



Thesis for Change

A renaissance in natural products

Globally, there is now a renaissance in the use of natural products with medicinal herbs playing a very prominent role. The World Bank estimates that by 2050, the market for natural products in the form of nutraceuticals and functional foods will exceed US\$ 5 trillion. Not surprisingly, many countries in Southeast Asia are investing heavily in the development of herbal products and the farming of medicinal and aromatic plants (MAPs). In Indonesia, Malaysia, Thailand, and Vietnam, the MAPs industry already generates tens and thousands of jobs and is an important contributor to rural economic development. China alone has around 500,000 farmers of medicinal herbs, while India around 150,000. MAPs farming and its supporting value chain is however a very new industry in the Philippines. There are many gaps in technology that still need to be addressed before the industry can take off. Clearly, natural products researchers play a pivotal role in this development.

Farming of medicinal plants for livelihood

Philippine agriculture remains as the backbone of the country's economy and accounts for 33% of total employment. The cultivation of MAPs offers a very promising area of diversification for Filipino farmers. MAPs are generally cheap to produce, are pest resistant, do not require expensive fertilizers, are simple to process, and are not subject to wide fluctuations in farm gate price. They also offer a large variety of species for cultivation which can suit practically every farming condition and environment. The farming of medicinal herbs not only generates livelihood, but also supports biodiversity conservation, reduces carbon footprint (being living phytochemical factories), and of course provides better healthcare to the population. In the Philippine setting, it is estimated that for every million Filipinos that regularly consume herbal products as a health supplement, as much as 20,000-30,000 jobs can be generated in the countryside. Examples of promising medicinal plants include sambong, pansit-pansitan, tsaang gubat, oregano, bayabas, banaba, luyang dilaw, sinta, and takip kuhol. At present, however, the number of farmers employed by the industry is still very few, most likely no more than 2,000.

The impact of globalization

By 2015, the ASEAN Free Trade Area (AFTA) takes into effect relaxing trade barriers amongst member countries in order to promote regional competitiveness and investments as a production base in the world market. ASEAN-based manufacturers by then will be able to conveniently source their raw materials from neighbouring countries and export their finished products as well to member countries with only 0-5% tariff. The repercussions of this to Philippine agriculture are huge because the farming sector, with the exception of a few crops, is widely regarded to be uncompetitive due to the high cost of fuel, electricity, and transportation in an archipelagic setting. With higher local raw material cost, it can be expected that Philippine-based manufacturers will increasingly source their raw materials from countries like Indonesia, Malaysia, Thailand, or Vietnam. In fact, this is already happening with a number of supposedly very Filipino agricultural products such as tamarind, sampaguita essential oil, ampalaya leaves, and shrimps. AFTA will create winners and losers in Philippine agriculture, and losers will inevitably be the inefficient small farmers. There is therefore a need to diversify crops for small farmers and enhance their competitiveness. Medicinal and aromatic plants offer a very promising alternative crop.

The Philippine islands – a treasure trove of unique plant species

The Philippines has one of the most diverse floras in the world with an endemism rate second only to Madagascar. Out of around 9,250 vascular plant species (of which some 1,500 are medicinal), approximately 66% are unique to the Philippines and these can be found nowhere else in the world. In comparison, the average rate of endemism

in Southeast Asia (excluding the Philippines) is only 18%, with Indonesia having the highest at 34%. The Philippines' unique endemic plant resources can very well become the strongest platform of the country for developing its natural products sector.

Philippine flora is a rich "hunting ground" for many things new, from undiscovered plant species to new food sources, from more effective medicines to novel molecules – it is the perfect platform for "Discovery Science." For over a century, this gift of biodiversity has moulded our natural products scientists to be explorers and discoverers of what are unknown to science. And indeed, we have given more than our fair share to world knowledge for the love of science. Sadly, to this day, this frame of thinking still prevails and contributes very little to solving the day-to-day problems and challenges that Filipinos face to survive globalization. To empower the natural products industry and enhance overall competitiveness, there is an urgent need to refocus R&D efforts to more applied research that can have a direct impact to farming and the manufacturing sectors. This requires a paradigm shift from "Discovery Science" to "Developmental Science."

The weakest link in the industry

For the natural products industry to succeed in the Philippines there is the need to develop the entire value chain. This value chain starts with the farmer and extends all the way up to the manufacturer of finished goods. The weakest link in this chain is the ingredient manufacturer. While there is an abundance of MAPs for raw materials in the country – and there is growing demand of natural products ingredients by the manufacturing sector – there is virtually no industry for manufacturing ingredients that are already processed and ready for use. Moreover, the level of manufacturing technology in the country is low compared to its neighbours. As a result, most of the large manufacturers of nutraceuticals, functional foods, and cosmetic products in the Philippines resort to importation. There are presently various initiatives from the Department of Science and Technology, Department of Agriculture, and Department of Trade and Industry to address this problem but much still need to be done.

Thesis for Change - students can make a difference

Much R&D work needs to be done just to be able to commercialize a single ingredient and hence make an impact to agriculture. Research efforts need to be holistic covering interrelated scientific discipline including ethnobotany, horticulture, agricultural engineering, chemistry, chemical engineering, pharmacy, food science, among others. With so few natural products scientists in the country and so much medicinal plant species to work on, it is difficult to see how the R&D sector can cope up with the demands of commercialization.

Every year, thousands of Filipino students in science courses invest valuable time, effort, and resources to undertake a science-related thesis work or special problem. A favourite area of research, not surprisingly, is on Philippine medicinal plants. For the majority of students, however, thesis or special problems are just another academic requirement. Some do take the challenge more seriously to hone their skills in scientific investigation, but only a few exemplary works do manage to make real contributions to the pool of scientific knowledge. Fewer still make a real impact to the Filipino society. Student's research work, in reality, end up mostly in library shelves where they gather dust until their obsolescence. What a waste of youthful talent and inquisitiveness! If only this energy can be channelled to national development.

At Herbanext Laboratories, we are committed to Developmental Science, with the end goal of promoting MAPs as alternative crop for the small farmers in Negros Island and neighbouring provinces. To help fast track this development, we have made it our CSR to work with students and get them interested in the world of natural products. Since 2009, Herbanext has been accepting in its facility academically committed student as interns for hands-on work experience on the condition that they pursue a thesis research topic that can contribute to the development of the local ingredient manufacturing industry. Hence the project *Thesis for Change*. *Thesis for Change* provides students and their advisers an industry perspective in developing their research topic in natural products to ensure relevance of their work beyond the confines of the university. *Thesis for Change* guides selected students in prioritizing their plant species for research, based on critical market factors such as marketability, local manufacturing competitiveness, and viability for farming. Starting with a small group of students from Philippine Science High School Western Visayas Campus, the project has now expanded to include college and graduate students from leading universities in the Philippines. Through *Thesis for Change*, Herbanext aims to contribute in its own little way to the development of a "critical mass" of researchers that can provide the necessary focus and impetus in the development of new crops and locally processed ingredients for commercialization. For information on how to join this project, please drop us an e-mail at philipcruz.herbanext@gmail.com.

