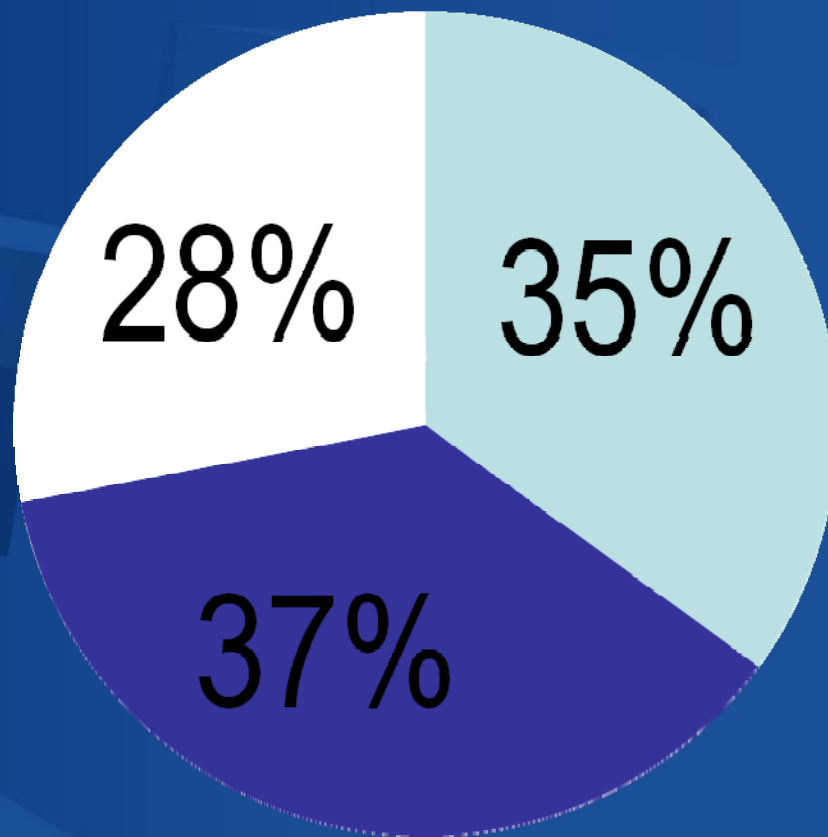
- Integrated
- Interdisciplinary
- International
- Independent
- Solution-oriented
- Long term
- Trade offs



= Systems
Analysis

IIASA'S APPROACH

INTERDISCIPLINARY



■ Natural Scientists & Engineers

■ Social Scientists

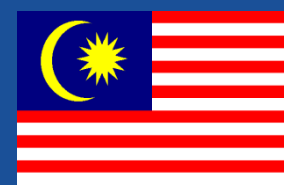
■ Mathematicians and others

HOME OF IIASA SINCE 1972



RESEARCH FUNDERS & PARTNERS

- FUNDING
 - 50/50 membership fees and external funds
 - EUR 17 million budget
 - In 2011: 19 national members and 50+ organizations sponsored IIASA research
- PARTNERS
 - IIASA collaborates with almost 300 institutions from nearly 40 countries



IIASA'S MEMBERS: NATIONAL ACADEMIES

YOUNG SCIENTISTS SUMMER PROGRAM



IIASA'S STRATEGY 2011-2020



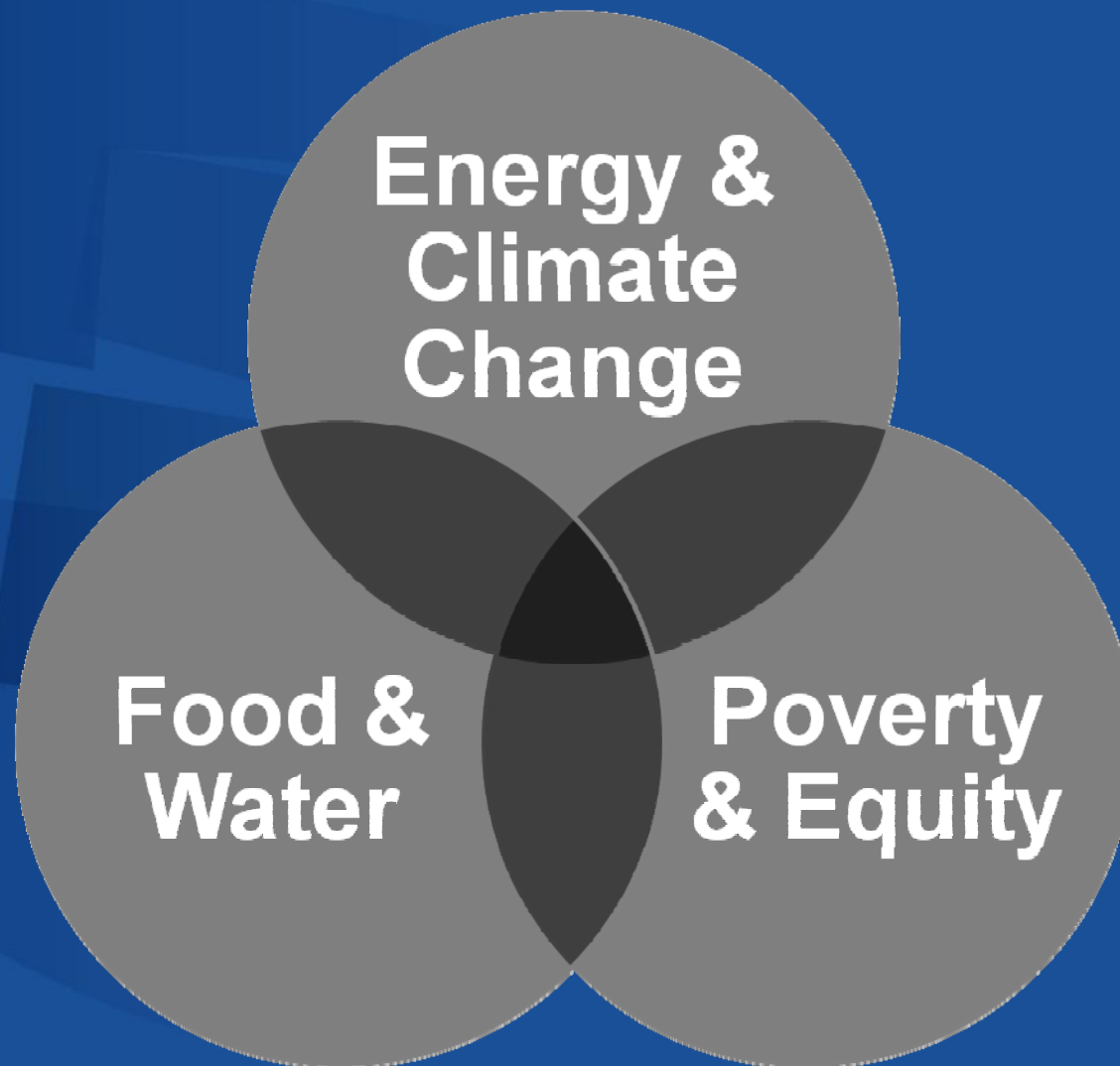
VISION

IIASA will be a world leader in systems analysis to find solutions to global problems for the benefit of humankind.

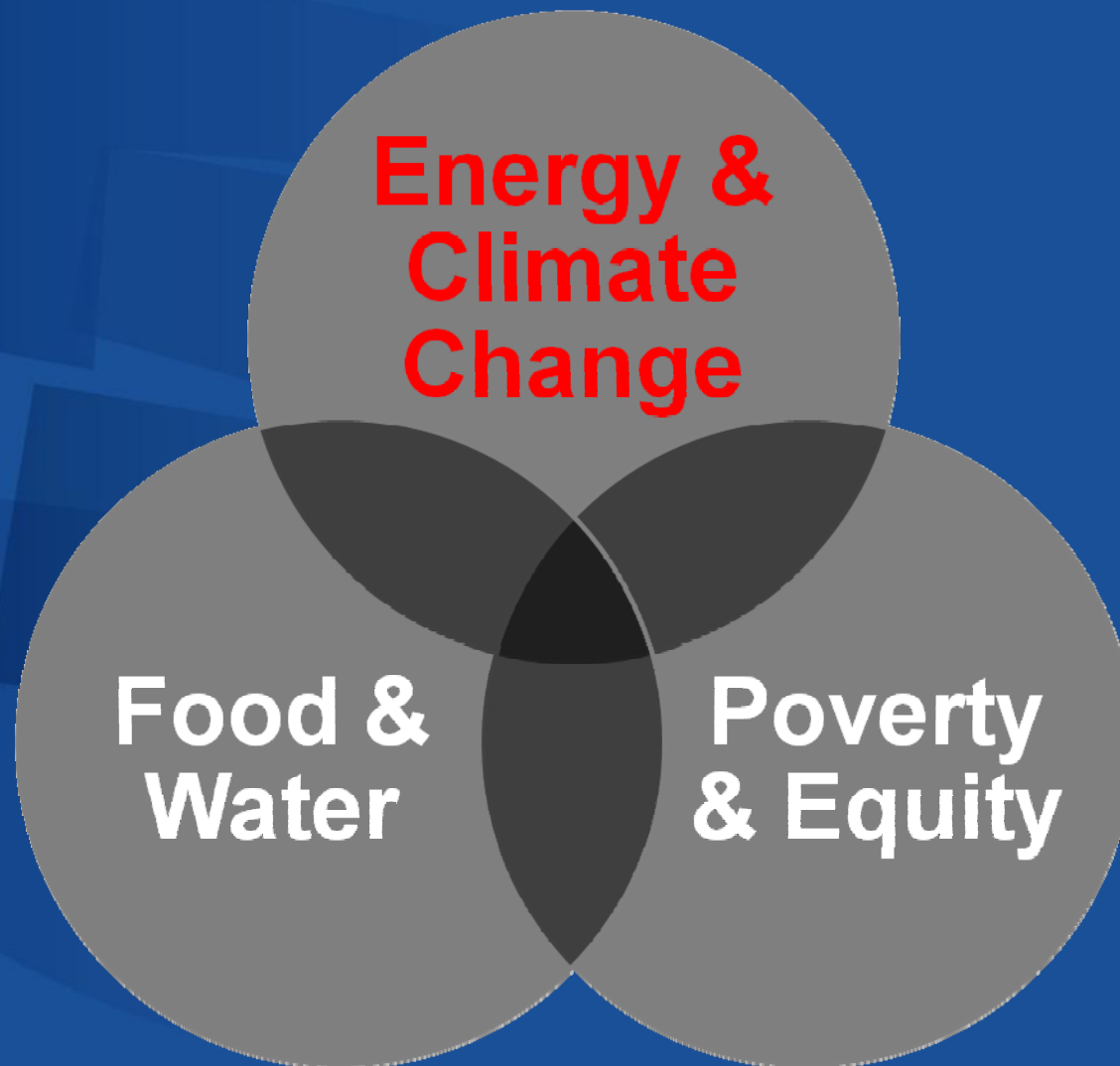
IIASA'S STRATEGY FOR THE DECADE

- Focus on a few global problems
- Emphasis on policy relevance
- Innovation in systems analysis
- Increased capacity building

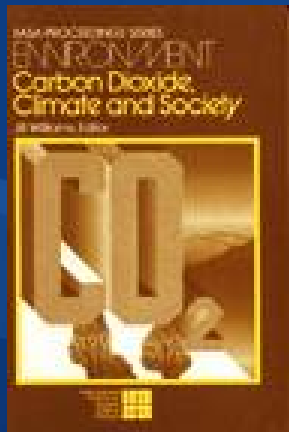
RESEARCH FOR A CHANGING WORLD



RESEARCH FOR A CHANGING WORLD



ENERGY & CLIMATE CHANGE: BUILDING ON PAST SUCCESSSES



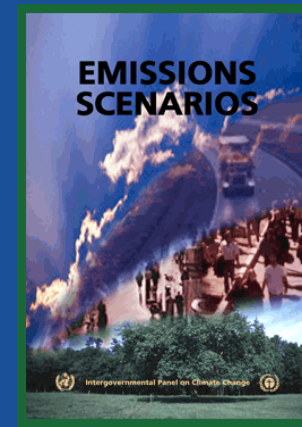
1976



1981

RAINS
helps
cut
sulfur
dioxide

1994



2000

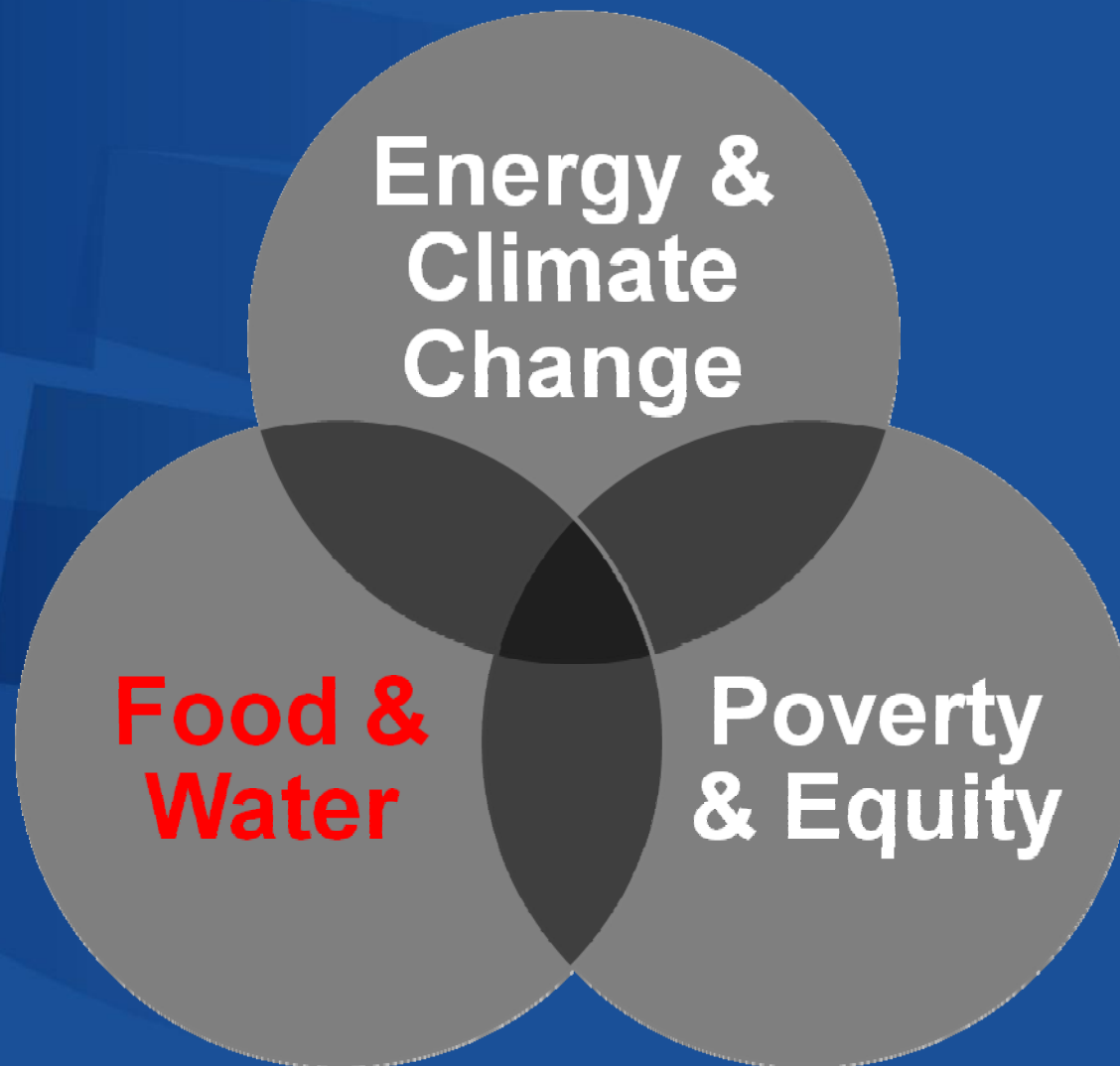
MESSAGE
has helped
over 80
countries
with energy
planning

2010

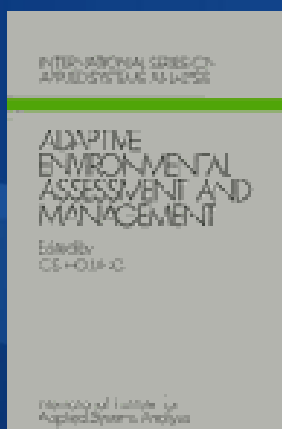
ENERGY & CLIMATE CHANGE: FORTHCOMING RESEARCH

- Global Energy Assessment
- Transformation of the Global Energy System to Achieve a Low-carbon World
- Reframing the Greenhouse Gas Reduction Debate
- Investing in Energy and R & D
- Consumer Choice and Technological Efficiency in Energy Consumption
- Adaptation to Climate Change

RESEARCH FOR A CHANGING WORLD



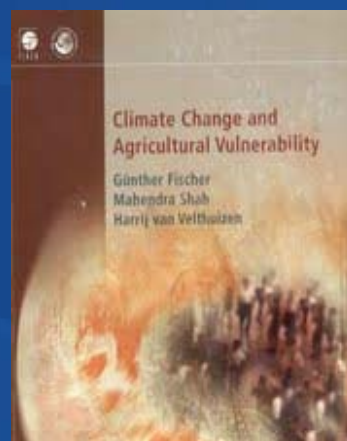
FOOD & WATER: BUILDING ON PAST SUCCESSES



1975



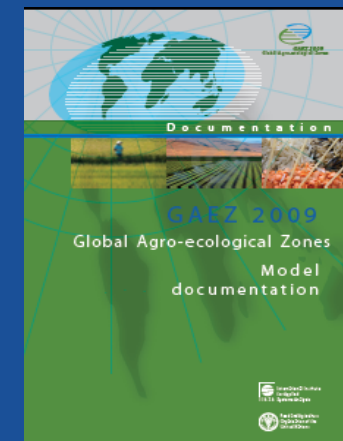
1986



2002



2009

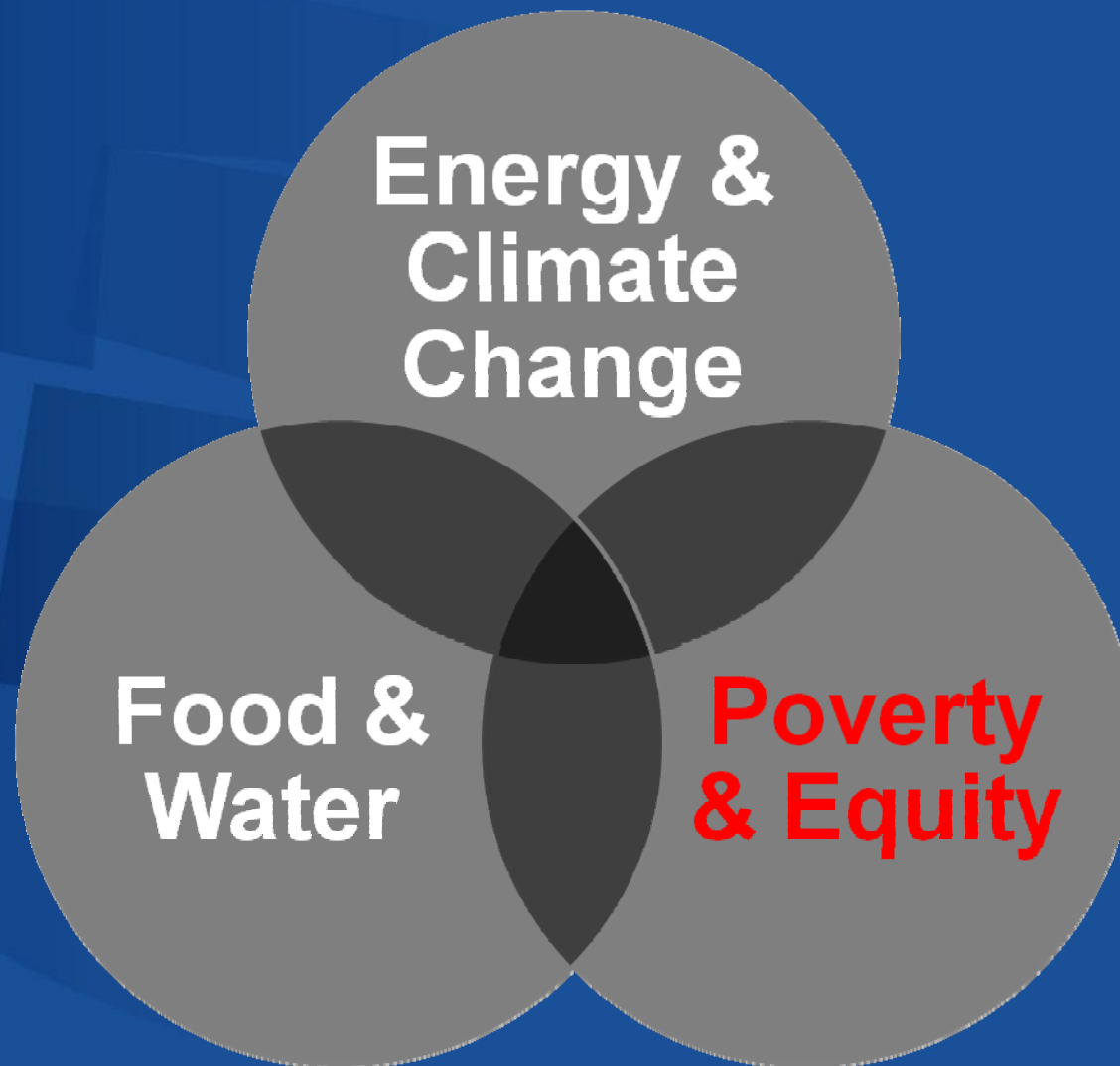


2010

FOOD & WATER: FORTHCOMING RESEARCH

- F & Water Security: Doubling Food Provision
- Responsible Investment in Agriculture
- Climate Change Adaptation of F & W Systems
- Integrated Watershed Management
- Managing Multiple Ecosystem Services
- Safeguarding Sustainable Seafood and Aquatic Ecosystems

RESEARCH FOR A CHANGING WORLD



POVERTY & EQUITY: BUILDING ON PAST SUCCESSSES

WFS model
created to
identify
policies to
eliminate
hunger

1988

HIV and
Development

1997-2001



2005

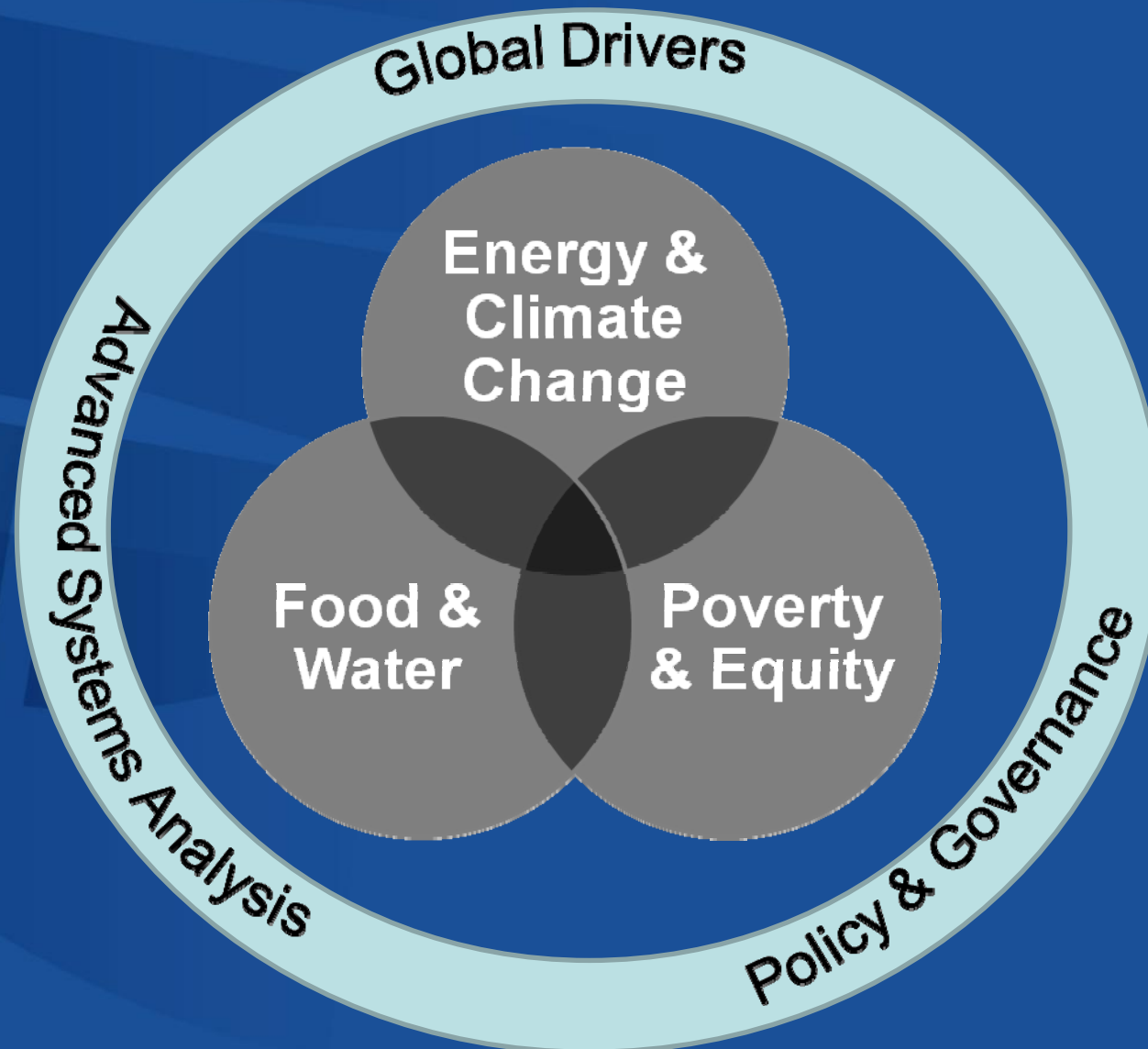


2008

POVERTY & EQUITY: FORTHCOMING RESEARCH

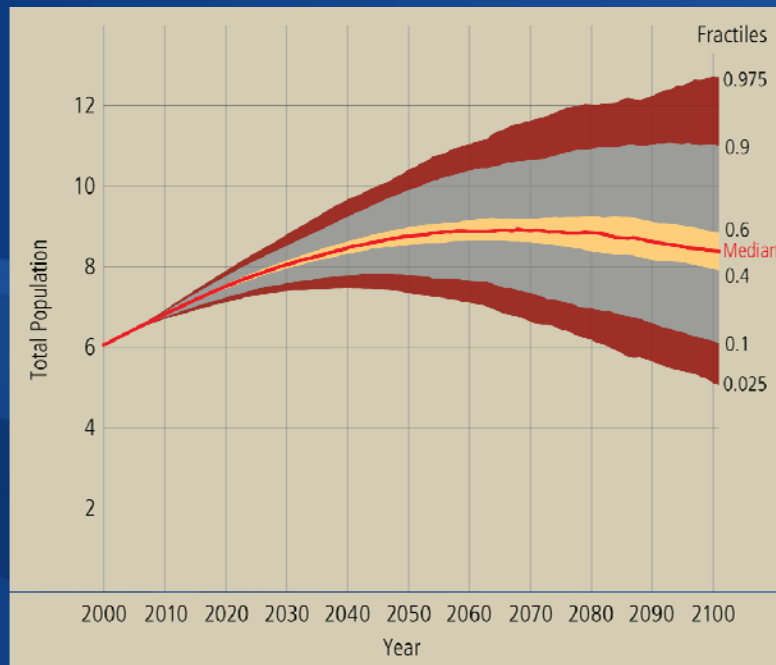
- Integrated and Multi-dimensional Modeling of Poverty
- Wellbeing, Development, and Equity
- Poverty Traps

RESEARCH FOR A CHANGING WORLD

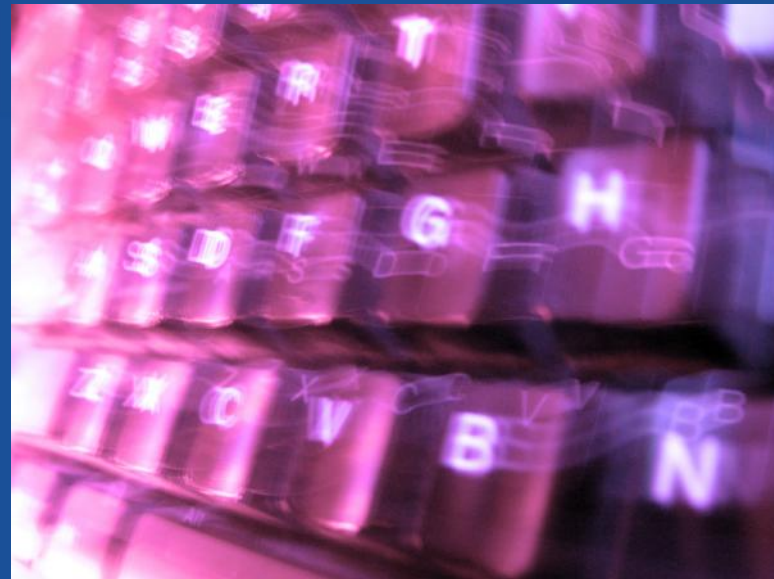


GLOBAL DRIVERS:

- Future Population



- Technology



- Interactions between Population, Education, Poverty and Equity
- Urbanization and Migration
- Sustainable Growth

ADVANCED SYSTEMS ANALYSIS:

PAST SUCCESSES

- Dynamic Systems
- Multi-criteria decision analysis
- Adaptive dynamics theory
- Game theory
- Agent-based modeling
- Stochastic optimization

NEW RESEARCH

- Advances in Modeling Dynamic Systems
- Extreme events, Systemic Risks and Robust Solutions
- Integrated Modeling and Decision Support
- Advanced Systems Analysis Forum

POLICY & GOVERNANCE

PAST SUCCESSES

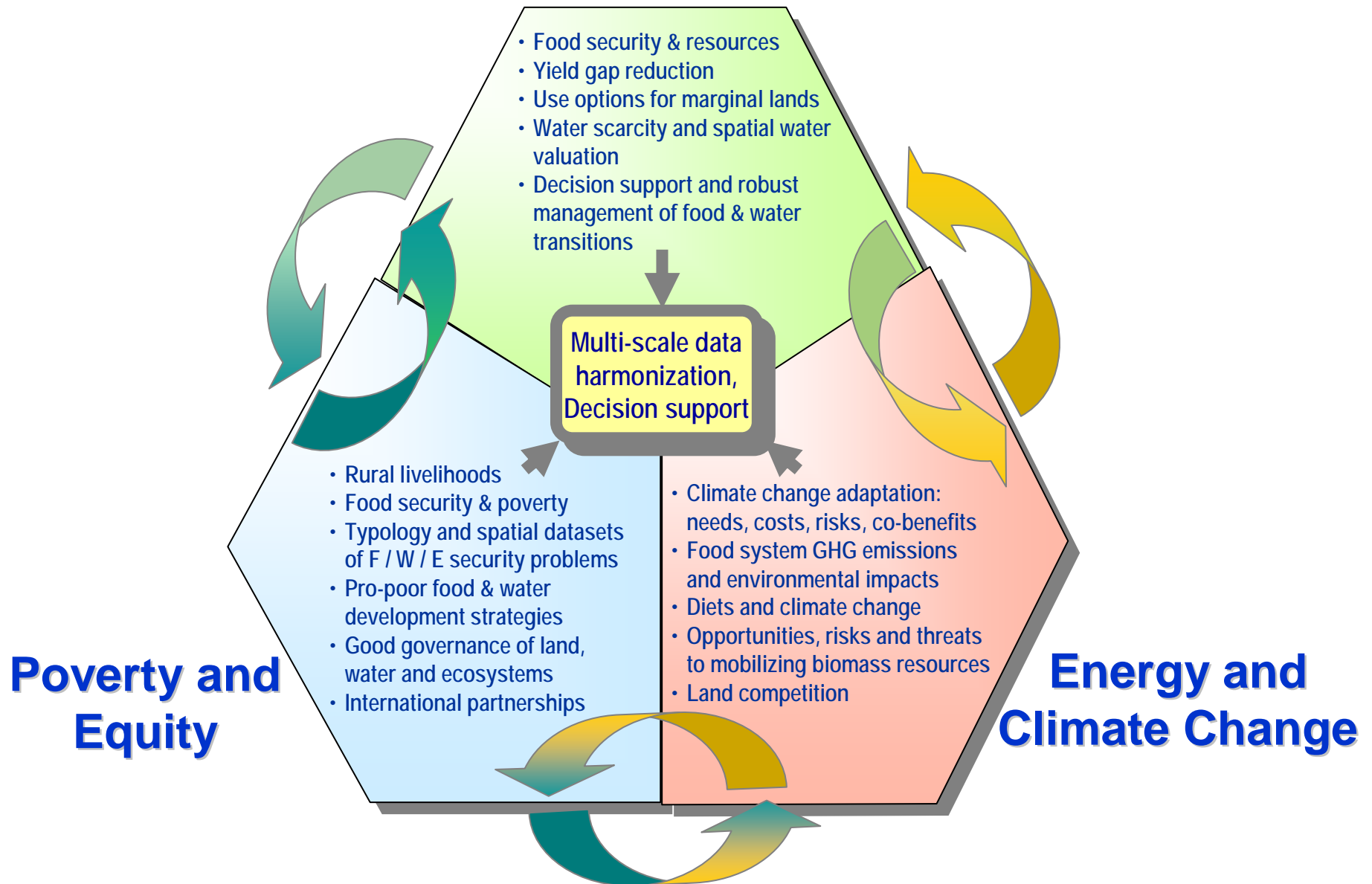
- Energy Assessments
- IPCC reports
- WSSD Johannesburg
- Reducing air pollution in Europe
- Biofuels and Food Security
- Advising UN Secretary General

NEW FOCUS

- Establishing policy dialogues and relationships
- Linking global research to national policy agendas
- Collaborating with local policy and scientific institutions

LUC Research for a Changing World

Food and Water





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Thank you

For further information about IIASA:
www.iiasa.ac.at or inf@iiasa.ac.at



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