Scaling Up Agroecology

TOWARD THE REALIZATION OF THE RIGHT TO FOOD

If there was a silver lining in the disastrous 2007–2008 food price crisis, it was that it prompted governments and international donors to re-examine their priorities for agricultural development. They committed to invest in agriculture and food security in a manner that prioritizes small-scale producers (especially women), enhances the environment and contributes to the development of rural economies. While their promises to spend more received media attention, the focus of countless other debates at the United Nations, among donors and even at the World Bank, refocused attention on how those funds would actually be spent. Choices about production methods, farming systems, types of aggregators and value chains, etc., will lead to very different kinds of outcomes for communities engaged in food production, harvesting and processing.

This is borne out by past experiences in international development aid. All through the second half of the twentieth century, agricultural development aid supported export-oriented production, rather than local food security. Donor support for agricultural food production and processing methods that simultaneously help small-scale producers realize their food sovereignty and protect the environment, would lead to a different outcome. Toward this end, we outline a set of principles and practices of agroecology.

Those debates highlighted the environmental concerns associated with industrial monocultures, but all too often, agricultural development programs and projects still choose from a very limited array of seeds and plants, and opt for chemical-intensive agriculture (involving high use of pesticides, herbicides and fertilizers). In a world confronting an increasingly chaotic climate, this kind of agriculture offers little stability either for food producers or for consumers, and results in high social costs.[1] Instead, the investments could support a more holistic approach that integrates improvements in productivity with enhancements of the natural environment, crop-nutrient value, local livelihoods and local control.

That alternative approach is agroecology, which has the potential to increase both the resiliency and sustainability of agroecosystems and not only "provides the principles for rural communities to reach food sovereignty, but also energy and technological sovereignty."[2] In the lead up to Rio+20, civil society organizations ranging from the global farmers movement La Via Campesina to development and environmental organizations made a concerted effort to gain political support for agroecology

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as a way to help address the multiple challenges related to food security, the climate crisis and environmental crises.

But what exactly is agroecology and how does it differ from other approaches to sustainable agriculture?

First, agroecology is an interdisciplinary science that has benefitted from the insights of ecologists and agronomists, as well as social scientists. According to the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD, a multi-year study involving hundreds of experts and several U.N. agencies), agroecology is "the science of applying ecological concepts and principles to the design and management of sustainable agroecosystems. It includes the study of the ecological processes in farming systems and processes such as: nutrient cycling, carbon cycling/sequestration, water cycling, food chains within and between trophic groups (microbes to top predators), lifecycles, pollination, herbivore/predator/prey/host interactions, etc."[3]

This definition implies that the study of ecological processes takes place not only within the farming system, but also in relation to surrounding landscapes & relevant watersheds, as well as in relation to global carbon and nitrogen cycles. The IAASTD definition also recognizes that "agroecological functions are generally maximized when there is [a] high species diversity/perennial forest-like habitats."

The following ecological principles have been identified as central to agroecology by pioneer advocates and academics such as Miguel Altieri.[4]

1. Enhance recycling of biomass and optimizing nutrient availability and balancing nutrient flow.
2. Securing favorable soil conditions for plant growth, particularly by managing organic matter and enhancing soil biotic activity.
3. Minimizing losses due to flows of solar radiation, air and water by way of microclimate management, water harvesting and soil management through increased soil cover.
4. Enhancing species and genetic diversification of the agroecosystem in time and space.
5. Enhance beneficial biological interactions and synergisms among agrobiodiversity components thus resulting in the promotion of key ecological processes and functions.

The above principles, mostly informed by an ecosystem-based approach, are shared by almost all shades of agroecologists.[5] They also implicitly presume a set of social practices grounded in local empowerment and knowledge generation that are often absent from other definitions of "sustainable agriculture."

One such definition is sustainable intensification (SI) of agriculture, which has become popular especially with international institutions, foreign-aid programs and other large funders of agricultural research and development. SI focuses primarily on increasing productivity by tapping the unrealized potential of small-scale producers. In initiatives such as the U.S. Feed the Future Initiative and the Gates Foundation's Alliance for a Green Revolution in Africa (AGRA), SI is the way to increase yield without adverse environmental implications. Funders such as Bill and Melinda Gates Foundation, Rockefeller Foundation, and UK's Department of International Development (DFID) support knowledge-creating international agricultural research institutions of Consultative Group on International Agricultural Research (CGIAR), which has identified sustainable intensification as its policy objective.

However, as Friends of the Earth International (FoE International) points out in an analysis of SI efforts: "Aside from environmental sustainability this [the definition of sustainable intensification by Feed the Future Initiative] could be a definition of commercial, intensive agriculture."[6] FoE International further analyzes the practice and experience of sustainable intensification and shows several examples where either they do not benefit small farmers, or are not really environmentally sustainable.

Since 2010, the Food and Agricultural Organization (FAO) has begun using yet another term, Sustainable Crop Production Intensification (SCPI), which it has identified as one of its key strategic objectives since 2010. It is based on three technical principles: "simultaneously increasing agricultural productivity and enhancing natural resource"; the "use of managed and natural biodiversity to build system resilience to abiotic, biotic and economic stresses, and a third, improving resource use efficiency in input uses including pesticides and fertilizers."[7] Through SCPI, FAO plans to "provide member countries with an array of technologies, policies, knowledge, information and capacity building to help them increase their crop *productivity* and *profitability* throughout time [emphasis added]."[8] It is not surprising that conservation agriculture, recognized as part of SCPI, often includes "chemical intensive no-till agriculture" especially when it comes to industrial-scale operations. Agribusinesses ranging from seed supply and agrichemical multinationals (e.g., Monsanto), to companies working all along the food value chains (e.g., Nestle, Unilever, Pepsi) too are very invested in the promotion of both SI and SCPI, as is clear from an initiative of theirs at the World Economic Forum (WEF): 'The New Vision for Agriculture'.[9]

This tension between holistic agroecological principles and sustainable intensification contributed to interest among key stakeholders pushing for the development of ecological-based farming in Africa to organize a strategic planning meeting in Thika, Kenya, in May 2011. Organized by the African Union Commission (AUC) and the Participatory Ecological Land

Use Management (PELUM) Kenya, the meeting led to the creation of an African Ecological Organic Initiative and proposed an action plan which aims to mainstream "Ecological Organic Agriculture (EOA)" into national agricultural production systems by 2020.[10]

Ecological Organic Agriculture (EOA) is perhaps the closest continental-level action plan based on agroecological principles. The adjective "ecological" is especially important, and implicitly acknowledges that the mainstream certified organic sector is often based on large-scale industrial agricultural systems where input substitution—biopesticides rather than chemical pesticides—is the norm, rather than an integration of all the agroecological principles above. Thus the international network of organic producers, IFOAM, defines organic agriculture in a manner that includes input substitution with bio-based inputs.

Unlike mainstream organic agriculture, the idea of agroecology is to develop agroecosystems with minimal dependence on energy-intensive inputs, emphasizing complex agricultural systems in which ecological interactions and synergisms between biological components provide the mechanisms for the systems to sponsor and sustain their own soil fertility, productivity and crop protection.[11]

This vision of agroecology as both a science and a set of practices, is what Buttel describes as emerging from ecological and political economical critique of modern agricultural systems.[12] In this vision, agroecology is highly knowledge intensive, and is based on techniques that are not delivered top-down but developed on the basis of small-scale producers' knowledge and experimentation.[13] This understanding of agroecology was developed in the context of indigenous and peasant farming systems (and notably, against the backdrop of large scale industrial monocultures in the Latin Americas) over the last three decades.[14] Here agroecology is not only central to maintaining ecosystem integrity, but also to realizing food sovereignty.

What is food sovereignty?

Food sovereignty is defined as "the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems."[15] Made prominent in 1996 at the Food Summit, by La Via Campesina, one of the largest global networks of owner-cultivators, food sovereignty is about putting those who produce, distribute and consume food at the center of decisions on food systems and policies, rather than the corporations and market institutions that have come to dominate global agriculture and food systems.

Advocacy for food sovereignty has been in the making, not only in Latin Americas but around the world, for a few decades now. Farmers in India practicing what they call "natural farming," or those in East Asian countries practicing sustainable agriculture, while campaigning to get agriculture out of free-trade negotiations, or indigenous groups around the world seeking to enhance their traditional agricultural and pastoral practices through innovative approaches, have all been advocating for their right to define their own food and agriculture systems.

Their practices too have been agroecological both in terms of ecology—protecting the ecosystem base that supports their food security while seeking to maximize agricultural production within ecosystem limits—and in terms of political economy, as part of seeking to control their food systems and thus about realizing food sovereignty.

In short, this vision of agroecology combines the sciences of ecology and agronomy with the political economy of food production and consumption (expressed as food sovereignty). This approach goes beyond improving the availability of food to also ensuring access and the achievement of the right to food; indeed, it should be the standard by which national agricultural strategies, food security plans and foreign assistance programs are evaluated by their respective publics.

Assessing global food security programs

It is against this background that IATP is working with partners to develop a set of policy indicators to assess whether public or private programs to address global food and agriculture challenges are actually heading in this new direction. To do that, we have started with certain core agroecological principles and practices, developed a set of indicators to assess ecological benefits as well as socioeconomic outcomes of these practices (see appendix).[16] These indicators, however, should be considered in an integrated sense, to ensure that the focus is not simply either on the science of agroecology, or on the political economy of the food production. While these indicators are listed against a principle and practices that directly correspond to them, all principles are mutually supportive and thus outcomes, too, mutually reinforce each other. From that starting point, we have defined certain key elements of policy support that would be needed to make those principles, practices and outcomes possible.

Agroecology is by definition an innovative, creative process of interactions among small-scale producers and their natural environments. Indigenous knowledge systems are invaluable resources for agroecological farming systems that emulate and coexist with natural ecosystem processes. At the same time, advocates of agroecology recognize that in many parts of the world farmlands have become degraded and it would require additional investments as well as policy support to help small-scale producers improve soil and water conditions to increase farm outputs, achieve local food security and long-term ecosystem sustainability.

One size most definitely does not fit all. However, our initial consultations with allies have identified certain sets of policy support that are conducive to creating an enabling environment for those innovations to occur and prosper. At the national level, they include:[17]

- Agricultural policies that incentivize recycling of biomass within the agroecosystem
- Agricultural investments and extension targeted specifically to help small-scale producers improve soil and water conditions through agroecological practices
- Agricultural policies that incentivise *in-situ* water conservation, soil (biota, organic matter and nutrient) enhancement, organic tillage regimes and microclimate management
- Water policies that incentivize reduction of grey/blue water footprint of agricultural and food systems, not only in crop selection and farming methods but also in food processing and packaging, etc.
- Trade, investment and intellectual property rights policies that protect indigenous and peasants' rights to select, domesticate, breed, exchange and use native species of crops and livestock varieties
- Environmental and food safety policies based on the precautionary principle that avoid reckless introduction of GMOs or other emerging technologies
- Coordinated environmental and agricultural policies on biodiversity that ensure heterogeneity and diversity at the landscape and farm level.
- Agricultural, water and energy policies that prioritize the use of natural resources such as land and water for food production, local energy security and local water security
- Agricultural research policies and extension programs that prioritize:
    - Research and development of new varieties that are based on participatory plant breeding techniques
    - Farmer- to- farmer knowledge exchanges based on locally determined priorities
- Pro-democratization policies that recognize women's central roles in agricultural and food systems, revitalize rural economies, minority cultures as well as marginalized livelihood practices.

These policies and programs, in turn, require an enabling environment at the international level, including:

- International trade agreements that allow national governments to exempt agricultural goods that are central to rural livelihoods, food sovereignty and rural development from tariff liberalization as needed.[18]
- International investment agreements (whether within trade agreements or in bilateral investment treaties) that reject investor-state dispute resolution provisions that give foreign investors the right to sue national governments over policies (such as restrictions on GMOs or changes in research and extension programs that restrict the use of imported inputs)
- International guidelines on land tenure that take as their starting point the rights of small-scale producers to stay on their land[19]
- Foreign assistance programs that:
    - respond to locally determined priorities for knowledge generation and dissemination (including recovery of traditional knowledge and scientific innovations)
    - support efforts to organize cooperatives and institutions controlled by local small-scale producers and their communities[20]
    - assist developing countries to develop national action plans to review and adjust laws that will allow farmers to save, use, exchange and sell their seeds; and allow improved access to genetic resources that go beyond the limits of agreements such as UPOV 1991 to enhance community rights over innovations in seeds, plants and biodiversity[21]

Endnotes

1. Farmers' suicides in India are an example of a social cost of chemical intensive agriculture, borne by producers. Bitter Seeds by Micha. X. Peled, http://www.itvs.org/films/bitter-seeds Accessed June 28 2013.

2. Miguel A. Altieri Toledo (2011), The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants, Journal of Peasant Studies, Volume 38, Issue 3, 2011.

3. International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), Global report, (Washington, DC: Island Press, 2009), http://www.agassessment.org/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20%28English%29.pdf, Annex C, Glossary, p.560 Accessed June 28 2013.

4. Reijntjes et al. (1992) quoted in A Viable Food Futures, Part II, P.71 http://www.moreandbetter.org/file_download/112/future2-bw-web-print.pdf. Accessed on June 1, 2013.

5. Buttel describes three main types of agroecology: ecosystem agroecology (predominant among ecologists), agronomic agroecology, and the third most longstanding form of agroecology, referred to as agroecological political economy. See Frederick H. Buttel, Envisioning the Future Development of Farming in the USA: Agroecology Between Extinction and Multifunctionality? [New Directions in Agroecology Research and Education, 2004?] http://www.agroecology.wisc.edu/downloads/buttel.pdf Accessed on June 1, 2013.

6. Friends of the Earth, Wolf in Sheep's clothing? An analysis of the 'sustainable intensification of agriculture, October 2012, http://www.foei.org/en/wolf-in-sheeps-clothing. Accessed on June 1, 2013.

7. U.N. FAO: Save and Grow, A policy makers guide to sustainable intensification of smallholder crop production, Chapter 2. Farming Systems, http://www.fao.org/ag/save-and-grow/en/2/index.html. Accessed on June 1, 2013.

8. U.N. FAO: Sustainable Crop Production Intensification (SCPI) in FAO http://www.fao.org/agriculture/crops/core-themes/theme/spi/scpi-home/framework/sustainable-intensification-in-fao/jp/. Accessed on June 1, 2013.

9. World Economic Forum (WEF): Agriculture and Food Security http://www.weforum.org/issues/agriculture-and-food-security. Accessed on June 1, 2013.

10. Organic Africa: African Stakeholders meet in Kenya to develop an African ecological organic initiative (Source: IFOAM: Africa Organic News May 2011) http://www.organic-africa.net/1608.html?&L=0&tx_ttnews%5Btt_news%5D=522&cHash=07a82dde68456f0dcec8ca1fe482b6bc. Accessed June 28 2013.

11. Altieri and Rosset (1995), As quoted in Agroecology: principles and strategies for designing sustainable farming systems http://nature.berkeley.edu/~miguel-alt/principles_and_strategies.html). Accessed on June 1, 2013.

12. Frederick H. Buttel, Envisioning the Future Development of Farming in the USA: Agroecology Between Extinction and Multifunctionality? [New Directions in Agroecology Research and Education, 2004?] http://www.agroecology.wisc.edu/downloads/buttel.pdf. Accessed on June 1, 2013.

13. Miguel A. Altieri Toledo (2011), The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants, Journal of Peasant Studies, Volume 38, Issue 3, 2011.

14. Ibid.

15. International Planning Committee for Food Sovereignty (IPC), Definition Of Food Sovereignty (From The Declaration Of Nyéléni) http://www.foodsovereignty.org/FOOTER/Highlights.aspx Accessed on June 1, 2013.

16. Please see appendix on agroecological indicators and policy advocacy asks.

17. Please see appendix on agroecological indicators and policy advocacy asks.

18. As agreed to in the Hong Kong Ministerial declaration of the WTO in 2006, but subsequently vigorously opposed by rich country governments.

19. The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security provides a good starting point for those discussions.

20. The Global Agriculture and Food Security Program provides some useful lessons on decision-making structures and practices, particularly in the structure of its governing board, which includes an equal number of donor and recipient country governments and representation by farmers organizations from the Global South.

21. See the CSO reflections on the final statement from "International Treaty on Plant Genetic Resources" for Food and Agriculture Fifth Session of the Governing Body Muscat, Oman, 24/09/2013–28/09/2013, http://agrariancrisis.in/wp-content/uploads/2013/10/GB5-CSOreflection_PatrickMulvany.pdf. Accessed on October 2, 2013.

Agroecology Policy Options

Policy goal: Ensure climate adaptation for agriculture, stability of farm outputs, community access to micro-nutrient rich food and local food security while ensuring long term ecosystem sustainability

Agroecological principles	Selected agroecological practices	Assessable Indicators		Necessary Policy Support
		Contribution to ecosystems	Socio-economic benefit to local economies	
1.) Enhance a. recycling of biomass and optimizing nutrient availability b. balancing of nutrient flow	■ Increased use and recycling of farm based energy sources (e.g., farmyard manure, farm based biomass, manual labor) ■ Reductions in use of fossil-fuel based external inputs (fuel, fertilizer, pesticide)	■ Reduced carbon footprint ■ Increased ecosystem resilience to deal with climate extremes; ■ Help meet mitigation and adaptation goals ■ Crops less susceptible to pests and pathogens due to better soil nutrient balance	■ Strengthened local economies through higher employment (with increased use of appropriate technology that use manual labor), lower cost of production, and reduced dependency on external inputs resulting in retaining of wealth in the local communities ■ Increased efficiency through sustainable use of natural resources in vulnerable ecosystems resulting in higher output per unit of resource ■ Reduction in input costs results in reduction of agriculture-related indebtedness in rural communities ■ Less dependency on suppliers of external inputs including patented inputs	**Agricultural policies and programs that incentivize recycling of biomass within the agroecosystem**
2.) Secure favorable soil conditions for plant growth, particularly by a. managing organic matter b. enhancing soil biotic activity	■ Mulching and other practices designed to incorporate organic matter into the soil	■ Better soil quality in terms of: a. micro-nutrients b. organic matter c. microbial and mycorrhizal biomass d. micro & macro-arthropod diversity, soil biotic activity ■ Enhanced resilience of crops and landscape to weather events such as droughts and floods ■ Building long-term sustainability of soil and plant life	■ Increases in agricultural output from agroecosystems and improving local food security ■ Decreased vulnerability to communities living in areas that are prone to droughts or excessive rains ■ Building long term productivity of farming systems	**Agricultural investments and extension targeted specifically to help small-scale producers improve soil and water conditions through agro-ecological practices**

Agroecological principles	Selected agroecological practices	Assessable Indicators		Necessary Policy Support
		Contribution to ecosystems	Socio-economic benefit to local economies	
3.) Minimize losses due to flows of solar radiation, air and water by way of a. microclimate management, b. water harvesting c. soil and water management through increased soil cover	■ Integrated soil and water management practices, including: a. Integrated Pest Management b. Push-Pull pest management c. increased use of farmyard manure etc.] d. organic low/no-till agriculture ■ Water harvesting practices including: a. bioswales/berns b. terraces c. bunds, etc	■ Increased water availability for ecosystem sustenance; increase in ecological processes and functions such as water filtration ■ Improved water retention capacity of the soil; improved moisture content of air in the micro-climate of the agro-ecosystem ■ Reduction in grey water footprint of agriculture (that causes issues such as algae blooms and hypoxia) and food processing ■ Reduction in blue water footprint of crops (or irrigation water applied), thereby help address water crisis ■ Improved ground water levels in the watershed	Increased water availability for meeting other water needs including for socio-economic development of the community	■ **Agricultural policies that incentivise *in-situ* water conservation, soil (biota, organic matter and nutrient) enhancement, organic tillage regimes and microclimate management** ■ **Water policies that incentivize reduction of grey/blue water footprint of agricultural and food systems, not only in crop selection and farming methods but also in food processing and packaging, etc.**
4.) Enhance species and genetic diversification of the agro-ecosystem in time and space.	■ Crop diversification programs designed to achieve higher biodiversity in terms of: a. intra- and inter-species diversity in farming b. spatial and structural diversity of crops (multicropping, intercropping, hedgerows, tree fences, etc.), across landscapes c. temporal diversity (in terms of rotations) d. conservation of landraces or traditional varieties ■ Protection of local biodiversity (fauna and flora outside the agroecosystem concerned) as a result of agroecological practices ■ Improved livestock integration into the farm	■ Increased biodiversity and Increased presence of beneficial insects ■ Diversified cropping systems that are capable of dealing with biotic and abioic stress ■ contribute to global adaptation goals in terms of increased resilience and robustness ■ improved micro-climate that in turn supports an increase in biodiversity ■ Increase in availability of trees and shrubs that function as carbon sinks; ■ Improved landscape diversity e.g., in terms of hedgerows, living fences, trees etc. ■ Reduced resource footprint of animal-based food production	■ Increase in communities' resource base for meeting their livelihood needs ■ Increase in total income per acre or production unit ■ Increased stability in terms of assured farm outputs as well as possible higher productivity in terms of total output per unit area (measured in terms of output from a intercropping, rotation as well as from animal products raised from the same farm simultaneously) ■ Higher micronutrient values in crops, grains and vegetables (or animal products) and thus increased access to healthy food	■ **Trade, investment and intellectual property rights policies that protect indigenous and peasants' rights to select, domesticate, breed, exchange and use of native species of crops and livestock varieties** ■ **Environmental and food-safety policies based on the precautionary principle that avoid reckless introduction of GMOs or other emerging technologies** ■ **Coordinated environmental and agricultural policies on biodiversity that ensure heterogeneity and diversity at the landscape and farm levels.**

Agroecological principles	Selected agroecological practices	Assessable Indicators		Necessary Policy Support
		Contribution to ecosystems	Socio-economic benefit to local economies	
5.) Enhance beneficial biological interactions and synergisms among agro-biodiversity components thus resulting in the promotion of key ecological processes and functions	■ Locally controlled solar, wind and renewable energy programs and water resource development that respects ecological limits ■ Crop diversification programs that integrate crops, vegetables, livestock, trees and fish in the ecosystem	■ Contribute to global efforts in: a. biodiversity conservation b. water conservation c. Climate mitigation and adaptation ■ Increased ecological functions measured in terms of a. water quality improvement of runoff b. increased plant biodiversity c. increased soil microbial diversity	Synergies among economic, ecological and climate adaptation benefits (especially stability in terms of assured farm outputs from unit of land through practices such as integrating trees, crops, vegetables, livestock and fish in the agroecosystem)	**Agricultural, water and energy policies that prioritize the use of natural resources such as land and water for food production, local energy security and local water security.**
6.) Scientific research on agroecology integrates related disciplines to help understand the life in and around the soil and complements indigenous knowledge systems on agroecological farming systems that emulate and coexist with natural ecosystem processes	■ Research and development of indigenous crop and livestock varieties, as well as new varieties based on participatory plant and animal breeding techniques ■ Applied research on soil structure, moisture, soil biota, and other agricultural methods defined with local farmers ■ Free and open sharing of farming (and other food production–related) knowledge with small-scale producers, that does not require them to use external inputs ■ Farmer-to-farmer knowledge exchanges based on locally determined priorities is the primary mechanism for knowledge sharing and extension	Decrease in environmental footprint of agriculture and food systems	■ Enhanced social standing of, and participation by local communities, (both men and women engaged different aspects of food production and processing) as the owners of local information for agroecological knowledge ■ Increased access to extension—particularly agro-ecological extension ■ Small-scale producers no longer dependent on corporate input suppliers for their farming knowledge and extension	Agricultural research policies and extension programs that prioritize a. research and development of new varieties that are based on participatory plant breeding techniques b. farmer-to-farmer knowledge exchanges based on locally determined priorities
7.) Enhance abilities of agriculturalists, pastoralists, fishers and others to self-organize; retain, reproduce and redefine cultural practices to pursue sustainable and gender-sensitive livelihood strategies; and effectively influence social and policy processes as well as governmental decisions	Support efforts by small-scale producers and their communities to establish locally controlled institutions, including cooperatives	Livelihood strategies at community level are ecologically sustainable	Empowerment of local communities, increased economic viability of traditional livelihood practices, revitalized rural and agrarian economies	**Pro-democratization policies that recognize women's central roles in agricultural and food systems, revitalize rural economies, minority cultures as well as marginalized livelihood practices**