Case 1: Climate change in Kenya
Maize is a highly significant staple crop in Kenya, socially and economically. This project takes maize in Kenya as a window through which to explore different responses to climate change. It traces different types of innovation proposed by various actors - public agricultural research institutions, donors and private companies; and practiced within communities and broader social networks. At issue are the ways in which people in different institutional and geographic locations understand and frame resilience, for example as a property of seeds, farming systems or broader livelihoods; and how these framing assumptions shape agendas and steer solutions, programme designs and resources in certain directions and not others.

More reading

Agri-food System Dynamics: pathways to sustainability in an era of uncertainty, STEPS Working Paper 4, by John Thompson, Erik Millstone, Ian Scoones, Adrian Ely, Fiona Marshall, Esha Shah, and Sigrid Stagl (2007).
ISBN – 13: 978 185864 653 7

Pathways to Sustainability: an overview of the STEPS Centre approach by Melissa Leach, Ian Scoones and Andy Stirling (2007). ISBN – 13: 978 1858646561

For other titles in this series (including water, health, dynamics, governance, designs) see: www.steps-centre.org/publications

Credits

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About the STEPS Centre

The STEPS Centre (Social, Technological and Environmental Pathways to Sustainability) is an interdisciplinary global research and policy engagement hub uniting development studies with science and technology studies. We aim to develop a new approach to understanding, action and communication on sustainability and development in an era of unprecedented dynamic change. The STEPS Centre is based at the Institute of Development Studies and SPRU Science and Technology Policy Research at the University of Sussex with a network of partners in Asia, Africa and Latin America and is funded by the Economic and Social Research Council. Find out more: www.steps-centre.org

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Agri-food System Dynamics for Sustainability

From STEPS Working Paper 4: Agri-food System Dynamics: pathways to sustainability in an era of uncertainty

STEPS briefing 4

In an era of rapid change, growing risk and uncertainty, there are many challenges to the sustainability of agricultural policy and practice in the developing world. Concerns about chronic hunger, malnutrition and technology-enhanced productivity, adverse environmental changes, increasing land degradation, the loss of biodiversity, livelihood insecurity and poverty in agricultural communities abound. These apprehensions raise important questions about whether the forms of agriculture developed over the past century can respond to the complexity of 21st century challenges.

Change in an uncertain world

A focus on uncertainty, complexity and diversity lies at the core of the STEPS Centre agenda. We seek to shift attention away from policies and practices that maintain the status quo or control change in systems that are assumed to be stable. Instead, our work favours analysis and practices that enhance the capacity of agri-food systems to respond to, cope with and shape change. According to how you frame the debate, different assumptions about economic, socio-political, technological and ecological systems and

"Basic shifts in the governance of agri-food systems are needed"

African oil palm seeds for sale, Benin / Peeter Viisimaa / iStockphoto

their dynamics suggest different pathways to sustainability. A key challenge is to identify ways forward which are responsive to changing conditions and meet wider, normative sustainability goals.

We believe the future of agri-food systems debate needs refreshing. The mainstream perspective, with imperatives of increased productivity and economic growth, is seen as the sole way forward. Meanwhile, an unhelpful slanging match has surfaced, framed in 'either/or' terms, such as the genetically-modified crop debate. But rather than ask whether a particular technology or policy is 'good' or 'bad', a more nuanced analysis of technology society relations is needed. The framing of agri-food policy and practice and broader trajectories of socio-technical change must be investigated. These policy framework choices or innovation options are political, requiring more basic shifts in the governance of agri-food systems recognised by current narratives of agricultural development.

From Green Revolution to Gene Revolution

The first Green Revolution is predominantly viewed as a success. However, many developing countries, particularly in Africa, have not realised a Green Revolution and do not produce enough food to feed their growing populations. Microeconomic conditions in poor areas render agricultural production and trade risky and costly, militating directly against the adoption and diffusion of improved technologies. Thus, justifications for policy interventions that mirror the Asian success story are strong.

For many in mainstream agricultural development, a biotech, or Gene Revolution, is the natural successor to the Green Revolution. But again the emphasis is on moving beyond complexity and diversity, rather than to responding and adapting to them. And this pathway has been institutionalised within the international Consultative Group on International Agricultural Research (CGIAR) and national agricultural research systems.

Meanwhile this new revolution is led by major private sector 'life sciences' companies, with big biotechnology research and development budgets, and is based on a particular set of governance arrangements – professions, organisations, incentives, intellectual property rights, shrinking state provision and so on.

As a result, agricultural science and technology combined with growth-oriented development targeted at global markets are heralded as the way to meet the Millennium Development Goals and other targets. But in many developing countries government agricultural policy, backed by international development agencies, supports large commercial farms and the 'small farm sector' with different policies, promoting a dualistic system for agriculture in the name of poverty reduction.

"Our work favours analysis and practices that enhance the capacity of agri-food systems to respond to, cope with and shape change"

Rethinking agri-food systems

How appropriate is this prevailing vision of modern agriculture? We argue for engagement with at least two strands of thought. Firstly, rethinking agricultural development using a systems perspective that emphasises spatial, temporal and cultural variation, and complexity and uncertainty. Secondly, rethinking agriculture-related natural and social sciences by focusing on agro-ecological interactions, principles and histories and situated analyses of particular people in particular places.

In rethinking agri-food systems some challenging questions need to be asked. Given growing uncertainty, complex dynamics, shocks and stresses in both the North and the South, how resilient and robust are different alternative approaches to agricultural development? How to think about the governance of global and local agri-food systems in the light of R&D and innovation systems restructuring and the global politics of food? What does this mean for different normative understandings of sustainability, expressed by different groups? And what does this imply for different pathways of change in different contexts? In response, we offer:

Six elements of a STEPS agri-food systems research agenda on:

1. **Framing the sustainability challenge.** Unpacking 'sustainability' in agri-food systems with analysis of different framings and deliberations among farmers, consumers, processors, R&D players and others.
2. **Exploring multiple pathways.** The diversity of 'rural worlds' opens up variety of future pathways for agri-food systems. An opening up of debates, unlocking both intellectual and practical biases and constraints, is needed.
3. **Scales of analysis.** Farmers' options and opportunities must be understood in relation to processes interacting across scales, from the very local to the global.
4. **Dynamic system properties.** How do different pathways respond to internal and external shocks and stresses, and how resilient, robust, durable and stable are they? Depending on who is pursuing a particular pathway, different system attributes may be more or less desirable. Debates about choices and trade-offs are key.
5. **Governance analysis.** What influences the framings of 'the problem'? How inclusive and deliberative are the policy processes that define what – and who – agriculture is for? Which pathways are constrained by current arrangements, and which options might be opened up if alternative governance arrangements were envisaged?
6. **From analysis to practice.** How to facilitate the design of agri-food systems that meet the challenge of sustainability in the future? This requires new approaches to appraisal and the wider processes that affect what happens on the ground.

Growing vegetables in the shadow of Jakarta's Central Business District, Indonesia / Chris Stowers / Panos Pictures