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RESEARCH ARTICLE

DEVELOPING FRAMEWORK TOWARDS INNOVATIVE AND TRANSFORMATIVE HIGHER AGRI-FISHERIES EDUCATION IN THE PHILIPPINES

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ABSTRACT

This paper offers a doable framework to repackage the Agriculture and Fisheries programs to be more attractive to achieve a remarkable number of enrolees and graduates. This also aims to redeem the programs from the stigma of being low paying, back-breaking professions into economically-sustainable careers. This paper is a product of a higher education innovation and transformation project for the Philippine Higher Education Career System – Executive Development Program. The paper conceptualizes curriculum in a systems approach which establishes three processes attuned to the most important phases of the student lifecycle management. These are the 'Take-in process' – introducing the 3G marketing and recruitment strategy which intends to make the programs more attractive and well-subscribed; the 'Take care process' - innovating curricula into outcomes-based and interdisciplinary, ICT-integrated and entrepreneurship-infused as it adopts the 'parable-of-talents concept'; and the 'Take-out process' – innovating support programs for income opportunities and employment of graduates. The innovative and transformative concepts presented in this paper are outcomes of series of round table discussions, interviews, consultations, focus group discussion (FGD), benchlearning, university dynamics laboratory, and immersion. The paper also draws on relevant literature on the previous initiatives of curricular reinvention. The stakeholder-participants are the SUCs leaders, agriculture and fisheries professionals, students (prospective and enrolled), parents, faculty, staff, guidance counsellors, government officials, industry partners, and community folks.

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INTRODUCTION

Agriculture is central to economic growth and food security predominantly in countries where a significant stake of the population depends on this sector. Philippines is basically an agriculture-based economy. This economic classification, however, brings irony, to the plight of the country's agricultural education. Great disparity is evident on the current number of its population against the number of the farmers, agriculture students, agriculture graduates and agriculture professionals. Many Filipinos are bothered that soon nobody will be producing rice, vegetables, eggs, meat, and fish because farmers are getting older with the average age of 57 and the young generation does not seem to be interested in farming at all (Sarian 2016). The proof is the declining number of enrolees, graduates, and licensed professionals in agriculture and fisheries. The enrolment to Agriculture, Forestry, Fisheries, and Veterinary Medicine (AFFMV), as discipline group, is roughly 2.6 per cent of the three million higher education enrolment and which is only .009 per cent of the total population (estimated 103,796,832 in February 2017). Graduates from these disciplines mark roughly .001 per cent of the total population and the number of passers of their respective licensure exams is just a speck. Many higher education institutions (HEIs) in the country offer Agriculture and Fisheries as their mandated or flagship programs. However, the enrolment of these programs has been dwindling for many years already. According to Vitriolo (2013), Agriculture and Fisheries are among the undersubscribed programs in the country with a very low enrolment rate compared to popular courses like those related to IT, health, business, teacher education, engineering, technology, and others. Some of the reasons for the decline in enrolment is the negative perception about the professions. Stigmatized by the present generation of students, they describe Agriculture and Fisheries as filthy or blue-collar jobs, backbreaking, low-paying poor man's professions. It is a reality for most HEIs offering Agriculture and Fisheries that their takers belong to the bottom ranks of the applicants and usually these are not their first choice. Consequently, the programs have very low engagement and graduation rates. These programs also

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produce relatively few takers and passers of their licensure examinations. This is the reason that the Commission on Higher Education (CHED) identified agriculture and related fields among its priority courses. These realities, posit a challenge to HEIs to do their part in promoting these programs and must not focus too much on the popular ones. HEIs should balance their courses offering to give way to the 'unpopular' courses.

The CHED mandates the HEIs to increase advocacy for these unsubscribed programs, to heighten their importance in the current labor force and in society in general (Vitriolo 2013). In the past, many HEIs, with the CHED, were in the quandary whether to retain or close the programs because they failed to meet the standards, the enrolment in the last five years has been negligible, and the graduates have consistently performed badly in the licensure exams (Diokno 2016).

Table 1. Agri-fisheries education trends in the Philippines

	2009	2010	2011	2012	2013	2014	2015	2016
Philippine Population	91890000	93440000	95050000	96710000	98390000	100500000	102200000	102626209
Higher Education Enrollment	2627798	2774368	2951195	3044218	3317265	3563396	3811726	*fna*
Higher Education Graduates	470139	481331	496949	522570	564769	585288	656284	*fna*
AFFVM Enrollment	59208	59745	63471	68098	81740	96164	125526	*fna*
AFFVM Graduates	9862	10043	9618	11605	13796	13986	*fna*	*fna*
Agriculturist Licensure Exam Takers	2113	2650	2936	3438	4786	5022	6080	5795
Agriculturist Licensure Exam Passers	812	961	1082	1309	1699	1808	1888	1790
Fisheries Technology Lic. Exam Takers	215	220	319	343	0	0	1014	1391
Fisheries Technology Lic. Exam Passers	51	66	91	85	0	0	366	457

(AFFVM-Agriculture, Forestry, Fisheries, and Veterinary Medicine; fna-figures not available)

Figure 1. Comparison of the country's enrolment for agri-fisheries against other disciplines based on CHED data

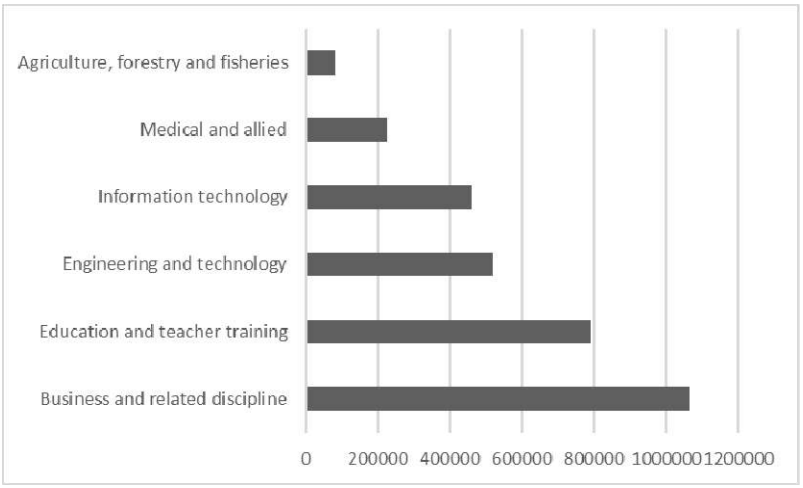

Figure 2. The contexts of 3G-strategy for marketing the programs and recruiting students

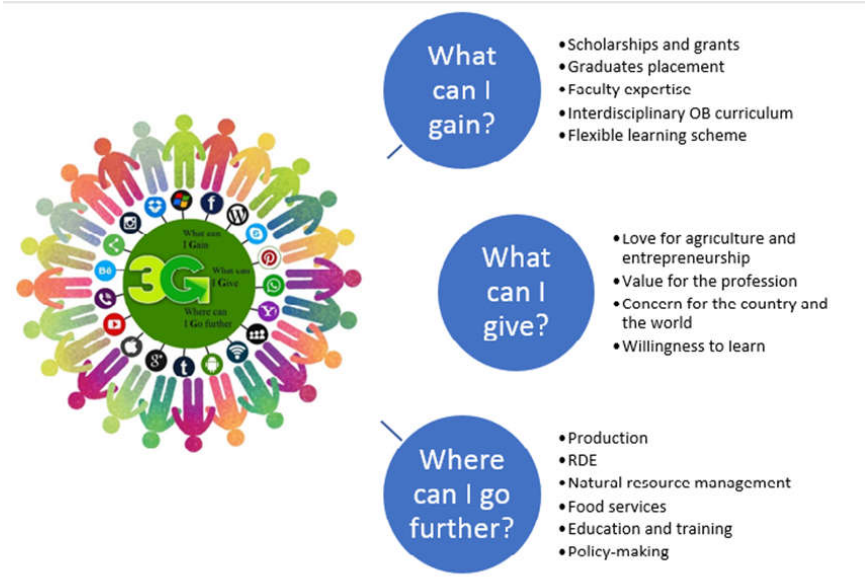

Figure 3. The mechanism of the 'Parable of Talents' concept

However, by reasons of need and fidelity to mandates, a majority kept the programs. Thus, it is imperative for HEIs to strategize to let the programs survive and be attractive once again. This effort is not only at the institutional level but also at the national and international levels. In the Philippine Senate hearing on October 11, 2016, a senator prompted the CHED Chairperson to make agriculture, and fisheries, and other related courses more appealing to the youth. The reason is they are now becoming uninterested with agriculture-based courses (www.senate.gov.ph 2016).

Another senator also pushed for making farming attractive to young people and proddingthem to return to agriculture by giving scholarships programs. ('Farming is empowering business' 2016). It is a worth noting that many Philippine lawmakers feel the unattractiveness of the programs. Hence, their pronouncements and the embodiment to their sponsored bills 'to make agri courses attractive again' is a tall order not only for the CHED Chair but for all HEIs offering agriculture and fisheries programs. Reinventing the programs and making them more attractive are the best approaches in addressing the

Figure 3. The mechanism of the 'Parable of Talents' concept

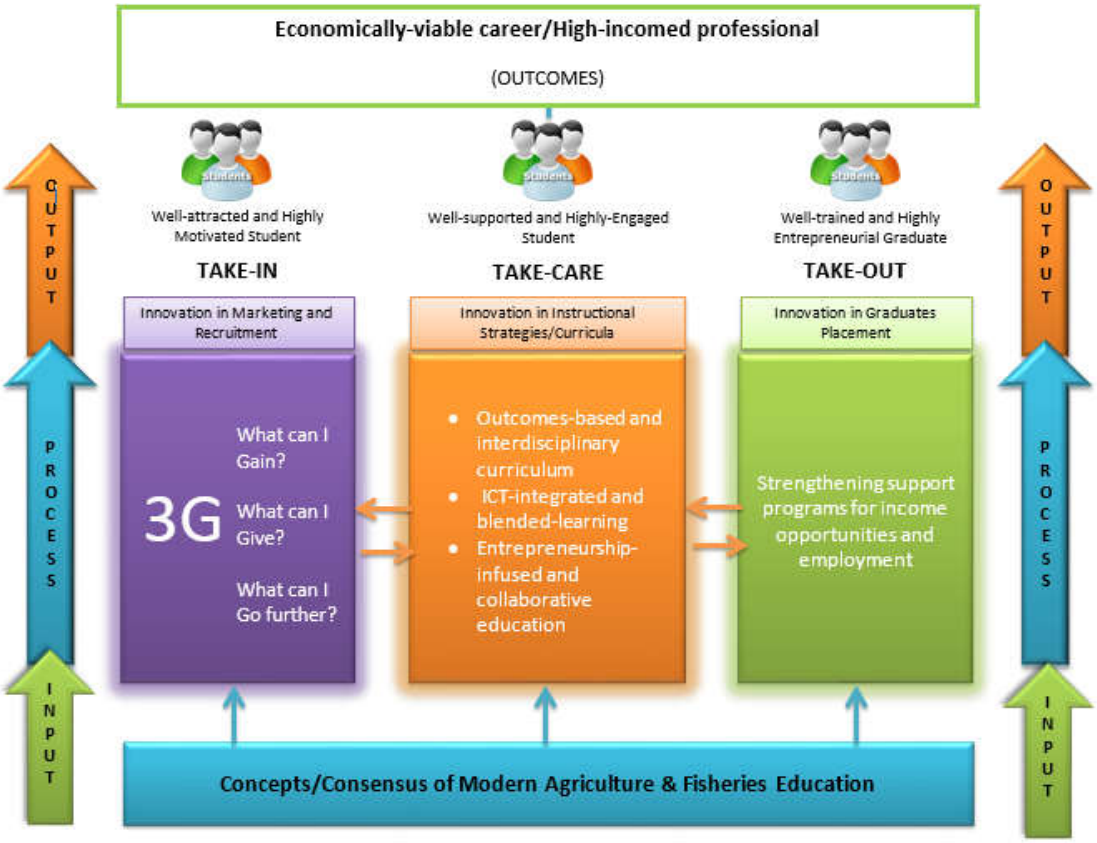

Figure 4. The innovation framework for the agriculture and fisheries programs

challenges because the bulk of the literature reviewed and opinions solicited point to significant gaps in the relevance and quality of agri-fisheries education. This effort is timely for the country's enactment of the K-12 Basic Education Program which extends by two years the country's previous ten-year education curriculum. The new image of the programs is expected to entice graduates of senior high schools as they pursue a college education. The ASEAN integration also offers opportunities for the improvement of the Agriculture and Fisheries curricula and in the development and institutionalisation of courses anchored in the sustainable agriculture framework with ASEAN perspective. It also leads to the enhancement of the performance of the graduates, makes the agriculture profession more attractive, and renders the programs more marketable for both local and ASEAN students. The need for a 'common' language among ASEAN higher education institutions is emphasized to facilitate student mobility, implement credit transfers and possible joint or double degree programs, and mixed mode degree programs and online (Zamora 2014).

Research Questions/Context

This paper seeks answers to these questions:1) What shall the majority of research participants propose to make Agriculture and Fisheries programs more attractive and saleable?; 2) What program innovation shall the Higher Education Institutions work out for?; 3) What are the qualities and attributes of graduates of the reinvented programs?

MATERIALS AND METHODS

This paper is an output of a higher education innovation and transformation (HIT) project for the Philippine Higher Education Career System – Executive Development Program (PhilHECS-EDP) scholarshipsponsored by the Commission on Higher Education (CHED), Philippine Association of State Universities and Colleges (PASUC), and Development Academy of the Philippines (DAP). The innovative and transformative concepts presented in this paper are outcomesofseries of interviews, consultations, focus group discussion (FGD), benchlearning, university dynamics laboratory, and immersion. The paper also draws on relevant literature on the previous initiatives of curricular reinvention. The participants are the SUCs leaders, agriculture and fisheries professionals, students (prospective and enrolled), parents, faculty, staff, guidance counsellors, government officials, industry partners, and community folks. Thus, this a mixed or multi-method research.

RESULTS AND DISCUSSION

The following presentation are answers to the research questions and discussion generated after employing several methodologies stated above:

The innovation: T-ICO framework (take-in, take care and take-out processes)

The innovation conceptualizes new image for Agriculture and Fisheries programs, from being low paying and back-breaking professions into an intellectually- stimulating and economically-viable careers. This innovation hopes to inculcate to the new generation that the programs are more than just farming and fishing; they are part of a global economic network of import and export business. Agriculture is more than subsistence farming today; that young people can explore career options in research, bioengineering, genetics, environmental science, farm culinary, farm systems technology, and a lot more - all of which contribute to a viable industry now and in the future. Hence, it is a mandate to make agriculture and fisheries programs more appealing and change public perceptions so that they are recognised as essential careers, thereby, turning these programs considered blue-collar into greener pasture. This framework is a curricular/ instructional innovation for programs transformation.

Component I: Take-in process - Innovating marketing and recruitment strategy.

Objectives: Make the programs more attractive and saleable and sustainable in terms of enrolment and graduation;and2) strategize marketing and recruitment through value reorientation.

The agriculture and fisheries programs need to project a positive image through public relations and marketing. The recruitment process is reviewed and strategized. From a worn-out school-to-school campaign strategy, every HEI goes to greater lengths to sell the programs. Communicating successfully a 'brand' of agri-fisheries instruction to the prospective students, their parents and other stakeholders become a necessity for an HEI to attract best enrolees. Hence, this paper presents the 3G strategy as innovative concept for marketing and recruitment. This recruitment strategy is putting into context the answers to the following questions: 1)What can I Gain? 2) What can I Give? and3) Where can I Go further?

1)What can I Gain?

The context of this marketing strategy focuses on the quality of education and training the prospective students derive from the program and the HEI. This part includes the enticing details about the scholarships and grants the HEIs offer. This part also highlights the redesigned curriculum, the profile of the faculty and experts, the laboratory facilities and equipment, and the relevance of the programs. Most especially, this marketing and recruitment initiative showcases the 'earn-while-you-learn' and the 'parable-of-talents' or the entrepreneurial concepts of the curriculum. The clear possibility of earning while schooling convinces the prospective students and parents. The prospective enrolees are also inspired with the success stories of the well-known agriculture and fishery professionals and agri-preneurs in the country who saw greener pastures in agriculture and fisheries.

2)What can I Give?

The context touches more on the emotion or the affective side of the prospective students and their parents. This recruitment effort involves a valuing strategy that aims to inspire the love for agriculture in youth through relying on a cause and passion. This is one gap the seen missing in any recruitment and marketing strategy for educational programs. The youths have a cause that they believe in and fight for. While some may support causes as part of a trend, there are many young people who are truly fervent about whatever cause they are aggressive in and labour hard at it every day. Passion and purpose are

traits one finds in many youths today. They love what they do, and they want to make a difference and they want to be always trending as millennials. This is the best mode to get them involved in agriculture. For agriculture, the cause can be ending global hunger. Agricultural education envisions the world where all people value and understand the vital role of agriculture, food, and natural resources systems in advancing personal and global well-being. It instils in the youth that they are fighting for food security and getting youth involved in this challenge is essential in achieving that goal. Their involvement to the journey to a world of zero hunger are played up in any recruitment media ('How Do We Get Youth Interested' 2014). The parents are oriented of the value agricultural careers bring to their children and the society. Hence, this passion-igniting-strategy is embodied in the training of faculty, guidance counsellors, guidance associates, and marketing staff to sell the programs maximally.

3)Where can I Go further as a graduate of the program?

In this context, the prospective students and their families are convinced of the graduate placement programs, the career opportunities available in the agriculture and fisheries industry as a part of the career pathway model and the possible employment/income options such as but not limited to the following:

- *Production*. Graduates can engage in agribusinesses which service farms. They can go into farm consultancy, commodity market services and agricultural credit facilities.
- *Research, development, and extension (RDE)*. Graduates can be RDE specialists. The research areas which they can venture into include plant and animal breeding; pest, weed and disease management; plant and animal nutrition; farm systems; and farm business economics and a lot more.
- *Natural resource management*. Graduates can be the frontline environmentalists; they can specialise in climate change and climate-resilient farming.
- *Food services*. Graduates can go into food services such as putting up an organic restaurant, agri-markets, and many more. They can also undertake food processing.
- *Education and training*. Agriculture and fisheries graduates can be in the academe as technical educators.
- *Policy-making*. Graduates with notable agricultural competencies can go into policy formulation and management. This includes trade policy, biosecurity, industry policy and commercial assistance to companies engaged in agriculture ('Agriculture-graduate opportunities' 2016).

This recruitment and marketing strategy gives emphasis to the placement program. This is to assure the prospective students that there are huge income and employment opportunities after graduating from the agriculture and fisheries programs.This 3G strategy uses various media e.g. websites, social media, leaflets and brochures, videos, testimonials, interactive mobile application, film showing and the like. The recruitment process also employs strategies such as campus open house events, campus visit days for high school students, campus visit events designed for school counsellors, using enrolled students in recruitment/marketing, college-paid trips to campus for prospective students, and off-campus group meetings for prospective students and their parents.

Another important consideration during recruitment is student segmentation according to their needs of and interests to the programs. For instance, they are segmentized into 'high interest-high need', 'high interest-low need', high need-low interest' and low interest-low need'.

Component II: Take-care process - Innovating instructional strategies/curricula

Objectives. **1)** Transform the agriculture and fisheries curricula into outcomes-based and interdisciplinary;2) enhance the image of agriculture and fisheries as applied sciences, business, management, entrepreneurship, and integration of advanced technology;3) integrate application of ICT and applied academics into the curriculum;and 4) increase satisfaction and engagement level of the takers of the programs. This component process is caring and engaging the students already taken in. Engagement is one of the most important keys to students' academic success and has something to do with how the repackaged curriculum captures their interests. Today's millennial students are demanding for relevant coursework. They often want learnings to have a connection to their current interests and lives in the future. Taking premise from above-mentioned, the following are the innovations:

Integrated curricula for agriculture and fisheries. This innovation includes the following strategies:

1) **Designing and implementing a multi/interdisciplinary curriculum:** Prominent psychologist Howard Gardner established that students bring multiple forms of intelligence to the learning process. Given that students are varied in their learning styles and have diverse backgrounds, interests, experiences, talents, and values, he believes that drawing on a broad array of frameworks and methodologies enhance student engagement. Interdisciplinary instruction opens academic discussions to ideas from an assortment of disciplines so that students can relate and contribute to the learning process ('Why Teach Multidisciplinary' 2016).

Thus, this interdisciplinary curriculum promotes teaching and learning agriculture and fisheries in all courses – not only in major or professional courses but also in core, related and general education courses. Furthermore, this curricular innovation endorses convergence among departments to facilitate the offering of and cross-enrolment for 'electives' to cater the diverse interests of the takers of agriculture and fisheries programs. For instance, an agriculture student who is interested in cooking may enrol Culinary Arts, Food Processing, and any related course in the Hotel and Restaurant Management (HRM) Department, while the one who is into computer programming may take programming courses from the Information and Communications Technology (ICT) Department. This also considers inter-department collaboration and HEIs partnership to maximize expertise and resources in offering programs e.g. BS Agro-aqua-eco-tourism with HRM department, BS Precision Agriculture with ICT Department, BS Pet Care and Cosmetology with the Technology and Livelihood Education Department, BS Agricultural Cooperative Management and BS Agribusiness with the Business Administration Department and many more. This part

of the innovation addresses the issue that most AET curricula lack the breadth of interdisciplinary coursework that provides students with well-rounded and in-demand skills (Freer 2015). The author's community immersion experience validates this observation. In a community where he immersed, many households own aquaculture farms, but intriguingly, not one of them graduated a fishery course and not one of their children enrols to the program. Instead, most of the college students in the community take tourism and ICT related courses. Agriculture and fisheries are not among their interests.

Contextualizing new general education curriculum: Contextualized instruction has proven to be the most robust approach in reinforcing technical learning. Students believe in their lessons when every assignment adds meaning and creates understanding in all their classes. Hence, technical teachers and general education teachers e.g. English, Mathematics, Sciences, and other courses, all collaborate to plan and present lessons that centeraround a career– themed lesson, issues, or problems. For example, the courses 'Understanding Self' and 'Ethics' under the New General Education Curriculum, focus on attitude-forming in the context of agriculture and fisheries. Practically, all instructional materials for general education courses are aligned in the framework of the programs.

***Blended-learning and flexi-class scheduling**:* This innovation operationalises the outcomes-based education (OBE). Outcome-based education changes the focus of schools from the content to the student. The teacher's role in the classroom becomes that of a coach. Hence, meaningful programs and activities allow for the application of classroom and laboratory knowledge and skills. Programs possess a proper balance of classroom-laboratory activities and work (classroom=50%, laboratory=50% of the total agriculture/fisheries education offered). This blended-learning are done effectively in a proactive and interactive learning environment such as but not limited to:

- Flipped classrooms. For agriculture and fisheries which are basically skills programs, flipped classrooms are very relevant. 'Flipping the classroom' refers to a pedagogical model in which the typical lecture and homework elements of a course are reversed, and in classroom experiences reconstructed to rely less on passive learning and more on active engagement. The concept behind flipped classrooms has much to do with accessibility and convenience, as it allows students to consume the core elements of a course regardless of time or place. This means professors re-allot classroom time completely and make room for other activities, such as experiential or collaborative learning opportunities as opposed to passive learning through lectures. By leveraging online platforms, lectures are delivered through varied media and core content accessed by students anytime, anywhere, and as many times as they need. This means that classroom time is instead used to augment the lecture content, whether through discussion, group exercises or quizzes ('Trends in Higher Education'2014).
- Split classroom. In a split class blended learning model, the teachers zero-in on a topic that half the class are discussing with while the other half works independently on their assigned gardens/farms. This learning innovation best addresses the problem on limited apparatuses and equipment during laboratory activities which usually cannot cater the 1:1 ratio.
- Station rotation. A station rotation model enables teachers to deliver a targeted lesson with a small group of students while the rest of the class rotates through a variety of demo-farms. When not engaged in the teacher lesson, students rotate through a range of teacher-created activities. All 'supervised agricultural experience programs' are under the firm supervision and monitoring by the faculty-in-charge and the students' deliverables are properly defined and agreed upon.
- Integrating ICT in instruction. In implementing the blended-learning and flexi-class scheduling, ICT plays a pivotal role. To complement the flipped-classroom and earn-while-you-learn approaches, for instance, computer-aided-instructions and web-based instructional materials are utilized. Learning portals, Electronic Learning Management System (eLMS) and Individual Learning Management System (iLMS) are designed for the students, and eLibrary are made available for students' use. For this purpose, HEIs need to upgrade the internet facility e.g. improve connectivity, increase the bandwidth, and the like. Students are taught the importance of technology to include: biotechnology, genetic engineering, and precision farming. Students are immersed in the agriculture and fishery industries using systems-assisted farming and fishing conveniences or state-of-the-art facilities.

This innovation component takes reference from the finding that constraints in equipment and ICTs have hindered agricultural education and training programs, specifically they lacked library and reference materials, computer availability and internet connectivity (Freer 2015). Embedding competency appraisal courses and ladderized courses in the curriculum. To keep track of the progress of the students and to address the low passing rate in licensure examinations, a Competency Appraisal, Retooling System for Students (CARESS I, II, III & IV) is made part of the curriculum. This student retooling system aids for career guidance intervention to help a student decide whether to complete the baccalaureate degree and take its licensure exam or mainly settle in a short term equivalent course. To cater students who are deficient in competencies for a baccalaureate degree, a ladderized Agriculture and Fisheries curricula are offered. The ladderized curriculum hones students' competencies such as technical competence (1st Year and 2nd Year Levels), supervisory competence (3rd Year Level) and entrepreneurial/managerial competence (4th Year Level).

Holding 'Skills-Olympics' as co-curricular activities

This strategy enhances the students' involvement in related co-curricular activities through participation in Skills-Olympics (e.g. chicken dressing, fish deboning, farming system development, and others). The strategy aims to develop 'soft skills' such as teamwork, communication, work ethics, gender-sensitivity and other workplace readiness skills that ensure further development of one's full potentials. These skills are necessary across middle and high-level supervisory positions that require interaction with a range of stakeholders (Freer 2015).

Entrepreneurship-infused and income-ensuring curricula

The not-so-enticing impression about agriculture and fisheries programs is their mark as 'poor man's profession' which cascades to the belief that takers of these programs are financially and intellectually-challenged. To counter this impression and to attract more enrolees, the curriculum is made business/earnings-oriented. The curriculum develops entrepreneurial, business and management skills needed by the students. Hence, adopting the following innovative concepts:

- Earn-while-you-learn concept. This concept comes in any of these modalities: a) Placing the students in the HEIs' income-generating projects; b) Assisting students to put-up their own income-generating projects e.g. poultry production, high-value crops production and the like; and c) Allowing flexi-time class schedules for working and part-time students.
- The 'Parable-of-Talents' concept
- Depending on the knowledge, skills, and attitudes (KSAs) displayed by a student in school, he is entrusted with an arable land and capitalization and other forms of assistance to produce marketable agricultural and fishery products. The parents and other family members of a student may be involved in this undertaking.

This is done through a collaboration of a group of students with different skills and expertise. For example, a 'green-thumbed' student-farmer engages the expertise of a 'techy-student' to design a computer system for farm irrigation and fertilization; he also involves a fellow student who is good at marketing to sell the produce. In short, students simulate the real-world production collaboration and enterprise. The policies and mechanisms of this innovation (e.g. profit-sharing) are taken care of by the HEI's enterprise unit. Further assistance/capitalization and area expansion adopt the 'normative-financing mechanism – meaning these are performance-based and production/income-based assistance.
This original concept with Biblical origin, fills in the gap reiterated in many literature and practice that college students taking agriculture lack arable lands for them to have environments for experiential learning and for them to exercise and develop their entrepreneurial skills. This 'Parable-of-Talents' concept also hopes to concretise 'zero-idle-land' mandate for many HEIs.

Retooled faculty: Faculty members are continually retooled or capacitated in accordance with the requirements of the curriculum in terms of contents and practical/technical skills. Trainings and seminars for faculty are of paramount importance to ensure that they are comfortable with the new trends in instruction and have the confidence to guide the student in the learning process. The faculty engage in professional development and emerging agricultural technologies. The faculty are trained to use the new curriculum, especially in innovative pedagogy, student-centered learning, field visits, and other related activities (Maguire 2012). Scholarship programs offered by related agencies are accessed for this purpose.

Modernized farm technologies and mechanization*:* The curriculum content changes with advancement in technologies and practices throughout the industry. Thus, investments in farm technology and machinery are prioritized. Farm equipment and machines are systematically updated, maintained and inventoried. Fabricators and assemblers of agri-fishery machinery, either faculty or students, are incentivized. An investment plan is made for this purpose.
Relative to convergence among departments, maturing and diffusing the technologies/systems developed by the IT Department of an HEIs are given attention such as, for example, automated irrigation system using microcontroller-soil moisture sensor, electronic nursery watering system, automated water monitoring for aquaculture projects, and many more.

Strong linkages and collaboration: Linking with and seeking accreditation by agricultural organizations and industries both local and abroad increase the attractiveness of the programs. This part of the innovation considers establishing ties with other agricultural institutions for students' on-the-job-training, internship, and employment. This component also creates new alliances and strengthen existing relationships with government agencies, secondary schools, and the agricultural industries and communities.

Component III: Take-out Process –Support programs for income opportunities and employment of graduates

Objectives. 1) Link with partners for sources of capital for entrepreneurial graduates; 2) provide guidance and job placement services for graduates;and 3) provide continuing education and training for graduates.

This phase focuses on establishing linkages and partnership with industries, organizations, financiers as potential sources of capitals for graduates who are into business. The literature reviewed and opinions solicited point to substantial gaps in this area. The HEIs, in their efforts to innovate agriculture and fisheries programs, delved mainly on recruitment, curriculum, and instruction but not much about graduates' take-out or income and employment opportunities. The following are the innovations:

Well-supported graduates for income opportunities

This is the foremost effort the HEIs do to encourage graduates to become revenue and employment creators through business rather than merely being salaried employees. After all, this is the primary goal of making the curriculum entrepreneurship-infused. Supporting graduates for job placement/employment comes next. This component subscribes to the idea there is a need to provide employment opportunities for graduates not limited to formal employment but should cover self-employment as well. This support initiative encourages the following:

- Strengthening graduates' placement. This works out placing graduates to well-established industries and organisations where they can explore better career opportunities while opting to be salaried professionals and getting ideas for running business. An HEI prepares MOAs and MOUs to this effect.
- Adopting the 'Parable-of-Talents' concept for graduates. Outstanding graduates continue cultivating or using the previously assigned land for production. The graduates and the HEI agree on income-sharing. Eventually, this strategy makes the graduates valuable partners of the HEI to facilitate instruction, research, extension, and production.

- Providing an avenue for continuing professional education (CPE). Conduct of in- service training and education, seminars, fora, and workshops are the focus of this area. This is to ensure that graduates keep abreast with the current trends in agriculture and fisheries.
- Establishing linkage for graduates' micro-agri loan facility. This provides credit access and assistance by linking with different micro-agri-credit loans through banks, cooperatives, and countryside financial institutions e.g. Land Bank of the Philippines and other banks. Capacity building interventions are delivered to potential entrepreneurs.
- This 'Take-out' component takes cognizance to the findings of InnovATE (2014) stating that most AET programs do not offer valuable student services such as, career advising, internships, or job placement services and the income opportunities that help attract new students to the programs.
- The component processes as shown in the framework are sequenced according to the important stages of the students' lifecycle management such as recruitment (Take-in), progression and retention (Take-care), and graduation and placement (Take-out). In the implementation, however, it does not necessarily follow that the 'take-in activities' are done first. In fact, many sub-components under the other two components (e.g. curriculum revision, faculty retooling, and graduates' placement) need to be in place first because they are necessary showcases during marketing and recruitment phase. Thus, the three component processes are interrelated.

Conclusion

To sustain agri-fisheries education, the curricula entail regular updating to remain relevant to the interests of the students and the needs of the industries and the economy. Updated curricula must reflect the technological, social, economic, and environmental changes and must consider the stakeholders' consensus. Modern agri-fisheries curricula feature a learning approach centered on students, use an assortment of technology for instruction, and highlight practical experience gained at laboratories, farms, and other training facilities and modalities e.g. on-the-job training, internship, agricultural learning experience (ALE), and the like. The curricula must also produce entrepreneurs or 'employment makers' rather than 'employment takers'. Agricultural education must bring its takers and graduates to a greener pasture. The T-ICO framework is not only specific to agriculture and fisheries programs but it is also applicable to other higher education programs experiencing the same problems. Further, it is not only relevant to the Philippine context but also to other countries, especially the developing ones, which agri-fisheries education are also undersubscribed.

The T-ICOoperates a charismatic student lifecycle management, thereby, promotes an inclusive education.

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