



# SIANI

Swedish International Agricultural Network Initiative

## Higher Education for Sustainable Agriculture: Working for food and nutrition security in the Philippines

Policy Brief

March 2016

This Policy Brief describes the state of the art in agriculture education in the Philippines, provides an overview of the environmental concerns linked to agriculture in the country and the implications for higher education, and makes recommendations on how to resolve national agro-environmental issues and improve higher education in order to increase the sustainability of agriculture. The Brief contains recommendations by the SIANI Higher Education for Sustainable Agriculture (HESA) Philippines Experts' Group, made at a two-day dialogue and 'write-shop' held at the University of the Philippines, Diliman Campus, on 22–23 July 2015.

### Background and Rationale

Higher education institutions in the Philippines must undertake better research, improve their teaching and support enhanced extension services in order to provide a more effective response to the many environmental and agriculture- and development-related concerns in the country. The current state of higher education is not adequate to the task of addressing the many environmental, economic and social problems associated with mainstream approaches to industrial agriculture. The Philippines faces many complex global and national environmental problems linked to its agriculture.

The widespread and indiscriminate use of chemical fertilizers, hybrid seeds and pesticides, for example, leads to various environmental and health-related hazards and socio-economic problems. Worldwide food and agricultural trends are exacerbating the global ecological crisis. It has been estimated that 56 per cent of greenhouse gas emissions are linked to food production. Soils are also being degraded and eroded or made more acidic, decreasing the supply of nutrients for crop uptake. Farmers must then apply more fertilizers and pesticides to maintain or increase yields, while pests develop resistance. Pesticide residues in the food chain and ecosystem also threaten human health, ranging from increased incidence of cancers to food poisoning. Not all such health problems can be attributed to agriculture alone, but some correlations to various types of disease are suggestive. There is substantial evidence of well documented problems, such as the ingestion of toxic pesticides in food in the Philippines and elsewhere in Asia.

As the population of the world increases, the amount of grain being grown per person is declining. The Green Revolution of the 1960s was a package of technological innovations designed to increase agricultural yields. It consisted of the use of high yielding varieties, fertilizers and pesticides, and was initially focused on rice growing in the humid tropics of Asia in order to address a predicted rice shortage. The strategy was later expanded to all crops, including aquaculture. Agricultural crop and livestock yields increased, averting 'Malthusian' concerns about an impending food crisis.

Today, however, at least 800 million people still go hungry, and about 150 million children under the age of five are severely undernourished. Such problems could intensify if the world population increases as predicted from the current 6.7 billion to 9.2 billion by 2050.

At the same time, the widespread adoption of sustainable agricultural practices in the Philippines, across the ASEAN region



*Winnowing Rice by Hand - Rice Preparation in Philippines. Photo by Daniel Peckham via Flickr CC BY-NC-SA 2.0*

and worldwide could help to increase resilience to climate change and improve climate change mitigation and adaptation measures. It is essential to promote and support truly sustainable agriculture based on local soil and climate conditions, as well as local traditions and culture. Agro-ecological systems and practices should reflect these too.

However, a shift to sustainable agriculture will require local government entities, community-based family farms and cooperatives to have access to more information, and better education and communication on sustainable agriculture, as well as support to get access to technology and best organic farming and manufacturing practices. There is also a need to operationalize comprehensive agricultural extension and training support services for small-scale family farms.

### The Need for a Response from Higher Education Institutions

In response to such environment-, health-, and agriculture-related development challenges, the SIANI Higher Education for Sustainable Agriculture (HESA) Philippines Experts Group held a two-day dialogue and write-shop in July 2015. The dialogue was facilitated by SIANI-HESA and the Food Security in Southeast Asia Experts' Group Project. The dialogue aimed to ascertain the status of courses on sustainable agriculture and food security in higher education institutions (HEIs) and state universities and colleges (SUCs) across the Philippines.



Rice farming is a back-breaking labor intensive work, but the promise of healthy crops brings a smile to this woman farmer.. Photo by IRRI via Flickr CC BY-NC-SA 2.0

Of the 2180 HEIs in the country, 113 are SUCs. As of 2011, 170 HEIs offered degree programmes in agriculture and forestry. All of these must be convinced to better focus their curriculums on sustainable agriculture.

The leading HEIs offering programmes related to sustainable agriculture in the country participated in the July 2015 dialogue. All the participants agreed that there is a need for students to be more grounded in sustainable agriculture in order to better provide food and nutrition security for the country's people and to serve their learning needs; and that the current curriculum of the Bachelor of Science (BSc) in Agriculture inadequately addresses the concepts and practice of sustainable agriculture.

Participants made a number of key observations on higher education in the Philippines:

- Very few students are currently taking up agriculture-related courses throughout the country
- Courses tend to be theory-based, with little or no focus on practice
- The curriculum is not geared towards sustainable agriculture
- Agricultural universities and colleges still teach unsustainable conventional agricultural practices and technologies linked to crop and livestock production, such as crop monoculture and heavy use of chemical inputs
- Farming practices, technologies and systems linked to climate

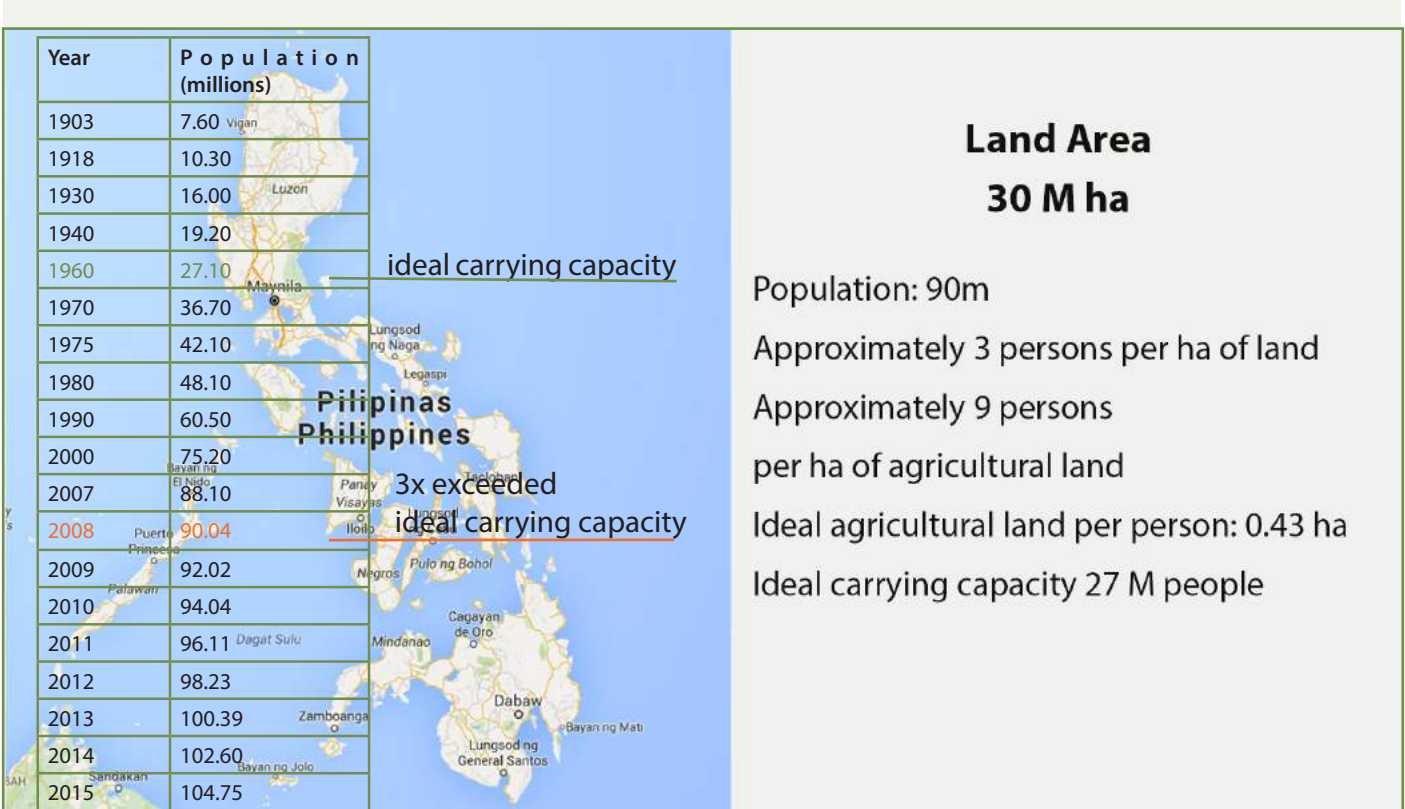


Illustration by Ted Mendoza

change adaptation are not adequately addressed in the curricula of HEIs and SUCs

Participants also noted the following research and farm extension challenges for HEIs:

- Farms and fisheries, which are the primary producers of food, generally have low levels of productivity. Improved farming practices and technologies are basic factors that could increase farm productivity and incomes, thereby alleviating poverty which remains a rural phenomenon. Research can help to increase understanding of the socio-economic problems faced by food producers and support innovation through new technologies applied in farm extension programmes that can improve livelihoods.
- Most new technologies, however, are currently geared to increasing farm productivity, and cater mostly to resource-rich farmers who are farming in favourable areas. New technologies and practices for capital-scarce farmers in the uplands or less favourable areas critically need to be generated through research.
- Farmer-led, scientist-supported and community-based technology transfer is essential to facilitate the adoption of technologies for the improvement of farm productivity. Establishing or strengthening university-farmer partnerships can help.
- The currently dominant technology-led, single commodity farming system must be transformed into multifunctional agriculture that provides economic, environmental and social services at the same time, by combining modern science and technology with farmers' traditional knowledge and experiential learning.

## Policy considerations

### INSTRUCTION

#### Adopt a common definition of sustainable agriculture

There can never be sustainable development without sustainable agriculture, but a common definition is needed to guide reform in practice. A shift to sustainable agriculture fits the intentions of many of the 17 Sustainable Development Goals (SDGs) recently adopted by the United Nations General Assembly. The concept of sustainable agriculture encompasses not only agro-ecological principles but also business values, because if an enterprise, project or activity does not generate adequate income for the farmers or other practitioners, there is no point in pursuing it. The Philippines HESA group, building on the existing literature and some of the SDGs, defines sustainable agriculture as:

*The art, science and philosophy of producing the food, feed, fibre and fuel needs of the present generation without sacrificing the long-term impacts of practices and technologies on the environment and biodiversity. Sustainable agriculture practitioners are able not only to meet their household needs but also to improve their lives through the value they add to farm produce that is safe and that promotes health and well-being.*

Although sustainable agriculture does not necessarily mean organic agriculture, at least one Philippine law suggests that strengthening organic agriculture is important for sustainable agriculture, and that education has an important role in this. Philippines Republic Act No.10068 of 2010 is a law on Organic Agriculture. It declares that:

*It is the policy of the State to promote, propagate, develop further and implement the practice of organic agriculture... that will cumulatively condition and enrich the fertility of the soil, increase farm productivity,*

*reduce pollution and destruction of the environment, prevent the depletion of natural resources, further protect the health of farmers, consumers, and the general public, and save on imported farm inputs.*

The law supports: '*continuing research and upgrading [and] the capacity building of farmers and the education of consumers*'. It provides a platform for promoting organic agriculture across various levels, organizations and regions of the country, but especially among the educational institutions involved in agriculture, since learning more about organic agriculture can be a highly effective mechanism for promoting sustainable agriculture.

#### Curriculum Development and Upgrading

During the July 2015 write-shop in Manila, participants formulated and experimented with a curriculum on sustainable agriculture that included elements of experiential learning, such as:

- Silliman University's curriculum idea that a feasibility study for establishing an organic farm should be part of a student's final exam
- A sustainable agriculture curriculum with students spending the final year playing different roles on a successful farm, based on sustainable agriculture theory and practice, and reflecting positive social, economic and environmental results.
- An approach that supports field learning and experience of practice in different locations. A sustainable agriculture curriculum must allow students to do practical work on various kinds of successful farms.
- A curriculum adapted from the European folk high school philosophy, which is an approach where students prepare their own experiential learning programme for 1–2 years by establishing and running an actual farm.
- The sustainable agriculture curriculum should emphasize entrepreneurial development. Students must be engaged in agri-enterprise development while at college/university to ensure the adoption of successful farming practice on graduation.

Participants emphasized that the sustainable agriculture curriculum should include an ethical and public service orientation. However, any personal gains or academic benefits from a student's formal education from any college or university should remain a foundation of the curriculum.

#### Internationalization and 'Filipinization' of Education

Filipinization is the conception of a unique national development model that draws on indigenous Philippine culture, values and socio-economic needs. The internationalization and Filipinization of education on sustainable agriculture can be achieved through:

- Setting up an outcome-based model curriculum that requires regional and international collaboration between HEIs and supports interested SUCs/HEIs.
- Setting up an outcome-based model curriculum that leads to the Filipinization of sustainable agriculture education as well as enhanced support and cooperation among SUCs/HEIs in the country. The Philippines Government is committed to long-term regional integration as part of an ASEAN Economic Community (AEC) as well as stronger social and political cooperation in a broader 'ASEAN Community' with other countries in Southeast Asia. Nonetheless, there needs to be a parallel commitment to Filipinization geared towards supporting national values and development strategies. This should include local utilization and mobilization of the country's agricultural and human resources to promote sustainable agriculture.
- The Philippines became involved in the ASEAN International Mobility of Students (AIMS) Programme in 2014. The Commission on Higher Education (CHED) selected 12 HEIs to

participate in the programme. Each school was chosen based on its degree programme offering, including opportunities for student exchanges. AIMS has several objectives, such as knowledge and skills enrichment, and enhancing cross-cultural understanding and basic respect for ASEAN cultural diversity.

- A Local Student Mobility Programme should be a component of HESA among SUCs and HEIs. Understanding and respect must be fostered for the cultural diversity arising from the country's 87 dialects and 7100 islands.

### COMMISSION ON HIGHER EDUCATION POLICIES ON CURRICULUM DEVELOPMENT

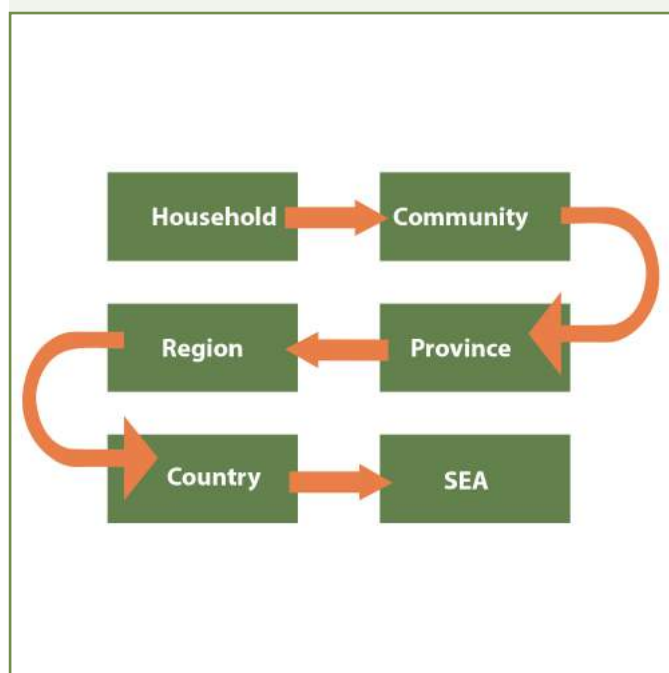
- The Commission on Higher Education's policies for instituting amendments and enhancements to the curriculum should be revisited. They must be geared towards offering a BSc in Agriculture with a major in sustainable agriculture, and a BSc in Sustainable Agriculture in the long term, within 10 years from 2016. The present CHED-mandated curriculum is made up of different elements that are treated independently, and students are expected to integrate at the end. It would be strengthened if agriculture were seen in the round, where people, technology, natural resources and the environment interact to meet the needs for food and nutrition security, and health and well-being in society.
- The process that CHED uses to evaluate proposals for new curricula is too long. Given the fact that each SUC has its own Board of Trustees or Board of Regents, decision-making should be decentralized. It should be more efficient, to enable the academy to address pertinent concerns, and the needs and situations that arise in unique agro-ecological zones which give rise to local agriculture industries.

### RESEARCH AND DEVELOPMENT

R&D on sustainable agriculture must be grounded in holistic, integrative and multidisciplinary sciences by:

- Conducting participatory R&D projects on sustainable agriculture that are farmer-led, scientist-supported and community wide.

Figure 1. Doing and Learning Mode



HESA-Philippines write-shop participants, Manila, 22–23 July 2015.

- The generation of viable models of sustainable agriculture in the different HEIs and/or SUCs representing the various agro-ecological zones. (As an archipelago with variable altitudes, the Philippines has hilly to mountainous terrain and more than more than 18 per cent of farm land is on slopes.)
- Organizing a central clearing house for the coordination of and information sharing on learning from each other's innovation and creativity.
- Strengthening the linkages among academic institutions and industry as sustainable agriculture adopts a knowledge-led development pathway from production-to-consumption.

Entrepreneurial and livelihood systems approaches must reinforce sustainable agriculture.

### EXTENSION

Following the value chain, capitalizing on strengths and recognizing weaknesses, professors, instructors, researchers and scientists must work with farmers in 'doing and learning mode' (see Figure 1). This will require a number of policy and institutional reforms. First, a SUC/HEI faculty must perform three functions: instruction, research and extension. Extension activities must be given workload credits equivalent to or on a par with instruction and research. For official recognition, CHED could issue a Memorandum Order requiring all HEIs to perform extension services, as an equally important function of all HEIs. The Board of Trustees of an HEI should pass a resolution on the necessity of conducting extension services in their respective agro-ecological zones.

### SUSTAINABLE AGRICULTURE PRACTITIONERS

- Equivalent degrees should be awarded to practitioners of sustainable agriculture in order to give them credibility and equal prestige, and so that other farmers might follow their example. Such farms could be accredited or recognized as sustainable agriculture learning centres, and monetary rewards could be established, such as pensions when farmers reach the legal retirement age. Similar awards could be made to outstanding teachers, professors, researchers and scientists.
- Together with the professors, instructors, researchers and scientists in the SUCs and HEIs, sustainable agriculture practitioners—farmers and students—should join together to convince other farmers to become sustainable agriculture practitioners, on a "learning by doing" basis. This job of convincing others should cascade or radiate from community to community.

### AGRICULTURAL INDUSTRIES

- Instruction, research and extension services must match and supply the human resource needs of the agro-based industries, and provide cost-efficient techniques and prototypes for the tools and machinery required for raw material production and processing. Economic viability is central to any enterprise, but resource enhancement rather than degradation is equally important alongside energy efficiency and reduced carbon emissions.

### BUDGETARY SUPPORT

- The Philippines budget for education is equivalent to only 2.5 per cent of its gross domestic product (GDP); UNESCO recommends 6 per cent. This budget must be increased over time, and a budget line for sustainable agriculture must be included in the General Appropriations Act.
- The Philippines allocates only 0.2 per cent of its GDP to R&D (Gross expenses on Research and Development, GERD). UNESCO recommends at least 1 per cent of GDP. Neighbouring countries exceed UNESCO's 1 per cent recommendation for



View of Barlig from above; Mountain Province, Northern Luzon, Philippines. Photo by Lon&Queta via Flickr CC BY-NC-SA 2.0.

GERD. South Korea, Japan and Singapore each allocate 3.4 per cent of GDP to GERD. Agriculture is not a standalone industry. R&D in the allied industries of machine manufacturing, transport/logistics, equipment/tools, processing technologies and the technology required for processing should also be supported.

- Academic-private industry partnership projects must be enhanced, promoted and facilitated to reduce the costs of R&D, generate readily usable and viable technologies and generate more funding among the HEI staff involved while performing their trilogy of functions of instruction, research and extension.

## MONITORING AND EVALUATION

- The Technical Panel for Agriculture Education (TPAE), which performs monitoring and evaluation of agriculture programmes, including of the research, development and extension programmes of HEIs in the country, should have a deep understanding of and strong background in sustainable agriculture that is grounded in the principles of agro-ecology.
- Graduates of agriculture and forestry programmes with knowledge of and skills in the use of the Geographic Information System as a decision support tool for agriculture landscape fine-tuning for sustainable agriculture and biodiversity conservation must be given priority in recruitment by the Department of Agriculture, the DENR and local government bodies.

### The following documents have been reviewed for this brief:

Alavanja MCR et al. 2003. Use of agricultural pesticides and prostate cancer risk in the Agricultural Health Study cohort. *American Journal of Epidemiology* 157: 800–14.

Altieri, MA, Funes-Monzote, FR and Petersen, P. 2012. Agroecologically efficient agricultural systems for smallholder farmers: contributions to food sovereignty. *Agronomy for Sustainable Development* 32: 1–13.

ASEAN Secretariat. 2015. *ASEAN Economic Community Blueprint, 2025*. Jakarta: ASEAN Secretariat, November 2015.

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Badgely, C et al. 2006. Organic agriculture and the global food supply. *Renewable Agriculture and Food Systems* 22(2): 86–108.

Grain. 2009. *The International Food Systems and the Climate Crisis*. Special Issue (October), [www.grain.org](http://www.grain.org) Complete references used by Grain technical persons can be accessed at <http://www.grain.org/go/climatecrisisrefs>.

IAASTD. 2008. *The International Assessment of Agricultural Knowledge, Science and Technology for Development*, <http://www.agassessment.org>.

Lucas, Mep, LC et al. 2006. *Fueling a Food Crisis: The Impact of Peak Oil on Food Security*. The Greens/European Free Alliance, European Parliament.

Mendoza, TC. 2004. Evaluating the benefits of organic farming methods in rice agroecosystems in the Philippines. *Journal of Sustainable Agriculture* 24(2): 93–114

Padilla-Concepcion, GP. 2014. Major investment in higher education and R&D is key to fulfilling the Aquino Social Contract with the Filipino people. *Philippine Star*, 9 January.

Pimentel, D. 1996. Green revolution agriculture and chemical hazards. *The Science of the Total Environment* 188 (Suppl. 1): S86–S98

Pretty, JN, Morison, JIL and Hine, RE. 2003. Reducing food poverty by increasing agricultural sustainability in developing countries. *Agriculture, Ecosystems and Environment* 95: 217–34.

Romeo F Quijano. 2014. Health and the Environment: the intimate connection in ASEAN in Wayne Nelles, Anop Kunavongkrit, Surichai Wun'gaeo

Kunawongkrit and Wun'Gaeo (eds), *ASEAN Food Security and Sustainable Agriculture in a Green Economy: Cross-Sectoral and Interdisciplinary Perspectives*. Bangkok: Chulalongkorn University Press, pp. 301–22.

UNCTAD, 2013. *Wake up Before it is Too Late: Make Agriculture Truly Sustainable Now For Food Security in a Changing Climate*. Geneva: UNCTAD Trade and Environment Review.

Villegas PM and TC Mendoza. 2005. Opportunities and Challenges for Green Agriculture in the South East Asian Nations: Focus on the Philippines. PAEDA paper series.

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## Notes