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Challenges and Opportunities of Double Degree Master Program: Case Study in Thailand

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Declaration

I hereby declare that I have done this thesis entitled "Challenges and Opportunities of Double Degree Master Program: Case Study in Thailand" independently, all texts in this thesis are original, and all the sources have been quoted and acknowledged by means of complete references and according to Citation rules of the FTA.

In Prague 24 April 2021

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Acknowledgements

Abstract

Agricultural education in Thailand has faced several limitations, especially the decrease of number of student enrolment and the increase in the number of dropout students. The PISAI Project created double degree study programme at the Master's level (DDMP) among four key agricultural institutes with support from EU partners. The study was designed (i) to analyse the opportunities and challenges of the DDMP, (ii) to identify which skills and competencies were improved during the DDMP and (iii) to investigate the aspects influencing future employability of the students. The data was collected from the stakeholders (21 DDMP students, 17 international students, 37 project staff, and 14 employers) via an online questionnaire. Concept code analysis was used to analyse qualitative data while descriptive statistics were used to analyse quantitative data. One-way ANOVA and T-Tests were used to test the hypothesis.

The results illustrated that there were some opportunities of the DDMP including skills and competencies development, good curriculum, network building, and good educational background. However, the DDMP faced some challenges such as language constraints, a tight schedule, difficult curriculum, conflicting regulation, financial problems, and cultural differences. Despites the challenges, DDMP students could develop skills and competencies: predominantly responsibility, interaction with other people and cultures, capacity to work in team, capacity to adapt to new situations, and ability to make your way through. Furthermore, both DDMP students and employers seem to have a positive perception of DDMP graduates regarding their future employability.

In Thailand, DDMP implementation is common between Thai universities and other foreign universities. However, the DDMP within the PISAI project is very special because of its unique way of collaboration. Therefore, this study provides interesting insights and recommendations for future projects and the implementation of similar activities at other universities, which will contribute to the development of higher education.

Key words: Agricultural Higher Education, Higher Education Institutes, Double Degree Master Program, Employability, Sustainable Agriculture

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List of the abbreviations used in the thesis

CMU: Chiang Mai University

CUAS: The Central University Admission System

CZU: Czech University of Life Science Prague

DD: Double Degree

DDMP: Double Degree Master's Programme

EU: European Union

FNR: Faculty of Natural Resources

FTA: Faculty of Tropical Agriculture

GDP: Gross Domestic Products

HEIs: Higher Education Institutes

ITC: International Trade Center

KKU: Khon Khen University

KU: Kasetsart University

MHESI: Ministry of Higher Education, Science, Research and Innovation

MOE: Ministry of Education

OBEC: The Office of the Basic Education Commission

OHEC: The Office of the Higher Education Commission

OVEC: The Office of Vocational Education Commission

O-NET: Ordinary National Educational Test

PISAI: Participatory and Integrative Support for Agricultural Initiative

PSU: Prince of Songkla University

TCAS: Thai University Central Admission System

UCPH: University of Copenhagen

UHEL: University of Helsinki

WB: The World Bank

1.   Introduction

The Kingdom of Thailand is one of largest economic country in Southeast Asia. Even the country has transformed from an agrarian country to be a more industrialized country, agricultural sector still plays an important role in the country economics. Agriculture shares 8.12% of GDP in 2018 but a large number of people still depend on agricultural (WB 2020). The share of employment in agricultural sector is 32.14% in 2018 (FAO 2020). Currently, Thailand economic depends mainly on exports and service which accounts for 66.82% of GDP (WB 2020). The large proportion of exports is a contribution of agricultural commodities such as rice, rubber, sugarcane, cassava, fruit, cashew nuts, corn, tobacco, cotton, cocoa, peanuts, soybeans, medical plants, dairy, and fishery product (ITC 2017).

Current economic development strategy is "Thailand 4.0" which focuses on Thailand's labor force into knowledge workers (Jones C. & Pimdee P. 2017). Agriculture & biotechnology is one among 10 key economic sectors of "Thailand 4.0" economic development strategy (British Council 2018). Expansion higher education in agriculture is very crucial way to achieve the country's development goals. Current Thai agricultural higher education is comprehensive and diversified. There are numerous study programs available in different modes. Double Degree Program is one of modes, which is commonly implemented between one Thai University and one EU University. However, it is rarely implemented between Thai Universities.

The PISAI project is co-funded by the ERASMUS + Programme of the European Union. The project main activity is to create double degrees at the Master's degree level (DDMP) between four key agricultural institutes, namely Prince of Songkla University (PSU), Kasetsart University (KU), Chiang Mai University (CMU), and Khon Khen University (KKU), with support from EU partners. PISAI project implementation may experience several challenging; yet brings also numerous fruitful outcomes. Therefore, the study is designed to analyse the opportunities and challenges of the DDMP, to identify which skills and competencies were improved during the DDMP and to investigate the aspects influencing future employability of the students.

2.   Literature Review

2.1.   Overview Economic and Agricultural Sector in Thailand

The Kingdom of Thailand, which is located in East Asia and Pacific, was classified as an upper middle-income country according to the Word Bank (2020). Thailand is a second largest economic in Southeast Asia after Indonesia. Thailand shares a successful story in social and economic development. Among 69,428,524 populations, there is no one living under poverty lines ($1.90 a day) (WB 2020). By using national poverty lines as a measurement; however, there is 9.9 % of population living in poverty (WB 2020). Thailand's economy grew at an average annual rate of 7.5% in the boom years of 1960-1996 and 5% during 1999-2005 (WB 2020). Historically, Thailand met two main financial crises: Asian Financial Crisis (1997-1998) and Global Economic Crisis (2008-2009). Beside this, Thailand also experienced several natural disasters and diseases such as Tsunami and Avian flu in 2004, floods in 2011, and current COVID-19 (coronavirus) outbreak in 2020, which are the obstacles for economic development. In 2018, GDP (Current US$) of Thailand has reached 504.993 billion US dollar with 4.1% annual growth (WB 2020). Otherwise, GDP growth in Thailand began to slow in 2019, with the growth rate 2.5% and it is expected to keep contracting in 2020 due to impact of COVID-19 outbreak causing a decline in external demand affecting trade and tourism, supply chain disruptions and weakening domestic consumption (WB 2020).

Thailand's innovation S-curve path has been through "Thailand 1.0" focusing on agricultural mechanization and increase yield in agriculture, "Thailand 2.0" focusing on using cheap labour to turn raw materials into finished goods for production and manufacturing such as textiles and garments, and "Thailand 3.0" focusing on the assembly and production of products such as computer disk drives, electrical components, compressors, and automobiles for export (Jones C. & Pimdee P. 2017). Current economic development strategy is "Thailand 4.0", focusing on Thailand's labor force into 'knowledge workers' across 10 key economic sectors (Jones C. & Pimdee P. 2017). Five economic sector of the first S-curve, including Next-generation automotive, Smart electronics, Affluent, medical & wellness tourism, Agriculture & biotechnology, and Food for the future, focuses on enhancing current industries. The other five economic

sector of the new S-curve, including Robotics, Aviation & logistics, Biofuels & biochemical, Digital, and Medical hubs, focuses on developing future industries (British Council 2018).

More than a half of GDP depends on exports and service making Thailand that used to be an agrarian country to be a more industrialized country. However, agricultural sector still plays a vital role in social and economic development. A large number of people depend on agricultural activities, especially who live in the rural area. Among, 34,749,671 populations, 50% of them are still living in the rural area (WB 2020). Geographically, agricultural region of Thailand is divided into four main regions: the central, northern, north-east and southern regions. Currently, Thai economic heavily depends on export of goods and services. The share of export to GDP has increased to 66.82% in 2018 (Table 1). Rice is the major crop grown and Thailand is the world's biggest rice exporter. Other agricultural commodities grown in the country include rubber, sugarcane, cassava, fruit, cashew nuts, corn, tobacco, cotton, cocoa, peanuts, soybeans, medical plants, dairy, and fishery products (ITC 2017). While the contribution of export of goods and services is increasing, the contribution of agriculture is decreasing (Table 1). The share of agricultural value added to GDP in 2018 is 8.12%, which employs 32.14% of total employment (Table 1).

Table 1: Overview of Thai Economy and Demography

	2000	2003	2006	2009	2012	2015	2018
GDP growth (annual %)	4.46	7.19	4.97	-0.69	7.24	3.13	4.13
GDP per capita (constant 2017 US$)	9,808.3	11,258.7	12,836.2	13,456.7	15422.5	16283.2	18042.4
Inflation rate (annual %)	1.33	2.15	5.1	0.19	1.91	0.72	1.41
Agricultural value added (% of GDP)	8.5	9.44	9.41	9.79	11.51	8.88	8.12
Exports of goods and service (% of GDP)	64.84	61.52	68.68	64.44	69.76	68.72	66.82
Population (1000)	62,953	64,550	65,813	66,867	67,836	68,715	69,429
Total Labour force (1000)	35,016	36,281	37,575	39,188	40,106	38,917	38,908
Employment in Agriculture (% of Total Employment)	48.77	44.88	39.71	38.97	42.1	32.28	32.14

Source: WB 2020; FAOSTAT 2020

2.2.   Thai Labor Force in Agriculture

Agricultural sector that used to be an engine in economic growth of Thailand, nowadays, only shares a small proportion in GDP (8.12%). The large proportion mainly occupied by exports of goods and service (66.82% of GDP). The transformation from agrarian country to industrialized country causes a change in labor structure of the country. Figure 1 showed the percentage of labor in agriculture reduced almost a half (from 63.96% to 32.14%) while the percentage of labor in non-agriculture was double itself from 36.04% to almost 70% from 1990 to 2018 (FAO 2020). Nonetheless, during this period, there was a slight increase in agricultural labor in 2011 and 2012. The movement of labor back from other sectors to agriculture was the consequence of flooding 2011 which damaged severely on every sector, mainly on manufacturing.
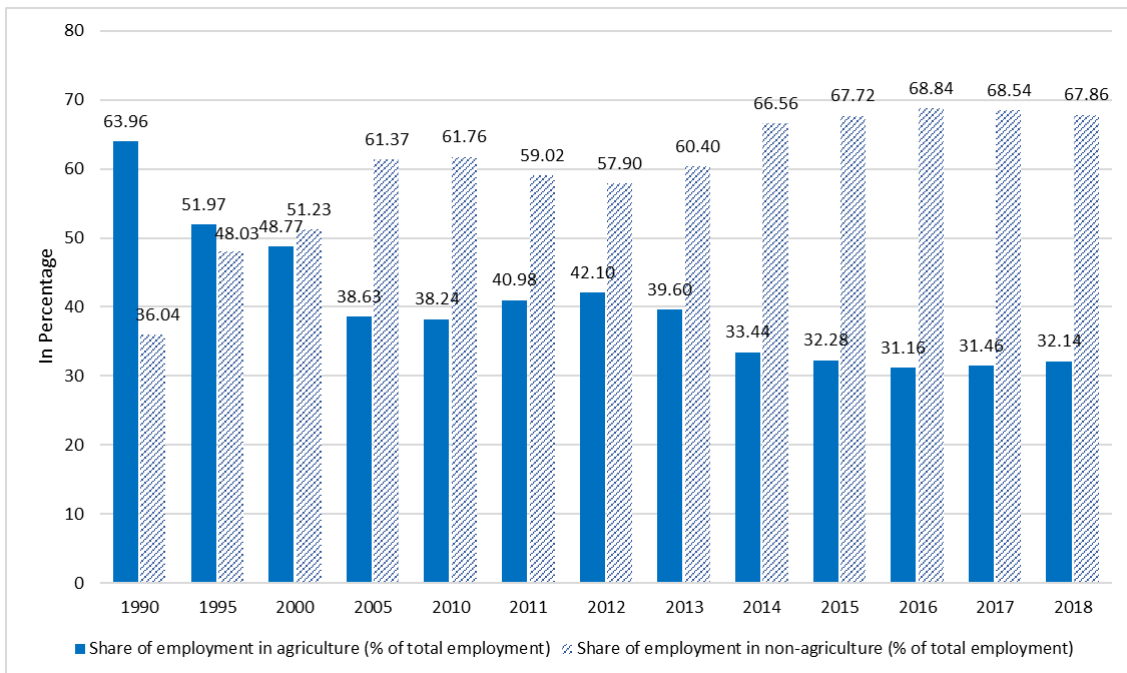
Figure 1: The Percentage Change of Employment in Agriculture and Non-Agriculture in the Period from 1990 to 2018

Economic losses in manufacturing due to damage of industrial factories was 1,007 billion Baht from July to December 2011 while loss of agriculture was only 40 billion Baht in the same period (Aon Benfield 2012). In overall, the Figure 1 shows that the number of labor moving from agricultural to other sectors has been dramatically increasing. Labor storage in agriculture is an issue in Thailand.

Demographic population change in Thailand also play a role in the decreasing labor in agriculture. Aging population is increasing. In 1990, the percentage of population ages 65 and above was only 4.52 % of total population; yet it increased to 11.90 % in 2018 (WB 2019). In contrast, young Thai are less interested in agriculture since they perceive agriculture as hard job. According to Tapanapunnitikull and Prasunpangsri (2014), farmers has gradually lost interested in farming because of several reasons such as attitude (perceive agriculture as hard job), poverty (low income and debt), economics (high production costs and low product prices), and the transition of agriculture to industrialize. Beside this, the world technology is more and more advance from day to day; in contrast, in current context of Thailand, agricultural sector has not yet fully driven by innovative technology since the productivity in agricultural remains low and the labour forces do not yet meet expected requirements and labour market demand.

To tackle this issue, Thai government has been focusing on the development of agriculture by introducing and implementing agricultural labour policies in order to cope with the problems and challenge with these global changes.

National Strategic Plan 2018-2037 has a vision to make Thailand to become "a development country with security, prosperity, and sustainability in accordance with the sufficiency Economy Philosophy" (National Strategy Secretariat Office 2017). To achieve this, "Development of human capital" is a strategy that aims to promote modern innovators, thinkers, entrepreneurs, farmers, and so forth based on personal skills and abilities." (National Strategy Secretariat Office 2017). There are some key development guidelines to reach the objectives such as the following:

- Transforming social values and culture of Thai people by encouraging all social institutions to unite in instilling desirable values and culture
- Promoting human development at all stages of life
- Improving learning processes to accommodate changes in the 21st century by encouraging lifelong learning and development of learning skills
- Realizing multiple intelligences
- Enhancing well-being among Thai people, including physical and mental health, wisdom, and social aspects
- Promoting conditions that encourage human capacity

(National Strategy Secretariat Office 2017)

2.3.　　　Education System in Thailand

Thai education system previously was under the Ministry of Education and Ministry of University Affair (MOE). Under the MOE, there was the Office of Vocational Education Commission (OVEC), the Office of the Basic Education Commission (OBEC), which was responsible for primary and secondary education, and the Office of the Higher Education Commission (OHEC), which was responsible for public universities, private higher education institutions and community colleges (Win 2016). Since May 2019 new Ministry of Higher Education, Science, Research and Innovation (MHESI) is responsible for higher education and the Ministry of Education (MOE) is responsible for primary and secondary education, and vocational education (Nuffic 2019).

The educational system in Thailand is showed in a flow chart which descripts the system from pre-school to PhD (detail in Appendix 1). A. Pre-school education for children whose age between 3 to 6 years old is non-compulsory in Thailand. However, compulsory education is 6 to 15 years (basic education + lower secondary education). Children aged 6 to 12 has to study 6-years basic education (Grade 1-6) in primary school and then sit for the Ordinary National Educational Test (O-NET). Later on, students who successfully completed their primary education will enter secondary education, which are divided into 2 cycle: Lower secondary education (Grade 7-9) and senior secondary education (Grade 10-12). Other way, students can also choose to attend 3-year programme for vocational education instead of this general programme. To attend higher education, either certificate of secondary education or certificate in vocational education is needed. Since 2018, "Thai University Central Admission System (TCAS)" that works with five admission round has been used to replace the old system "The Central University Admission System (CUAS)". Nowadays, the TCAS has been used by about half of the public higher education institutions (Nuffic 2019).

Office of the Permanent Secretary for Higher Education, Science, Research and Innovation (2020) stated that currently there are 156 higher education institutions including 27 Autonomous universities, 10 Public universities, 38 Rajabhat universities, 9 Rajamangala Universities of Technology, and 72 Private Higher Education Institutions. Among those university, there are 9 higher education institutions, which include Chiang Mai University; Chulalongkorn University; Kasetsart University; Khon Kaen University; King Mongkut's University of Technology Thonburi; Mahidol University; Prince of

Songkla University; Suranaree University of Technology; and Thammasat University, that are recognized as national research universities in 2009 (Win 2016). The main objectives of the recognition are to improve the quality of research at Thai universities and to promote Thai higher education (Win 2016).

2.4. Agricultural Education in Thailand: Challenges and Opportunities

As a leading food exporter in the Southeast Asia, development of human resource in agriculture is a significant component in agricultural development as well as the country's economic development. Agricultural education in Thailand exited since formative period. Basic education in agriculture first established in primary school in 1898 (Traimongkolkul & Tanpichai 2005). Specialized schools were initiated in the purpose of training agricultural teachers to be able to teach agriculture in elementary schools. Later on, during green revolution period, the demand of manpower and technology had increased. The U.S. model of agricultural education was adopted at that time. Notably, the "comprehensive school" model was implemented in secondary schools in 1967 (Traimongkolkul & Tanpichai 2005). The 1970s, there was a large expansion of vocational and higher education in agriculture response to high demand for vocational manpower in the government sector (Traimongkolkul & Tanpichai 2005). In 2002, agricultural education was restructured which influenced by the country's holistic reform in education and renewed direction in agricultural development (Traimongkolkul & Tanpichai 2005).

However, in context of agricultural higher education, there were several limitations including decrease of number of student enrolment for agricultural programs because of less interest, increase in the number of dropout students, lack of professional resource persons, and a weak linkage between the colleges of agriculture and the Ministry of agriculture which is responsible for research and extension (Win 2016).

In 2016, there was 2.23 million students enrolled in higher education (British Council 2018). Figure 2 shows the fluctuation of higher education student from 2007 to 2016. The decline of student's enrolment in higher education reflects the fall of the student-age population. Compared to its 1991 peak, the number of 15-to 24-year-olds population in

the country had decreased by more than 20% and it will drop 14% more over the next decade due to UN Population Division forecasts (British Council 2018). Therefore, the decline of student's enrolment in higher education will affect the number of student's enrolment in agricultural higher education as well. According to Tapanapunnitikull and Prasunpangsri (2014), university students registered in agricultural program was only 8.8%.
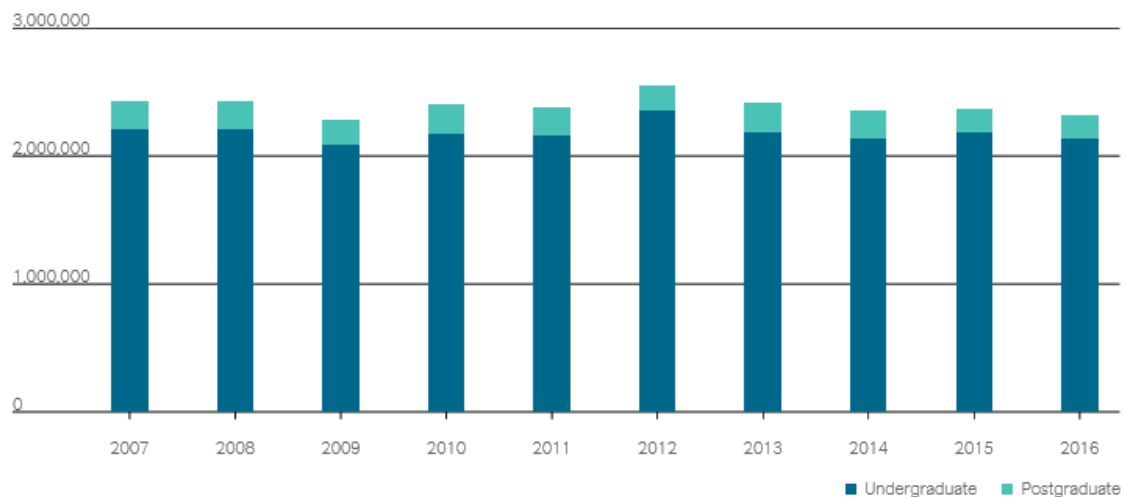
Figure 2: Thailand's HE Student Population Over Time (British Council 2018)

Current Thai agricultural higher education is comprehensive and diversified. Public universities offered many programs in agricultural sciences and related disciplines. Nearly all of the total 74 universities offer programs in agriculture or related sciences in 2005 (Traimongkolkul & Tanpichai 2005). In addition, there are different mode of transnational education delivery: Collaborative joint / double degree programmes, Franchising and validation, Articulation and credit transfer, Distance learning, Credit transfer, Branch campuses, and English-medium programmes at Thai universities (British Council 2018). Moreover, beside of regular program, there are different types of programs including international program, and special program. Kasetsart University solely offered 25 programs in the regular term under agriculture sector while eight programs are in the special term. Academic Institute (University and Vocational College) plays an essential role in bringing back labor to agriculture. Tapanapunnitikull and Prasunpangsri (2014) mentioned that Government agency, Private sector, Academic Institute, and Research Unit have roles in fostering the young into farming.

2.5.   Double Degree Program

Definition

In general, Double Degree Programme (DD Programme) is a collaboration between two universities that allows students to obtain two degrees from the two universities at the same time. The collaboration normally brings benefits to both universities. However, there is a mass confusion of term "Double Degree program"; especially with the term "Joint Degree Program".

Härkönen and Bussemaker (2013) differentiate between Double Degree program and Joint Degree Program as following:

"Double Degree Program is a joint educational programme in which students obtain two diplomas from two different universities, after having spent part of their study programme in each of the universities."

"Joint degree programme is a joint educational programme in which students obtain one single diploma that is jointly awarded by the universities: so one diploma with two (or more) university names and logos on it. Also here a student has spent part of the study programme in each of the universities".

In addition, Knight (2011) provided a short and clear definition of double degree Program and Joint Degree Program that:

"A double degree program awards two individual qualifications at equivalent levels upon completion of the collaborative program requirements established by the two partner institutions."

"A joint degree program awards one joint qualification upon completion of the collaborative program requirements established by the partner institutions."

Student Motive

Double Degree Programme is commonly implemented at least between two countries or multiple countries depending on partners and at the end of the study students will obtain two degrees. Therefore, it is very important to understand student's motive or expectation from the programme. According to Knight (2011), there is a doubt on student's rationale whether they want quality experience or two degrees for the price of one. Table 2 showed

both DD students and alumni focused on experience studying abroad, adapt with new environment and culture, and develop some skills which beneficial for their career path (Culver et al. 2012; Russell et al. 2007).

Opportunities and challenges

Some of the advantages of DD programme are to broaden and deepen education offerings, improve in the quality of curricula, enhance the cross-cultural competencies of students and staff, and gains in graduate employability (Kompanets & Väätänen 2019). Härkönen and Bussemaker (2013) stated that double degree program with a well plan may provide the fruitful outcomes such as: Bring optionality to studies and complement one's specializations; enhance the international experience and intercultural competencies; increase goal orientation in study practices; attract talent and increase the number of foreign degree students and completed degrees; act as a quality assurance for student and teacher exchanges; develop international content and quality of education; Internationalize the higher education community; deepen other cooperation with partner higher education institutions; Improve student's position in the (international) labour market and enhance workforce mobility.

However, Knight (2011) addressed some several academic issues such as alignment of regulations and customs; quality assurance and accreditation; language; fees and financing. in the case of Russian-Dutch double-degree master's programme in computational science, four issues were mentioned (1) separation of Russian educational system from research institutes; (2) cultural differences; (3) language issues; and (4) partial incompatibility of Russian educational system with the majority of the leading world universities, including those in EU (Krzhizhanovskaya et al. 2015). Aside from global issues, there was many challenges during program implementation. One example was the double teaching load due to the group split-up, when students in Amsterdam and students in St. Petersburg have to take the same courses at the same time (Krzhizhanovskaya et al 2015). Conflicting traditions and different interpretations of the same questions can lead to misunderstandings between partners according to Kompanets & Väätänen (2019). In the case of Finnish-Russian double degree programmes, however, the authors addressed only the different values and expectations related to globalisation trends among the partners, no serious conflict was found (Kompanets & Väätänen 2019). Students also face many difficulties in DD Program and in some reasons, they might quit

the study. According to Ou et al (2018) who studied about the reasons undergraduate students quit Double Degree Programs in China, there were two main reasons: (1) their expectations for courses, teachers and job prospects were not met; and (2) lack of external support such as parental support or peer support. Difficult curriculum content, inappropriate curriculum planning, irresponsible and unprofessional teachers, and alienated interpersonal relationships could be the reasons leading to students' dissatisfaction (Ou et al 2018). The study also stated that "Poor time management, a tight schedule and mismatch between courses and cognitive level, also turned out to be the contributing factors of students' withdrawal from double-degree programs." (Ou et al 2018). By the way, the limited contribution of double-degree programs to job opportunities was also an important factor yet have been rarely discussed (Ou et al 2018).

Table 2: Factors Evaluating on DD Programmes

Aspects	Author(s), Year	Country	Findings
Motives	Culver et al. 2012	The United States, Italy, Germany, and Sweden	DD students: travel, experience another culture, adapt with new situation, improve some skills. DD alumni: study abroad, improve language skills, social skills, problem solving skills and confidence.
	Russell et al. 2007	Australia	Acquire job-relevant skills to improve employment prospects, the extra challenge and stimulation of a different discipline.
Opportunities	Kompanets & Väätänen 2019	Russia & Netherland	Broaden and deepen education offerings, improve in the quality of curricula, enhance the cross-cultural competencies, and gains in graduate employability.
	Härkönen & Bussemaker 2013	Finland & Netherland	DD programme brings a quality international standard education, enhances interpersonal skills, and prepares students for labour market.
Challenges	Knight	-	Alignment of regulations and customs; quality assurance and accreditation; language; fees and financing.
	Krzhizhanovskaya et al. 2015	Russia & Netherland	Separation of Russian educational system from research institutes; cultural differences; language issues; and partial incompatibility of Russian educational system with other universities in EU.
	Ou et al 2018	China	Difficult curriculum content, inappropriate curriculum planning, irresponsible and unprofessional teachers, and alienated interpersonal relationships, poor time management, a tight schedule and mismatch between courses and cognitive level, and lack of external supports.

2.6.   Skills and Competencies Development

Skills and competencies development was promoted by different programme in purpose to enhance the graduate's employability. Nowadays, skills and competencies were broadly discussed in different studies. Table 3 summarises skills and competencies development through DD programme and other programme in different countries. Holstein (2012) found that the five most important personal skills are (1) Attitude; (2) Learning skills; (3) Social skills; (4) Team working skills; and (5) Problem-solving skills among DD students in Aalto University (Finland). In the case of engineering double degree program in Sweden, students mention that "the double degree makes them more marketable, in part because it extends their pool of job opportunities (from one country to at least two) and demonstrates their initiative and willingness to do something different from their peers" (Culver 2011). The results from a survey among women students who did double degree for their bachelor's degree in Australian Universities stated that the students would build the skills of integration, boundary work, communication and teamwork associated with transdisciplinarity, which equip students for a range of employment (Russell et al. 2007). According to Culver et al. 2011, DD students improved general academic skills including critically thinking, effective communication within different cultures, problem solving, leadership, ability to adapt to new situations, self-confidence and independence etc.). Another finding of the study among medical students stated that "there are indeed significant differences between dual-degree and traditional medical students on a number of dimensions that relate to career plans, leadership, motivation to be leaders, and confidence" (Sherrill 2000). Using self-evaluation method to evaluate skill and competencies improvement of Erasmus Mundus Alumni in the Field of Agriculture and Related Life Science, the results showed that responsibility, decision making, and independence were the most developed skills and competencies (Chaloupkova et al 2015).

Table 3: Summary of Skill and Competencies Development

Author(s), Year	Programme	Country	Skills and competencies improvement
Holstein 2012	DD Programme	Finland	(1) Attitude; (2) Learning skills; (3) Social skills; (4) Team working skills; and (5) Problem solving skills
Russell et al. 2007	DD Programme	Australia	(1) Ability to integrate, (2) Boundary work, (3) Communication, (4) Teamwork, and (5) Transdisciplinarity.
Culver et al. 2011	DD Programme	The United States, Italy, Germany, and Sweden	(1) Critically thinking, (2) Effective communication, (3) Problem solving, (4) Leadership, (5) Ability to adapt to new situations, (6) Self-confident, (7) Independent
Sherrill 2000	DD Programme	United States	(1) Career plans, (2) Leadership, (3) Motivation to be leaders, and (4) Confidence
Chaloupkova et al (2015)	Erasmus Programme	Thailand	(1) Responsibility, (2) Decision making and (3) Independence

2.7. Employability of the Graduates in Agriculture

Agricultural labor force of Thailand has dramatically declined due to demographic population change, increase the number of aging population, and decrease of the number of young generation that is interested in agriculture. Therefore, agriculture sector of Thailand has been facing shortage of labor. To tackle this issue, government of Thailand has laid out the future planning which involves the global trend of the fourth industrial revolution or in short "Industry 4.0" (Poapongsakorn & Chokesomritpol 2017). This policy aimed to attract people to come back into agriculture and increase the livelihood, specifically income of farmers from the average of 56,450 Baht (approximately 1575 Euro) annually to 390,000 Baht (approximately 10,900 Euro) annually (Poapongsakorn & Chokesomritpol 2017). Furthermore, there are a numerous supportive projects/programs initiated by several public and private organizations in enhancing more active participation of young agri-entrepreneurship in Thai the farming sector according to Decharut (2018). To achieve the development in agricultural sector, human resource in agriculture and related field is increasingly needed. The result of Erasmus Mundus Alumni Employability Study in the Field of Agriculture and Related Life Science in Thailand found that the majority of the students as well as employers think "there is a demand for graduates in the agricultural fields and there are new job opportunities which nowadays combine more varied disciplines, such as entrepreneurial agriculture." The graduates in the Field of Agriculture and Related Life Science worked in various sectors

including public sector (educational or research institutions or banks), private companies, and nongovernmental organizations. Moreover, most of the graduates reported that they were satisfied with their current position in term of salary, social status and professional relations (Chaloupkova et al. 2015).

Factors influencing student employability can be both internal and external factors which are very complex. Table 4 shows a summary of previous studies on some potential factors influencing student employability, namely biological background, educational background, skills and competencies, and social and professional networks. Biological background has influenced employability differently according to different country contexts and cultures. Educational background plays a crucial role during seeking for job and student's major is one of the criteria which has to consider during the recruitment. Skills and competencies are the main factors which have studies in several studies. To enhance graduate employability, transferable skills, soft skills and career development practices are delivered through different modes of programme. Last but not least, having social and professional networks also can help graduate getting information on job. Networks can affect positively on student employability.

Table 4: Summary of Factors Influencing the Graduate's Employability

Factors	Author(s), Year	Country	Statements
Gender and Age	Kong (2011)	China	Female graduates find jobs more easily than male graduates.
	Heo & Xiaohui (2019)	South Korea	Men have more influence on the employment possibility than women. Age does not have a significant effect on employment
Educational Background	Alibaygi et al. (2013)	Iran	Educational background had positive effect on perceived employability.
	Heo & Xiaohui (2019)	South Korea	The employment decision is based on one's major rather than a minor or double major.
	Kong (2011)	Beijing, China	High reputation university graduates find jobs more easily compared to three-year college graduates. Agriculture graduates have lower probabilities of unemployment than law and science graduate.
	Rothwell & Arnold (2007)	United Kingdom	Academic performance, university brand and the reputation, the status and credibility of graduates' field of study affect labour market outcomes.
Skills and competencies	Baek & Cho (2018)	South Korea	Leadership, teamwork, responsibility, independent, and patience enables students to improve their employability.
	Bosibori (2018)	Kenya	Non-technical skills (communication, problem solving, creative thinking, leadership, teamwork, etc) were important for employability purposes.
	Chaloupkova et al. (2015)	Thailand	Responsibility, adaptability, teamwork and networking, communicate skills, and a positive attitude were influenced factors on their employment.
	Mirakzadeh & Ghiasy (2011)	Iran	Professional skills, communication skills, practical experience are effective factors on employment of agricultural graduates.
Social and Professional Networks	Chaloupkova et al. (2015)	Thailand	Professional networks are one of the main resources for job search for graduates.
	Harry et al. (2018)	South Africa	Social networks have become a major factor in how an individual competes in the labour market.

2.8. Overview of PISAI Project

The PISAI project is co-funded by the ERASMUS + Programme of the European Union. The project is implemented for 4 years (2017-2021). The project involves four main Thai universities, namely Prince of Songkla University (PSU), Kasetsart University (KU), Chiang Mai University (CMU), and Khon Khen University (KKU), with the support from four EU universities and research centers, namely Montpellier SupAgro in France, University of Copenhagen (UCPH) in Denmark, Czech University of Life Sciences Prague (CULS) in the Czech Republic, particularly Faculty of Tropical AgriSciences, University of Helsinki (UHEL) in Finland, and international association AGRINATURA.

Project's Objective

- Build capacities of HEIs to address the commitments on self-reliance and agricultural sustainability for future food supply
- Create and offer a DDMP in " Participatory and Integrative Support for Agriculture " (PISAI) by four leading agricultural universities at the national level in collaboration with Thai agricultural networks
- Internationalize the HEIs, the developed program and the graduates' profile in agriculture through the collaboration and contribution from experienced European partners that will have a multiplying impact on adoption by ASEAN and other developing countries

Project's Main Activities

The project main activity is to establish Double Degree Master study programme among four key agricultural institutes (KU, PSU, CMU and KKU) with support from EU partners. Other seven associate organisations which are active in cooperation with small holder and local farmers and governmental sectors also involve in the project by providing study sites, experience, knowhow, valuable advice and dissemination of project activities.

The DDMP organized four Modules in total for two batch of students (academic year 2017/2018 and academic year 2019/2020).

- Module 1: Value Chain Management at Chiang Mai University
- Module 2: Environment/Ecosystem in Sustainable Agricultural Production at Khon Kaen University

- Module 3: Challenge and Opportunity in Sustainable Agricultural Production at Kasetsart University
- Module 4: Internship

Four Thai Universities' Background

The project involves four main Thai universities situated in key agricultural production areas that cover different geographical parts of the country.

1) **Prince of Songkla University (PSU)** was established in 1967, situated in southern Thailand. Faculty of Natural Resources (FNR) has been working closely with the communities in agriculture and natural resources management since the university was established and work closely with the agricultural knowledge dissemination sectors of the Local Government Organizations in several southern Provinces supported by the Ministry of Agriculture and Co-operatives.

2) **Kasetsart University (KU)** is Thailand's first specialized agricultural university in Bangkok, the centre of country development. KU was established in 1943 and translates into "University of Agriculture" in Thai. Moreover, KU is internationally known for its top tier research and programs in agriculture, tropical forestry, agroindustry, fisheries and engineering.

3) **Chiang Mai University (CMU)** is the first university established by the provincial government since 1960. CMU is located in the Lanna region, the foot of Doi Suthep, Suthep Subdistrict, Mueang District, Chiang Mai Province. In 2008, CMU changed its status to an autonomous university. Among 20 faculties, faculty of agriculture offers various agricultural programs at all levels of higher education, both international and Thai program.

4) **Khon Kaen University (KKU)** is the first university founded in the Northeast according to the policy to expand higher education to the regions under the First Social and Economic Development Plan and was founded in 1967 by King Rama IX. People in this Northeast, most of whom are poor, always face the problems of drought every year, and thus agricultural production is not good. Khon Kaen University changed its status to an autonomous university in 2005. Under faculty of agriculture, KKU provides numerous agricultural higher educational programs including both international and Thai program.

3.   Aims of the Thesis

In order to achieve development goal in agricultural sector in Thailand, human resource development plays a crucial role. However, the number of students enrolled in the field of agriculture and related fields is still limited and the number of students' dropout is increasing (Win 2016). Therefore, DD Programme are implementing among agricultural higher educational institutes in order to attract more students as well as to promote the quality of the study. According to Härkönen and Bussemaker (2013), DD Programme equips students with quality international standard education, enhances interpersonal skills, and prepares students for labour market. Nevertheless, there are many challenges for DD programme such as academic issue, cultural differences, language issues, and excessive workload for students (Krzhizhanovskaya et al. 2015). Despite all challenges, DD Programme can enhance students' skills and competencies which can help students for their career path, namely learning skills, social skills, team working skills, problem-solving skills, general academic skills, language skills, leadership skills, and effective communication skills (Holstein 2012; Culver et al. 2011; Sherrill 2000). Employability of the young graduates is nowadays broadly discussed topic. Culver et al. 2011 stated that if DD programme was promoted among employers about their value, it would be beneficial to students in job market.

Therefore, this study is designing with three specific objectives, particularly (i) to analyse the opportunities and challenges of the DDMP, (ii) to identify which skills and competencies were improved during the DDMP and (iii) to investigate the aspects influencing future employability of the students.

Hypothesis:

H_1: There is a difference among the students, staff, and employers regarding importance of skills and competencies improved during the studying DDMP.

H_2: There is a different perception of female and male DDMP students regarding their future employment.

4. Methods

4.1. Data Collection Approach

The thesis is based on both secondary data and primary data. The main sources of secondary data of the research were scientific journals and online articles from various scientific databases including ResearchGate, ScienceDirect, Google Scholar, CZU library and PISAI project's webpage. Statistical information regarding socioeconomic aspects was mainly from FAOSTAT and DataBank of WB. The information from secondary data were very useful for developing theorical and conceptual framework for this study.

Primary data were collected through online questionnaire. For collecting these data, purposive sampling method has been chosen to reach key stakeholders involved in the project PISAI. The respondents participated voluntarily and anonymously. Table 5 showed detail regarding the number of stakeholders in each categories.

There were two batches of DDMP students (academic year 2017/2018 and academic year 2019/2020). Questionnaires were distributed to 24 DDMP students from 4 universities (KU, PSU, CMU and KKU) plus 33 international students from EU universities (CZU, SupAgro, UCPH, and UHLE) that partially participates in one of four modules. Questionnaires were distributed to 60 project staff (both Thai and EU staff) including teaching staff, administrative staff and management staff that involved in the project. The study also approached 34 employers, who were the project partners that provided learning site and internship opportunities to students.

Table 5: Background of Stakeholders by Categories

Stakeholders	Thai Universities				EU Universities				International Organizations		Total
	KU	CMU	PSU	KKU	CZU	SupAgro	UCPH	UHEL	IRD	Agrinatura	
DDMP Students	3	6	10	5	-	-	-	-	-	-	24
International Students	2	-	2	1	16	7	-	5	-	-	33
Project staff	14	6	17	12	3	1	2	1	2	2	60
Employers											34
Total	19	12	29	18	19	8	2	6	2	2	151

4.2.   Theory of Change

Theory of Change are typically used as theory based evaluation. Theory of Change can visually shows how the intervention is supposed to work and flaws in logic model (Imas LGM & Rist R 2009). Without Theory of Change, it was hard to explain whether the intervention or project can reach the objectives or not. Theory of change approach argues that if an evaluator can validate a theory of change with empirical evidence and account for major external influencing factors, then it is reasonable to conclude that the intervention has made a difference. Therefore, theory of Change was constructed to understand the complexity of the research problems (Figure 3).
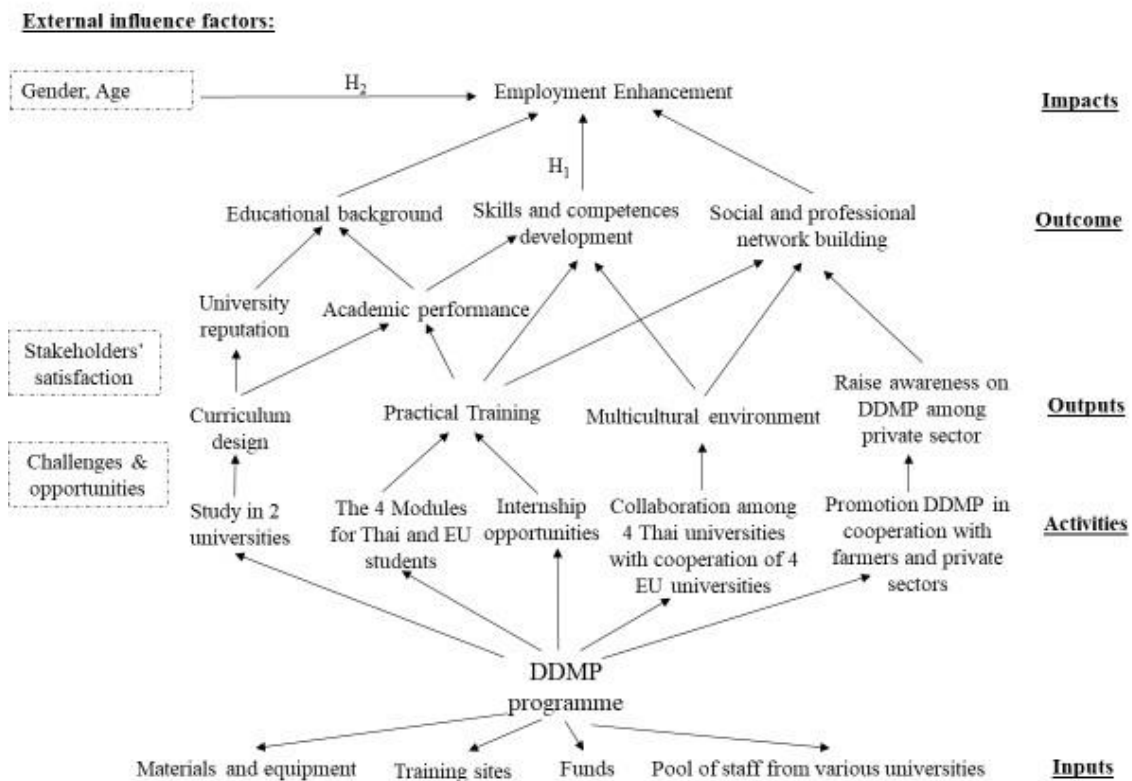
Figure 3: Model of Theory of Change

4.3.   Questionnaire

Questionnaires were used as research tool for this study. The questionnaires combined both quantitative and qualitative questions. The three types of questionnaires were translated in Thai language and developed both in Thai and English version using Google Form, and then sent via email to the three stakeholders.

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1.   "*Questionnaire for students*" mainly consists of six parts: (1) General information of students; (2) Self-rating on skills and competencies improvement using 21 aspects based on literature review; (3) Satisfaction toward DDMP using eight aspects based on literature review; (4) Pros and Cons; (5) Challenges and opportunities; and (6) Employability. For DDMP students, questionnaire was designed to evaluate DDMP. For international students, on the other hand, most parts (2-5) referred to the Modules they attended only since they partially joint the programme and there was no sixth part on employability.

2.   "*Questionnaire for Project staff*" consists of five parts: (1) General information of project staff; (2) Rating skills and competencies improvement of students from their perception; (3) Satisfaction toward DDMP; (4) Pros and Cons; and (5) Challenges and opportunities.

3.   "*Questionnaire for Employers*" focuses mainly on three parts: (1) General information of farms or companies; (2) Rating skills and competencies improvement of students (what they expect students should have to be a qualified employee); and (3) Employability

4.4.   Data Analysis

Data were exported directly from Google Form in Excel format. The data which was in Thai were translated to English and then compiled it with data in English. Data cleaning and data analysis were performed in STATA software and Ms Excel.

Concept code analysis was used to analyse qualitative data, which obtains from open-ended question (Appendix 6) (Ou et al. 2018). The answers were read several times to identify key words and group it into category based on their common. Then it was counted and ranked it in order based on the frequency mentioned by the respondents. Descriptive statistic was used to analyse quantitative data. For Likert questions, we calculated the Mean value and displayed it using clustered bar and 100 straked bar in excel. One way ANOVA was used to demonstrate the different between stakeholders on skills and competencies development and Bonferroni's correction method was used for post-hoc test to verify which group differed from which another group (Culver et al. 2012). T-Tests were used to test a difference perception of female and male students regarding their future employment.

5. Results

5.1. Respondent's Characteristics

At the end of the survey, the study got 87 respondents in total from the four categories of the target group: 21 DDMP students, 17 international students, 35 project staff, and 14 agricultural companies and farmers (Table 6). Comparing to the total number of stakeholders the study approached, the response rates were 88% from DDMP students, 52% from international students, 62% from projects staff, and 41% from agricultural companies and farmers.

DDMP students

Most DDMP students (21 out of 24 students) who studied in both batches of the DDMP joined the survey. 76 % of DDMP students were female while 29 % of them were male. The average age of them was 25 years old and most of them was below and equal 25 years old, which accounted for 76% of the total DDMP students participating in this survey. All DDMP students were domestical students who hold Thai nationality.

International students

There were 17 responses from international students. The majority of them (71%) was from EU universities. The remaining 29% was international students who studied in regular program or exchange program in Thai universities (2 responses from KU and 2 responses from PSU). All international students attended in one of the three modules of DDMP program. There was no student from UCPH joining any modules. The gender of international students was divided quite equally between female and male, 58% and 42 % respectively. The average age of international students were 27 years old. Most of them was above 25 years old which accounted for 65 %.

Project Staff

There were 35 responses from 4 Thai Universities, 3 EU universities, and 2 responses from international organizations. The majority of project staff participating in the survey (71%) was teaching staff. The rest of them were administrative staff (11%), management staff (11%), assistant teacher (3%), and observer (3%).

Employers

There are 14 agricultural companies or farmers (10 response from private farm, 2 responses from private agricultural companies, and 2 responses from community enterprises) which providing training site in each module and internship opportunity for DDMP students. Most of the agricultural companies are micro and small size (private company and community enterprises employed 14 employees in average and private farms had 5.29 Rai in average (1 Rai=1600 square meters)).

Table 6: Characteristics of Key Respondents

Respondents	Thai Universities				EU Universities				International Organizations		Total
	KU	CMU	PSU	KKU	CZU	SupAgro	UCPH	UHEL	IRD	Agrinatura	
DDMP Students	3	6	7	5	-	-	-	-	-	-	**21**
International Students	2	-	2	1	7	3	-	2	-	-	**17**
Project staff	4	5	17	4	2	1	1	1	1	1	**37**
Employers											**14**
Total	**9**	**11**	**26**	**10**	**9**	**4**	**1**	**3**	**1**	**1**	**89**

Number of DDMP Students Based on Home and Host University

Figure 5, on the other hand, showed more detail on the number of DDMP students according to their home and host universities. DD students were well distributed from their home universities, (7 students from PSU, 6 students form CMU, 5 students from KKU, and 3 from KU). However, almost half of them (10 students) chose PSU as host university, followed by KU which accounted for 7 students. The remaining 4 students chose CMU as host university. There was no Thai student choosing KKU as host university in the study sample.
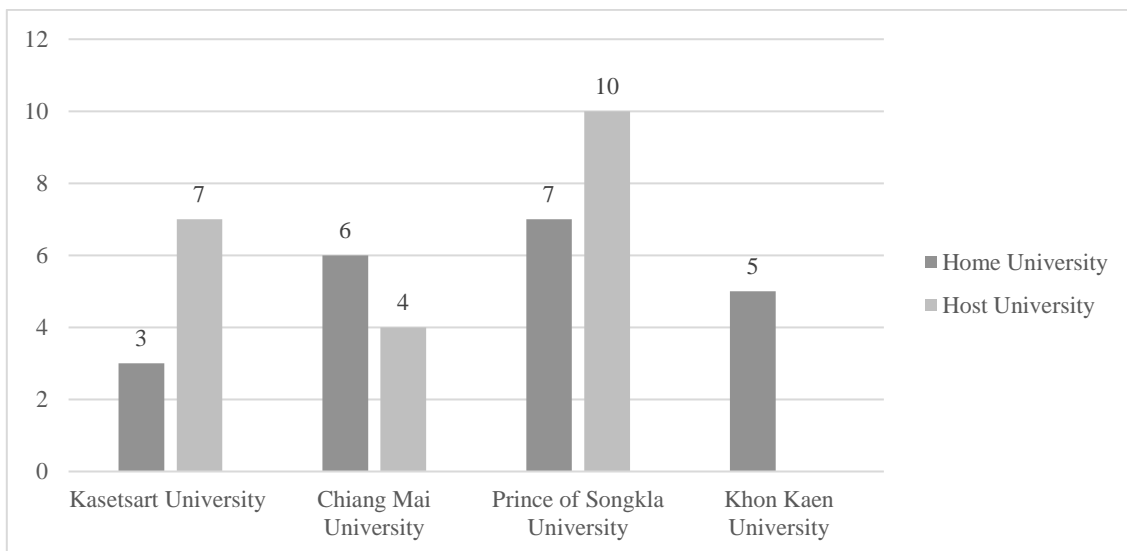
Figure 4: Distribution of Thai Students among Home and Host University

Number of DDMP Students and International Student in Each Module

The DDMP organized four Modules in total for two batch of students (academic year 2017/2018 and academic year 2019/2020).

- Module 1: Value Chain Management at Chiang Mai University
- Module 2: Environment/Ecosystem in Sustainable Agricultural Production at Khon Kaen University
- Module 3: Challenge and Opportunity in Sustainable Agricultural Production at Kasetsart University
- Module 4: Internship

Figure 6 showed the number of Thai students and international students participating in each module. Most of Thai students joined fully in Module 1-3, except in Module 2, one of Thai students was absent. Module 1-3 were organized by mixing both Thai and international students while module 4 (Internship) was for Thai students only. However, only 6 DDMP students got an opportunity in internship. The most represented international students were from Module 3 (10 international students). There were 5 international students participating Module 1 and only 2 international student participating in Module 2.
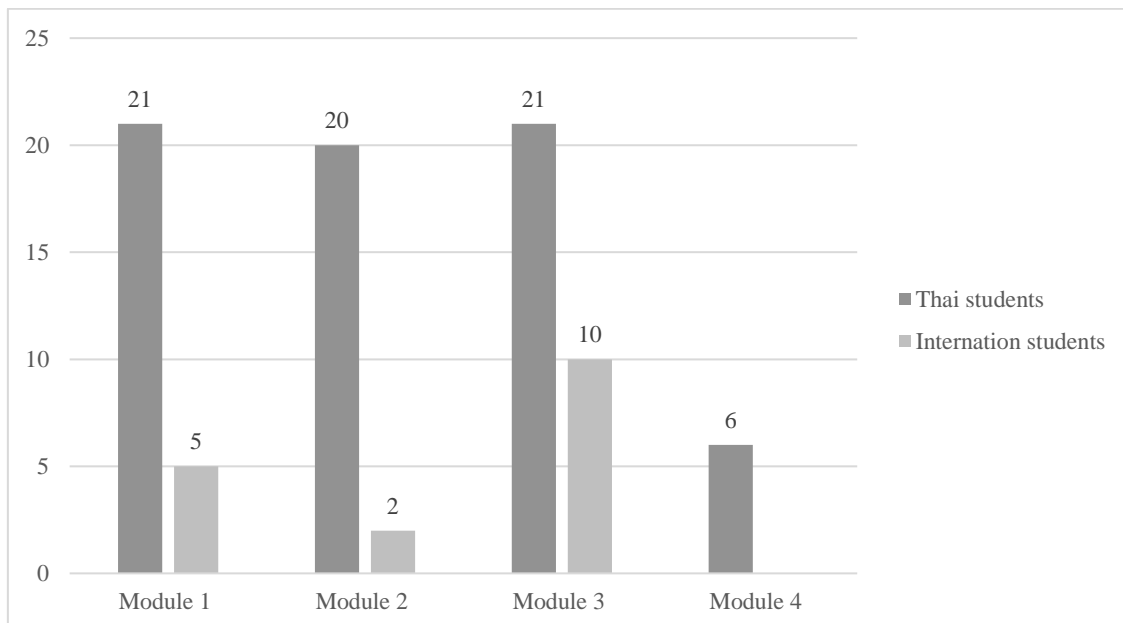
Figure 5: Distribution of Thai and International Students Participating in Module 1-4

5.2. Student's Motives in Studying or Participating in DDMP

DDMP students

There were several reasons the Thai students decided to study in DDMP. The first main reason, which mentioned the most by DDMP students, was because of curriculum design of DDMP. The second main reason was to develop skills and Competencies including research skills, ability to work in team, ability to learn new thing, and adapt with different culture, language skills, and practical training. The third main reason was to build connection and networking with students and staff in agricultural field, especially foreign friends from different countries. Only a few DDMP students mentioned about getting good educational background (two degrees) and financial support.

Table 7: Reasons for DDMP Students to Choose DDMP

Reasons	Count	Rank
Good Curriculum Design	12	1
Skills & Competencies Development	5	2
Network building	4	3
Good Educational Background	2	4
Financial support	1	5

International Students

Even though, international students were interested in different topics; however, the main reason they decide to join the Module was the contents of the training which they believe to get more experience and knowledge from the topic covered in the Module they attended. There was other several knowledge and skills which they differently wanted to improve through the Module including agricultural sustainability, ecosystem sustainable agriculture, challenge and opportunities in agricultural production in Thailand, agricultural production system, agricultural in tropics, how to add value added to agricultural products, research methodology, and research question.

The second most important reason was to get skills and competencies, especially through the fieldwork which allowed students to interview with local farmers and understand the real situation of agricultural in Thailand.

The other reasons, which motivated them to join the Module, were to get an opportunity to travel abroad and build networks.

Table 8: Reasons for International Students to Join the Module

Reasons	Count	Rank
Good Contents	14	1
Skills & Competencies development	4	2
Travel abroad	3	3
Network building	2	4

5.3.   Opportunities and Challenges of DDMP

Opportunities

Table 6 showed the opinion from student and project staff on opportunities they got during their study in DDMP and participating in Module (international student). The most mentioned by DDMP student and staff was opportunity to develop skills and competencies. Through the program, DDMP student could improve various skills including decision making, academic skills, language, time management, ability to learn and adapt in new situation, and flexible. In contrary, international student did mentioned much on skills and competencies development because they attended in short period of time (2 weeks). Instead, they mentioned the most on the contents and practical experience they gained from the Module such as field work, excursion, and interview with farmers.

The second most importance perceived by DDMP student and project staff was opportunity to learn in an innovative curriculum design which was developed by various institutes. There was many practical training and a mixture of lecturers from different universities, especially from EU.

Network building was another opportunity mentioned many times by stakeholders. DDMP was designed with a collaboration with various institutes and had many activities which allowed students to communicate and build both social and professional networks with students and academic from different universities and countries as well as with private sector during their practical training and internship.

Opportunities to get a good educational background (double degree) was perceived as a good opportunities by project staff; however, it was mentioned only a few times by DDMP student. Last but not least, there were other opportunities such as job opportunity and financial support which mentioned a few times by DDMP students and project staff.

Table 9: Opportunities of Student Studying and Participating in DDMP

Opportunities	DDMP Student		International Student		Project Staff	
	Count	Rank	Count	Rank	Count	Rank
Skills & Competencies Development	8	1	2	3	22	1
Good Contents and Practical Experience	-	-	10	1	-	-
Good Curriculum Design	7	2	-	-	8	2
Network Building	5	3	7	2	6	3-4
Good Educational background	2	4	-	-	6	3-4
Job Opportunity	1	5-6	-	-	2	5
Financial support	1	5-6	-	-	1	6

Challenges

Language was a main challenge mentioned the most by DDMP students. Most of the courses was taught in English, especially in the three modules which were a combination of both Thai and EU participate (professors and students). Moreover, during the field work students also had a trouble understanding dialect farmers used. The same with DDMP students, language was the most challenging for international students. International students claimed that it was hard to communicate because the English level of Thai students was still limited and have different accents. The staff also considered language as second main challenge. All responses emphasised on the ability of students to communicate in English was still limited and students should learn more academic vocabularies.

Time schedule was the second major challenges for the students. Time allocation for both home and host universities was challenging for students. On the other hand, projects staff considered time constraints were the most challenging one for DDMP students. It was hard from students to allocate time two both universities at the same time. The different academic calendar also added the burden to students, which required students to have a good time management and clear study plan.

The third challenge was the difficult curriculum which did not aligned with students 'previous study background and experience; therefore, it was hard for them to understand something new. The workloads for both home and host universities were excessive for students and it was challenging for students to manage it effectively. Here were the

statements from students. The staff also agreed that DDMP was not an easy study program which students had to learn new things, do thesis, and have field studies at the same time. Problem solving, leadership, responsibility were the needed skills which helped the students to adapt to the challenging study program with excessive workloads. Even international students thought that there was challenging due to the content of the Module. There were a mix of students in different major in the Module; therefore, some students have no knowledge about a specific content of the Module.

The Conflicting regulations between home and host were another challenge for students as well. The students had a hard time coordinating with both universities at the same time. Furthermore, the project staff also agree that both home and host universities' regulations was complicated for students to follow and understand them well.

Financial problems seemed to be not a major challenge to most of the students since DDMP students was grant a scholarship from PISAI project; however, there still was a challenge for students on their living expense, especially during studying in host university. The staff also perceived that financial issue was the least challenging.

Cultural differences were not considered as challenge according to DDMP student and the staff; however, it was ranked as second challenge for international student. Coming from different part of the world, international students find it hard and have to take some time to adapt to a new culture within a short period.

Table 10: Challenges of Student Studying and Participating in DDMP

Challenges	DDMP Student		International Student		Project Staff	
	Count	Rank	Count	Rank	Count	Rank
Language	10	1	9	1	12	2-3
A Tight schedule	6	2	-	-	16	1
Difficult curriculum	5	3	2	3	12	2-3
Conflicting regulations	4	4	-	-	6	4
Financial problems	1	5	-	-	2	5
Cultural differences	-	-	4	2	-	-

5.4. Stakeholder's Satisfaction

DDMP Students

The satisfaction toward the programme based on some aspects listed in Figure 6 were essential to see the outcome of project implementation. Figure 6 shows the level of satisfaction of DDMP students on DDMP including the modules they attended based on 9 aspects. According to the results, the percentage of DDMP students rated "Satisfied" and "Very satisfied" covered above 70% for all aspects, except academic facilities (67%). However, there were about 10-15% of DDMP which rated "Dissatisfied" and "Very dissatisfied" for academic facilities (14%), quantity of practical training (10%), the relationship with professional sector (10%) and opportunity of internships (10%). Approximately 20% rated "Neutral" for the relationship with academic staff, opportunity of internships, academic facilities. Beside these three aspects, DDMP students rated "Neutral" above 15% only, namely quality and quantity of practical training (14%), the relationship with professional sector, active learning, and the scientific level of the teachers (10%), and the didactical level of the teachers (5%). The top three aspects ranked in order which were rated "Very satisfied" and "Satisfied" were the didactical level of the teachers (96%), the scientific level of the teachers (90%), and active learning (90%). The three lowest level of "Satisfied" and "Very satisfied" were academic facilities (67%), opportunities of internships (71%), and quantities of practical training (76%).
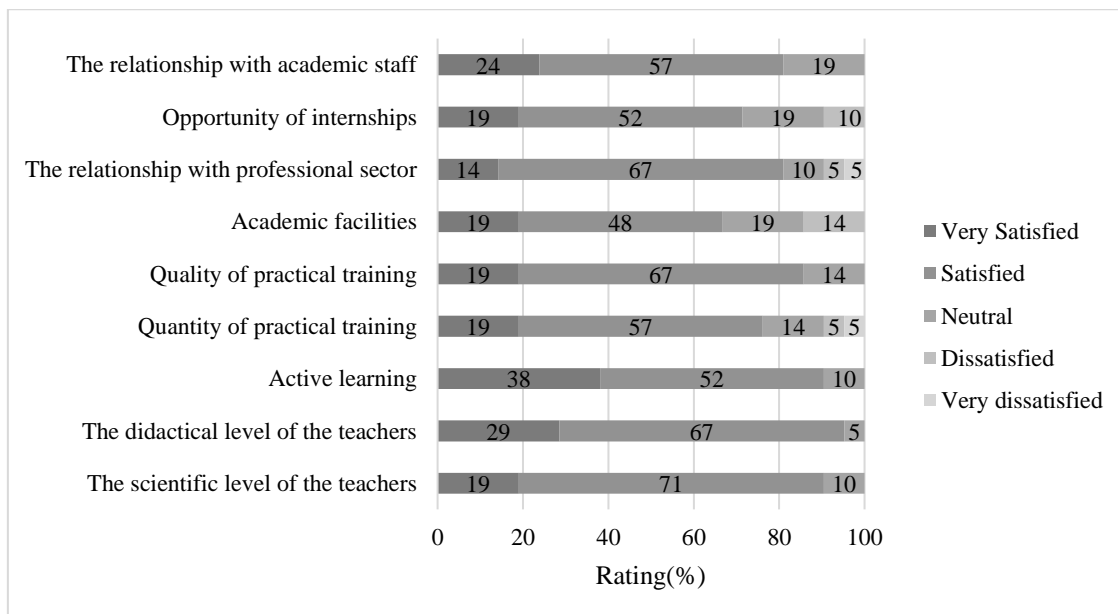
Figure 6: DDMP Students' Satisfaction On DDMP

International Students

Despite of rating on DDMP as the whole, international students, on the other hand, rated the satisfaction on the Module they attended only. Figure 7 showed their rating on eight aspects, except opportunities of internships since it was provided to DDMP students only. As a result, the percentage of international student rated "Satisfied" and "Very satisfied" covered most 70% for all aspects, except academic facilities (58%). Furthermore, there was high percentage of international student rated "Neutral" on academic facilities as well which accounted for 37%. There was around 20-25% of international students rating "Neutral" on the rest of aspect, except quality of practical training (16%), the didactical level of the teachers (11%), and the scientific level of the teachers (5%). In contrary, there were some aspects which the students rating "Very dissatisfied" and "Dissatisfied" including the didactical level of the teachers (16%), the scientific level of the teachers (10%), academic facilities (5%), quality of practical training (5%) and quantity of practical training (5%). Overall, the highest level of satisfaction on the Module was the scientific level of the teachers (85%), followed by active learning (79%), the relationship with academic staff (79%), quality of practical training (79%), quantity of practical training (74%), the relationship with professional sector (74%), the didactical level of the teachers (73%), and academic facilities (58%).
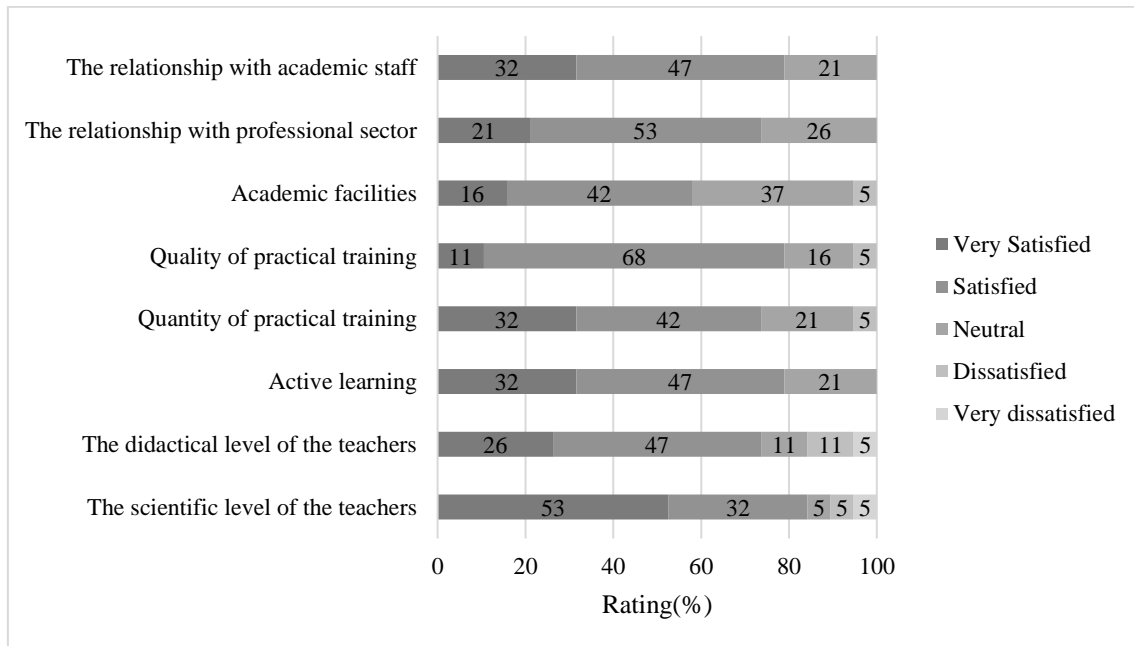
Figure 7: International Students' Satisfaction on the Module

Project Staff

Figure 8 the percentage of "Satisfied" and "Very satisfied" covered most 80% of the stacked bar for all aspects even there was still a rate of "Dissatisfied" for "Skype calls" and "Management", 5% and 3% respectively. There was a rate of "Neutral" approximately 20% for all aspects, except for "Management" which accounted for only 5%. "Management" had the highest level of "Satisfied" and "Very satisfied" rate (92%) from the overall rating, followed by preliminary results of the project, meeting, budget, communication, availability of equipment/materials, and skype calls which were 81%, 79%, 78%, 78%, 76%, and 73% respectively. There was no aspect that was rated "Very dissatisfied".
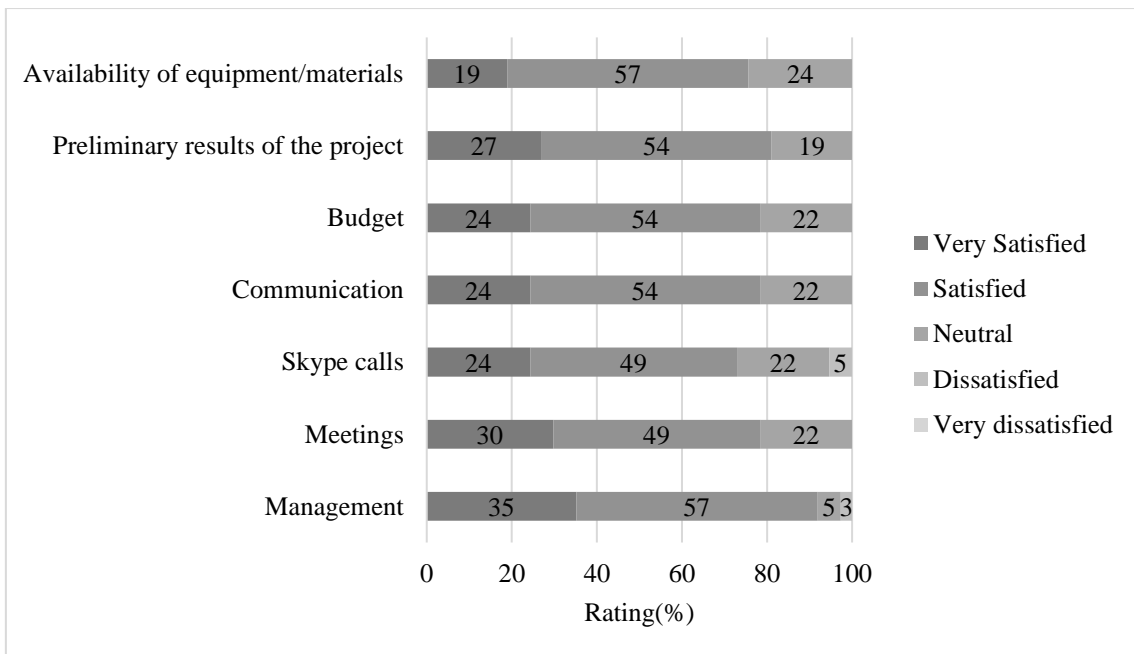
Figure 8: Project Staff's Satisfaction with PISAI Project

5.5.　　　Skills and Competencies Development

DDMP students themselves perceived the top five skills and competencies which they developed the most are: responsibility (4.43), interaction with other people and cultures (4.33), capacity to work in team (4.29), capacity to adapt to new situations (4.14) and ability to make your way through (4.14).

Similar to DDMP students, the most five important skills and competencies that project staff perceived that DDMP developing ranked in respective order are: interaction with

other people and cultures (4.59), capacity to adapt to new situations (4.54), responsibility (4.41), capacity to work in team (4.35), and ability to make your way through (4.22).

According to agricultural companies or farmers who can be potential employers, the most crucial skills and competencies raked in order that students should have to be qualified and competent employees in the future are responsibility (4.43), capacity for applying knowledge in practice (4.36), time management (4.29), capacity to work in team (4.21), and capacity to learn (4.21). `

Table 11 provided a comparison of the average responses and standard deviation for each stakeholder on skills and competencies development. In addition, the resulting F statistic of the one-way ANOVA demonstrated that the stakeholders differed on four skills and competencies such as capacity to adapt to new situations, capacity for applying knowledge in practice, interaction with other people and cultures, and self-confidence. Means were based on 5-point Likert-type scale responses with 1 being very low and 5 being very high. Means were then compared through Bonferroni's correction method which the significance level is divided into numbers of hypotheses tests ($p = 0.05 / 3 = .0167$). Where a statistically different ($p < .0167$) response is demonstrated, the statistically different mean is marked with a superscript "a" in the table.

Therefore, the results showed that staff thought that students adapted to new situation more that students thought they did. Employers required students to have capacity to applying knowledge in practice was higher that what students thought they could improve through the program. The staff perceived that students were able to interact with other people and cultures while it was less required by the employers. Last but not least, the staff thought that students would improve more self-confidence while students thought it was the least one comparing to other skills.

Table 11: Skills and Competencies Developments Through DDMP

Skills and competencies	Student	Staff	Employer	
	Mean (SD)	Mean (SD)	Mean (SD)	F value
Decision making	3.90 (0.70)	4.08 (0.72)	3.86 (0.77)	0.67
Capacity to learn	4.05 (0.59)	4.14 (0.48)	4.21 (0.80)	0.35
Capacity to adapt to new situations	4.14 (0.57)[a]	4.54 (0.51)[a]	4.14 (0.77)	4.18*
Capacity for generating new ideas	3.85 (0.62)	4.08 (0.55)	4.00 (0.78)	0.55
Capacity for applying knowledge in practice	3.81 (0.51)[a]	4.08 (0.43)[a]	4.36 (0.74)	4.61*
Capacity for analysis and synthesis	3.81 (0.60)	3.86 (0.63)	4.21 (0.80)	1.82
Capacity for critical and self-critical thinking	3.81 (0.68)	3.81 (0.70)	4.07 (0.83)	0.74
Interaction with other people and cultures	4.33 (0.66)	4.59 (0.55)[a]	4.07 (0.83)[a]	3.61*
Responsibility	4.43 (0.60)	4.41 (0.69)	4.43 (0.76)	0.01
Ability to make your way through	4.14 (0.65)	4.22 (0.67)	4.07 (0.83)	0.23
Self-confidence	3.48 (0.93)[a]	4.16 (0.65)[a]	3.71 (0.75)	5.95**
Ability in problem solving	3.86 (0.57)	4.16 (0.55)	4.21 (0.73)	2.22
Research skills	3.81 (0.75)	3.95 (0.62)	4.07 (0.73)	0.65
Language skills	4.00 (0.77)	4.08 (0.64)	3.79 (0.80)	0.87
Computer skills	3.62 (0.86)	3.68 (0.82)	3.86 (0.86)	0.36
Time management	4.00 (0.95)	3.97 (0.76)	4.29 (0.73)	0.79
Capacity to work in team	4.29 (0.64)	4.35 (0.63)	4.21 (0.70)	0.24
Planning and organization	4.10 (0.70)	4.03 (0.60)	4.00 (0.78)	0.10
Oral and written communication	3.86 (0.85)	3.95 (0.57)	3.93 (0.73)	0.11
Technical knowhow	4.00 (0.63)	3.68 (0.75)	4.07 (0.83)	2.13

Note: Rate between 1-5: 1 – Very low, 2 – Low, 3 – Moderate, 4 – High, 5 – Very high
*Significant at the .05 level. **Significant at the .01 level
a. The statistically different mean, where a statistically different ($p < .0167$) response is demonstrated.

5.6.   Perception of Future Career Opportunity

DDMP perception

According to Figure 9, half of the DDMP students (52%) agreed and strongly agreed that "As a DDMP graduate, I will be more potential compared to students studying in regular study program during job recruitment." while 43% chose "Neutral" and 5% chose "Strongly disagree" with the statement. The same figure also showed positive perception of the student which majority of the students (62%) agreed and strongly agreed that "I think that I will be able to find a satisfied job after graduating from DDMP.". The rest 38% chose "Neutral" and no one disagree or strongly disagree with the statement.
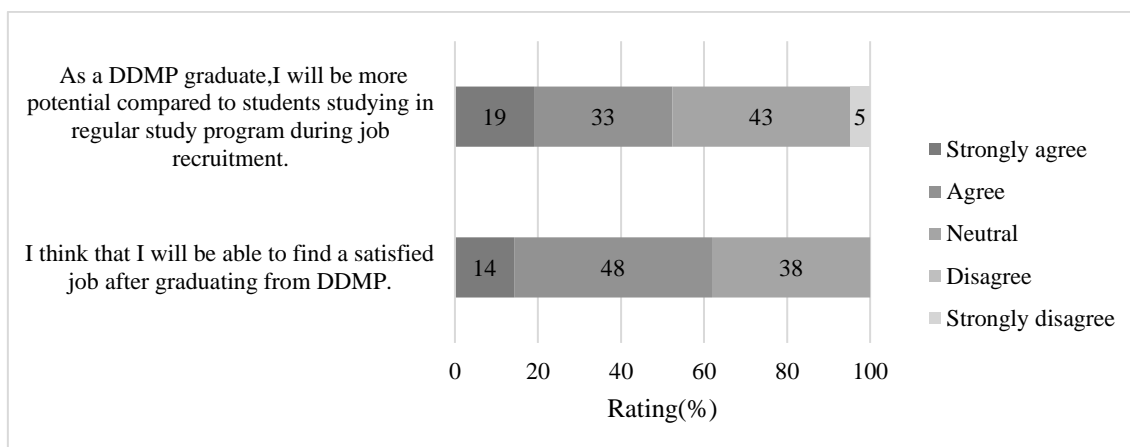
Figure 9: DDMP Students' Perception of Their Future Career Opportunity

There was a discussion either female graduates find jobs more easily than male graduates and men have more influence on the employment possibility than women. Due to different perception, the study also investigated further whether there was a difference between female or male student on their future employment. Table 12 illustrated that in average female students agreed more on the statements than male student in the same programme. However, the resulting of T-Tests showed that there was not significantly difference between female or male student on their future employment (P value > 0.05).

Table 12: Comparison of Female and Male Students' Perception of Their Future Employment

Statements	Female		Male		P value
	N	Mean (SD)	N	Mean (SD)	
I think that I will be able to find a satisfied job after graduating from DDMP.	15	3.87 (0.64)	6	3.50 (0.84)	0.29
As a DDMP graduate, I will be more potential compared to students studying in regular study program during job recruitment.	15	3.73 (0.80)	6	3.33 (1.37)	0.41

Note: Rate between 1-5: 1 – Strongly disagree, 2 – Disagree, 3 – Neutral 4 – Agree, 5 – Strongly agree

Challenges on future job opportunities

Decrease employment was perceived as a main challenge for students' future job opportunities. Economic crisis or global pandemic, for example Covid-19 can cause the decrease of employment opportunity.

DDMP students thought that there is a high competition in job market. Students are required to have a wide variety of knowledge and language skills. Furthermore, due to

the development of technology, labor will be replaced by machine or artificial intelligence in some jobs.

As DDMP students, there was a high expectation toward them. Moreover, the students concerned about the ability to apply knowledge and skills in actual work due to the lack of work experience and skills in practice work may be different from what students had learn in classroom.

The possibility to get a job that match with a field of study was also a problem for the students. Due to high competition and job availability, students sometimes have to work in different field from their study, which is against their willingness. Finally, yet importantly, getting a job with low wage was another challenge for students.

Table 10: Challenges in Future Job Opportunities

Challenges in future job opportunities	Count	Rank
Decrease employability	7	1
High competition	6	2
Skills do not match with job requirements	5	3
Unsatisfied job	3	4

Employer perception

Figure 10 shows that 57% of agricultural companies/farmers agreed and strongly agree with the statement "I am more interested to employ the graduates from DDMP than the graduated from Single Degree Master Program." because they believe that DDMP students have diversification of thinking, more knowledge and ability, have experience from many institutions, and ready to work. 36% of them chose "Neutral" and they still believe that new knowledge; however, they thought that it depends on the job description and requirement. For example, jobs with the need for knowledge and competencies of the employees require a high skill level. Only 7% of them disagree with the statement because as a small private farm they do not need to hire a high degree.
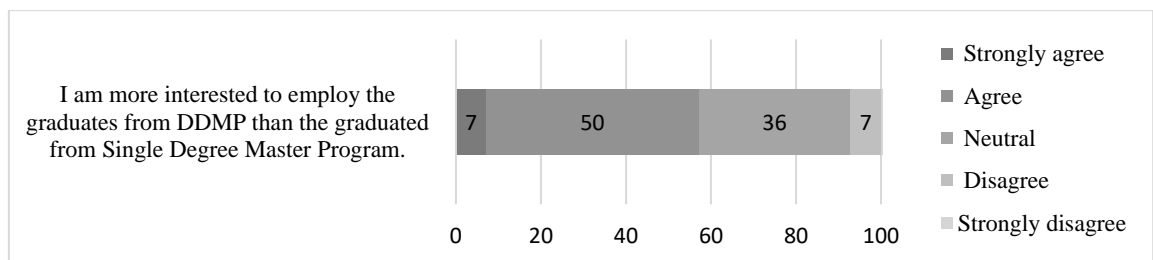
Figure 10: Employer's Perception of the Graduates from DDMP

6.   Discussion

6.1.   Who Takes Double Degree?

DDMP under PISAI project, women represented the majority of DDMP students which accounted for 76% of total respondents who studied in agricultural field. All DDMP students are domestical students (Thai students). Similarly, a study among students enrolled in double degrees at University of Wollongong, Russell et al. (2007) stated that double degree was overrepresented by domestical students, which accounted for 99% while there was 84% of domestical students in single degree. The study also stated, "More women take double degrees than men" (Russell et al. 2007). However, Russell et al. (2007) emphasised that there was a significantly difference between women and men according to the field they chose to study. Systematically, women preferred Arts–Law, Arts–Commerce, Creative Arts–Arts, and Health and Behavioural Science while men preferred Commerce–Engineering, Informatics–Engineering, and Science–Engineering (Russell et al. 2007). An experiences of ITMO University and University of Amsterdam on Double-Degree Master's Program in Computational Science also supported that women were less interest in Computational Science (Dukhanov et al. 2014). The study noticed that "There are barely any female students in Computational Science in University of Virginia (UvA), while in ITMO we now have 4 females in a group of 15 students." (Dukhanov et al. 2014). As same in engineering, men overrepresented in double degree which accounted for 79% (Culver et al. 2012). Nevertheless, the percentage of women and men was nearly equal among medical students who enrolled in dual degree programs, 49.3% and 44.9 % respectively and 5.8% of no response. Therefore, the proportion of female students and male students enrolled in double program was different according to the field they chose to study. However, if we compared double degree with single degree within the same study field, still there was a noticeable different. According to Russell et al. (2007) "Women represented 60% of double degree students at University of Wollongong, compared with 50% of single degree students".

6.2.　　　　　　Why Takes Double Degree?

Students decided to choose double degree for a number of reasons. Some students were interested in double degree because they believed that two universities would design a high quality program which enhance their employability prospects and career path; however, some students attracted to double degree because they could obtain two degree at shorter duration, less workload comparing to single two degree, and less financial burden (Knight, 2011). Therefore, there was a doubt about student rationales whether they wanted a quality experience or two degrees for the price of one (Knight, 2011). The results showed the majority of the DDMP students mentioned the reasons they chose double degree were because they were interested in good curriculum design, wanted to develop skills and competencies, and build networks. However, a few students mentioned about getting good educational background (two degree) and financial support. Therefore, the results illustrated that DDMP students cared about the quality of the program more than the quantity of degree they got. Home and host university of DDMP students under PISAI projects were both in Thailand that why the reasons differed from other double degree program. The results from focus group discussion among current double degree students in engineering who studied in at least two different countries in EU stated they enrolled in double degree not mainly for job oriented, but they wanted to travel and to experience another culture, an alternative to ERASMUS program, to interact with individuals in the new culture and to use the language, and to be self-reliant in this new situation and confident (Culver et al. 2012). The alumni of double degree in the same study mentioned that they want to get a chance to study abroad, to enhance their language skills, and seemed a more interesting alternative to existing foreign-language programs, and they were also drawn by the reputation or quality of the school at which the other degree would be offered (Culver et al. 2012). A study among current and past undergraduate students at the University of Wollongong showed that they took double degree in order to acquire job-relevant skills and improve employment prospects, have no choice (Law, at the time of the survey, was only available as a double degree), to explore different areas of study, and to engage with different disciplines and want the extra 'challenge' and 'stimulation' of a different discipline (Russell et al. 2007).

6.3.   Comparison of Skills and Competencies Development

Our results showed that responsibility, the ability to interaction with other people and cultures, capacity to work in team, capacity to adapt to new situations, and ability to make your way through were the skills and competencies that DDMP students perceived to develop through double degree program. Similarly, the results from a survey illustrated that among all stakeholders (student, alumni, faculty, and employer) perceived positively that double degree students improved general academic skills (critically thinking, effective communication within different cultures, problem solving, leadership, ability to adapt to new situations, etc.) (Culver et al. 2011). They also added that faculty staff thought that the graduates from double degree program had increased self-confidence and independence which made them more marketable during job seeking (Culver et al. 2011). In addition, Holstein (2012) agreed that DD students in Aalto University improved some personal skills though DD Programme, namely good attitude, learning skills, social skills, team working skills and problem solving skills. Another finding of the study among medical students stated that "there are indeed significant differences between dual-degree and traditional medical students on a number of dimensions that relate to career plans, leadership, motivation to be leaders, and confidence" (Sherrill 2000). Since the majority of double degree program required students to study in at least two different countries, there was a doubt that skills and competencies were improved through double degree program or international experience. A study among Erasmus alumni in Thailand illustrated that the skills and competencies, which were developed the most, were responsibility, decision making, and independence (Chaloupkova et al. 2015). According to our results, DDMP students had developed responsibility, ability to communicate in different culture, and teamwork the same as other DD Programme that required students to study in two different countries as well as Erasmus program. However, there was a different in terms of self-confident which was rated the least (20th rank) by DDMP students.

6.4. Comparison of Challenges between DDMP and Other Programmes

Learning new language was the main reasons for students to choose double degree programme; however, language was also considered as a main issues for double degree programme, especially the programme was collaborated between universities in different countries. Students must know three or more languages if there are multiple partners involve or at least bilingual (their native language and English) according to Knight (2011). For instant, students in Double-Degree Master's Programme in Computational Science between ITMO University and University of Amsterdam were required to write two thesis in two languages (Dukhanov et al. 2014). It would be less challenging if the programme accepted one thesis in English and just summary in Russia (Dukhanov et al. 2014). Even though, DDMP was the collaboration between four Thai Universities; however, the programme had partners with EU universities. Some courses, especially the four modules, were taught in English. In our case, language issue that we were not expected the main issue still a challenge, which mentioned several time by both DDMP students and project staff.

Cultural differences were one of the main challenge for DD programme between universities in two different countries and could lead to misunderstanding. Kompanets and Väätänen (2019) found that there was a different value and expectations related to globalisation trends; however, there was no serious conflicts in their case studies. In our case study, cultural differences were not considered as a main challenge according to DDMP students and project staff since DDMP was collaborated among Thai universities and only were supported by EU universities. For DDMP students, they only studied in Thailand. Otherwise, it was a challenge for international students who joined the modules in Thailand.

Excessive workload within a tight schedule were another challenge. In most cases, students needed extra time to complete the study because some courses were longer than they expected to pursue the degrees (Culver 2012). Double degree students in engineering stated that it took 'a bit longer' ('half a year' to a year, 'at most') according to Culver (2011). In a study done by Dukhanov et al. (2014), students stated that it was inconvenient for them to have two enrolment procedures, two thesis in two languages,

two supervisors, and two thesis defences. Ou et al (2018) conducted a study about factors of students' withdrawal from double degree found that poor time management, a tight schedule and mismatch between courses and cognitive level were the factors influences student's decision. The same in our case study, DDMP students complained lots about doing two thesis and the amount of works for both home and host university.

National and institutional regulations and customs from one country to country, for example, regulations preventing students from enrolling more than one university at a time, laws requiring students to spend their last year or semester at the home university, non-recognition on the number of courses/credits, etc., were addressed as an academic issues during implement DD programme by Knight (2011). In our case study, national regulations or laws were not a major problem since it collaborated mainly among Thai universities; however, there were still some challenges considered by DDMP student and staff. The differences among institutions included different minimum qualification, admission procedure, and academic schedule.

Financial and logistics were the main issue for double degree students due to physical mobility and it might be a severe issue when students had to delay their study. In our case, it seemed not a serious issue because DDMP students got the scholarship for PISAI project and the expense was not much since they studied only in Thailand. However, according to Knight (2011), "the sustainability of a program can often be at risk when it is dependent on external funds."

6.5.   Double Degree Make Students More Employable?

Based on the results, 62% of DDMP students believed that they will be able find a satisfied job and 52% of them had confident to be more potential than students in single program. The rest of respondents chose neutral because they cannot decide to agree or not agree with the given statements while only a small proportion (5%) opposed to the statements. We can conclude that DDMP students had a positive perception toward their future career. The study by Culver et al. (2012) also proofed that 96% of double degree alumni felt that the dual-degree program had helped them to obtain their current position and 87% of them were personally satisfied with their job. Among students in Medical field, DD students expected mean income was significantly higher than students in

regular programme (Sherrill 2000). A different case study in Sweden showed that "students and alumni believe the double degree makes them more marketable, in part because it extends their pool of job opportunities" (in two different countries) (Culver et al. 2011). In contrast, the alumni emphasised that double degree did not increase the marketability due to the lack of understand on double degree program of the employers (Culver et al. 2012). It made no different in term of the number of degree the graduates hold, the employers were more interested in the experience and level of competency of the graduate (Russell et al. 2007). On employer side, the majority of them agreed that the double degree graduates were effective leader, had better teamwork skill, more willing to communicate with those from other cultures, and would have greater value than a typical conventional degree (Culver et al. 2012). On the other hand, they concerned about retention issues because they believed that double degree students looking for a job that require more travel, more complicated and challenging tasks than they could offer; therefore, when they get bored, they will leave the job (Culver et al. 2012). Otherwise, double degree students believed that if double degree were well advertised and promoted among employers about their value, it would be beneficial to them in job market (Culver et al. 2011). However, all of the participants agreed that they would enrol in the double-degree program again even it made them marketability or not (Culver et al. 2011).

7.   Conclusions

DDMP within the PISAI project was very special because of its unique way of collaboration among four Thai agricultural universities in cooperation with EU universities. DDMP students could improve various skills and competencies, upgrade educational background, and build networking which can secure enhance their future employment. The opportunities of DDMP were matched with students' motivation and expectations. In addition, both students and project staff were very satisfied with most of the aspects, except a few aspects that need to improve such as provision of academic facilities, quality and quantity of practical training, and internship opportunities. There was also a noticeable difference among stakeholders on the importance of skills and competencies including capacity to adapt in new situations, capacity for applying knowledge in practice, interaction with other people and cultures, and self-confidence. The programme should engage students in some courses or activities that can boost their capacity to adapt in new situations, capacity for applying knowledge in practice, and self-confidence. In contrast, the ability to interact with other people and cultures was perceived to be not very important by the employers in this study. However, there was a limitation since the study could approach small sample size from employers and they were micro and small size. I would suggest the future study to approach private sector with a mix of small, medium, and large size, especially to include companies with multicultural working environment. On the other hand, both DDMP and employers had positive perception of DDMP students' future employment. It can conclude that employers preferred DDMP students because they were aware of the benefits of DDMP since they were actively involved in the project. Nevertheless, it was difficult to analyse the actual impact of the programme on student employment since DDMP students have not yet completed their study or fresh graduate when the study was conducted and only some of them got an internship opportunities. The future study can conduct in the next 2-3 years to investigate on their employment with a comparison with students in regular program.

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Appendices

List of the Appendices:

Appendix 1: Flow Chart: Education System in Thailand

PhD
(university education)
2

Master
(university education)
2

postgraduate

undergraduate

Bachelor
(university education)
4-6

Associate Degree
(universities/colleges)
2

Diploma in Vocational Education/
Diploma in Technical Education
(higher professional education)
2

Thai university Central Admission System (TCAS)
(entrance examinations)

Entrance examination

Certificate of Secondary Education/Matayom 6 (M6)
(senior secondary general education)
3

Certificate in Vocational Education
(senior vocational education)
3

0   Duration of education

Certificate of Lower Secondary Education
(lower secondary education)
3

Certificate of Primary Education
(primary education)
6

Appendix 2: Questionnaire for DDMP Student

Dear students,

I'm contacting you because of your participation in PISAI project 2017-2020. My name is EK Sreykhouch, a Master student from the Czech University of Life Sciences, Prague. I am writing my master's thesis regarding " Challenges and Opportunities of Double Degree Master: Case Study in Thailand ".

I would like to kindly request you to participate in this survey. All data will be processed anonymously in accordance with European data protection regulations (General Data Protection Regulation, GDPR). Your input in the survey is very important for the project evaluation. The data collected from this survey is not only for the master's thesis, but also for Quality Assessment (QA) of the PISAI project. The survey will take about 10 minutes. I hope you can join the survey before 15 October 2020.

Thank you in advance.

I.   General information

1.   Gender:
- ☐   Male
- ☐   Female
2.   Age: __ __
3.   Home University:
- ☐   Kasetsart University
- ☐   Chiang Mai University
- ☐   Prince of Songkla University
- ☐   Khon Kaen University
4.   Host University:
- ☐   Kasetsart University
- ☐   Chiang Mai University
- ☐   Prince of Songkla University
- ☐   Khon Kaen University
5.   Which PISAI' Module did you attend? (Select all that apply)
- ☐   Module 1 – Value Chain Management at Chiang Mai University
- ☐   Module 2 – Environment/Ecosystem in Sustainable Agricultural Production at Khon Kaen University
- ☐   Module 3 – Challenge and Opportunity in Sustainable Agricultural Production at Kasetsart University
- ☐   Module 4 – Internship
6.   What were the main reasons for studying in Double Degree Master Program (DDMP)?

Answer: _____

II.   Skills and Competencies Development

7.   To what extents do below skills improve after joining the Double Degree Master Program (DDMP)?

Skills	Very low	Low	Moderate	High	Very high
Decision making					
Capacity to learn					
Capacity to adapt to new situations					
Capacity for generating new ideas					
Capacity for applying knowledge in practice					
Capacity for analysis and synthesis					
Capacity for critical and self-critical thinking					
Interaction with other people and cultures					
Responsibility					
Ability to make your way through					
Self-confidence					
Ability in problem solving					
Research skills					
Language skills					
Computer skills					
Time management					
Capacity to work in team					
Planning and organization					
Oral and written communication					
Technical knowhow					

III.   Satisfaction

8.   To what extent do you satisfy with the Double Degree Master Program (DDMP) based on the below criteria

Criteria	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
The scientific level of the teachers					
The didactical level of the teachers					
Active learning					
Quantity of practical training					
Quality of practical training					
Academic facilities					

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The relationship with professional sector					
Opportunity of internships					
The relationship with academic staff					

IV. Pros & Cons

9. Which aspects would you evaluate as strengths of the Double Degree Master Program (DDMP)?
Answer:_____

10. Which aspects would you evaluate as weaknesses of the Double Degree Master Program (DDMP)?
Answer:_____

V. Challenges and opportunities

11. What kinds of challenges did you face during joining the Double Degree Master Program (DDMP)?
Answer:_____

12. What were the opportunities from the Double Degree Master Program (DDMP)?
Answer: _____

VI. Employability

13. To what extent, do you agree with these statements on future employability below?

Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I think I will be able to find a satisfied job after graduating from DDM.					
As a DDM graduate, I will be more potential compared to students' study in regular study program during job recruitment.					

14. What kind of challenges do you think you will face for the future employability?
Answer: _____

_____

Appendix 3: Questionnaire for International Student

Dear students,

I'm contacting you because of your participation in PISAI project 2017-2020.
My name is EK Sreykhouch, a Master student from the Czech University of Life Sciences, Prague. I am writing my master's thesis regarding " Challenges and Opportunities of Double Degree Master: Case Study in Thailand ".

I would like to kindly request you to participate in this survey. All data will be processed anonymously in accordance with European data protection regulations (General Data Protection Regulation, GDPR). Your input in the survey is very important for the project evaluation. The data collected from this survey is not only for the master's thesis, but also for Quality Assessment (QA) of the PISAI project. The survey will take about 10 minutes. I hope you can join the survey before 15 October 2020.

Thank you in advance.

I.   General information

1.   Gender:
  ☐ Male
  ☐ Female
2.   Age: __ __
3.   University name:
  ☐ Czech University of Life Science Prague
  ☐ SupAgro
  ☐ University of Copenhagen
  ☐ University of Helsinki
  ☐ Other (specify)
4.   Which did you PISAI's Module attend? (Select all that apply)
  ☐ Module 1 – Value Chain Management at Chiang Mai University
  ☐ Module 2 – Environment/Ecosystem in Sustainable Agricultural Production at Khon Kaen University
  ☐ Module 3 – Challenge and Opportunity in Sustainable Agricultural Production at Kasetsart University
5.   What are the main reasons in joining the module?
  Answer:_____

II.   Skills and Competencies Development

6.   To what extents do below skills improve after joining the module?

Skills	Very low	Low	Moderate	High	Very high
Decision making					
Capacity to learn					
Capacity to adapt to new situations					

Capacity for generating new ideas					
Capacity for applying knowledge in practice					
Capacity for analysis and synthesis					
Capacity for critical and self-critical thinking					
Interaction with other people and cultures					
Responsibility					
Ability to make your way through					
Self-confidence					
Ability in problem solving					
Research skills					
Language skills					
Computer skills					
Time management					
Capacity to work in team					
Planning and organization					
Oral and written communication					
Technical knowhow					

III.   Satisfaction

7.   To what extent do you satisfied with the module based on the below criteria?

Criteria	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
The scientific level of the teachers					
The didactical level of the teachers					
Active learning					
Quantity of practical training					
Quality of practical training					
Academic facilities					
The relationship with professional sector					
Opportunity of internships					
The relationship with academic staff					

IV.   Pros & Cons

8.   Which aspects would you evaluate as strengths of the Module?
        Answer: _____

9.   Which aspects would you evaluate as weaknesses of the Module?
        Answer: _____

V.   Challenges and opportunities

10.   What kinds of challenges did you face during joining the module/modules?
        Answer: _____

11.   What were the opportunities from the Double Degree Master Program (DDMP)?
        Answer: _____

Appendix 4: Questionnaire for Project staff

Dear PISAI project staff,

I'm contacting you because of your participation in PISAI project 2017-2020. My name is EK Sreykhouch, a Master student from the Czech University of Life Sciences, Prague. I am writing my master's thesis regarding " Challenges and Opportunities of Double Degree Master: Case Study in Thailand ".

I would like to kindly request you to participate in this survey. All data will be processed anonymously in accordance with European data protection regulations (General Data Protection Regulation, GDPR). Your input in the survey is very important for the project evaluation. The data collected from this survey is not only for the master's thesis, but also for Quality Assessment (QA) of the PISAI project. The survey will take about 10 minutes. I hope you can join the survey before 15 October 2020.

Thank you in advance.

I.   General information

1.   Position in PISAI project:
   - ☐ Teaching staff
   - ☐ Administrative staff
   - ☐ Management staff
   - ☐ Other (specify)

2.   University:
   - ☐ Kasetsart University
   - ☐ Chiang Mai University
   - ☐ Prince of Songkla University
   - ☐ Khon Kaen University
   - ☐ Czech University of Life Science Prague
   - ☐ Montpellier SupAgro
   - ☐ University of Copenhagen
   - ☐ University of Helsinki
   - ☐ Other (specify)

3.   On what activities you were participating?
   - ☐ Modules 1-3
   - ☐ Workshops
   - ☐ Meetings
   - ☐ Supervisor
   - ☐ Others (specify)

II. Skills and Competencies Development

4. To what extent do you think students improve the below skills after joining the program?

Nº	Skills	Very low	Low	Moderate	High	Very High
1	Decision making					
2	Capacity to learn					
3	Capacity to adapt to new situations					
4	Capacity for generating new ideas					
5	Capacity for applying knowledge in practice					
6	Capacity for analysis and synthesis					
7	Capacity for critical and self-critical thinking					
8	Interaction with other people and cultures					
9	Responsibility					
10	Ability to make your way through					
11	Self-confidence					
12	Ability in problem solving					
13	Research skills					
14	Language skills					
15	Computer skills					
16	Time management					
17	Capacity to work in team					
18	Planning and organization					
19	Oral and written communication					
20	Technical knowhow					

III. Satisfaction

5. To what extent do you satisfy with these following criterial:

Nº	Criterial	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
1	Management (coordination of the project)					
2	Meetings					
3	Skype calls					
4	Communication					
5	Budget					
6	Preliminary Results of the project					
7	Availability of equipment/materials					

IV.   Pros & Cons

6.   In your opinion, what are the strengths of the double degree programme?
Answer:_____

7.   In your opinion, what are the weaknesses of the double degree programme?
Answer:_____

V.   Challenges and opportunities

8.   In your opinion, what are the challenges for students studying DDMP?
Answer:_____

9.   In your opinion, what are the opportunities of the double degree programme?
Answer:_____

Appendix 5: Questionnaire for Employer

To whom it may concern,

My name is EK Sreykhouch, a master student from the Czech University of Life Sciences Prague. I am writing my master's thesis regarding" Challenges and Opportunities of Double Degree Master: Case Study in Thailand ".

I would like to kindly request you to participate in this survey. Your input in the survey is extremely valuable for the project evaluation and sustainability of the project. All data will be processed anonymously in accordance with European data protection regulations (General Data Protection Regulation, GDPR). The survey will take about 10 minutes. I hope you can join the survey before 15 October 2020.

Thank you in advance.

I.   General information

1.   Location of the company or farm (Province, District)
        Answer:_____

2.   What are your main products or your main activities of your company?
        Answer:_____

3.   What is your business type?
        ☐ Private company
        ☐ Cooperative
        ☐ Private farm
        ☐ Other (specify)
4.   How many employees/members do you have currently? (If you choose Private company or cooperative)
5.   What is your farm size? (If you choose Private farm)
6.   What was your company's involvement in the PISAI project?
        ☐ Provide study site
        ☐ Provide training
        ☐ Provide internship opportunity
        ☐ Other (specify)
7.   What was your expectations/expected outcome from the PISAI project?
        Answer:_____

8.   What was the benefits of the project for you/your company?
        Answer:_____

II.   Skills and Competencies Development

9.   To what extent do you think graduates should have the below skills to be a qualified employee?

Nº	Skills	Very low	Low	Moderate	High	Very High
1	Decision making					
2	Capacity to learn					
3	Capacity to adapt to new situations					
4	Capacity for generating new ideas					
5	Capacity for applying knowledge in practice					
6	Capacity for analysis and synthesis					
7	Capacity for critical and self-critical thinking					
8	Interaction with other people and cultures					
9	Responsibility					
10	Ability to make your way through					
11	Self-confidence					
12	Ability in problem solving					
13	Research skills					
14	Language skills					
15	Computer skills					
16	Time management					
17	Capacity to work in team					
18	Planning and organization					
19	Oral and written communication					
20	Technical knowhow					

III.   Employability

10.   Do you agree with this statement "I am more interested to employ the graduates from DDMP than the graduated from Single Degree Master Program."?
☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

11.   Could you please specify the reasons for preferring Double Degree Master graduates or Single Degree graduates?

Appendix 6: Coding for Open Ended Questions

Preliminary Codes	Category Codes	Concept Codes
Have new experience	Good Curriculum Design	Motive
Get knowledge		
Know principles of another university.		
Get something new		
Gain academic experience		
Learn more academic discipline at the same time		
Learn about the agriculture in the tropics	Good Contents and practical experience	
Improve knowledge about ecosystem sustainable agriculture		
Experience interview with farmers and field work		
Learn about agricultural sustainability		
Study challenge and opportunity in agricultural production		
Get knowledge on agricultural production systems		
Collecting the research work	Skills & Competencies Development	
Experience on-site learning		
Develop competency and teamwork		
Culture and language		
Practice English		
Improve knowledge on aquaculture		
Have an intercultural experience		
Learn research skill		
Obtain two Master Degree within two years	Good Educational background	
Great portfolio		
Get to know teaching staff from different universities	Network building	
Have more connections with foreign friends		
Exchanges with friends from other universities and countries		
Get to know friends from different universities.		
Meet new people		
Funding support	Financial support	
Travelling	Travel abroad	
Know more about Thailand		
English language	Skills & Competencies development	Opportunities
Capacity building		
Decision making		
Academic skills		
Language Development		
Time management		
Learning and adaptation, flexible		
Networking	Network building	
Connection		
Collaboration between universities		
Cooperation between institutes		

Make new friends		
New educational environment	Good Curriculum Design	
Multicultural environment		
Good curriculum		
More expertise		
Internationalization		
Theoretical lessons	Good Contents and practical experience	
Dialogue with farmers		
Excursions at farms, markets, companies		
Field work		
Interaction in Multicultural Environment		
Two degrees	Good Educational background	
Good in CV		
Job opportunity	Job Opportunity	
Financial support	Financial support	
English language	Language	Challenges
Communication with foreign friends		
English communication		
Coordination between host and home university	Conflicting regulations	
Two universities with different conditions		
Adaption for different work or research culture		
Condition and requirement of each institution		
Difficult study content	Difficult curriculum	
Excessive workloads		
Double Master thesis		
Conduct research work by yourself		
Time of the study and research	A tight schedule	
Different schedule of each university		
Finish double degree in two years		
Studying and doing a thesis in two years		
The limitation of the study period		
Adapt to a new culture	Cultural differences	
Adapting to a new culture		
New cuisine experience		
Financial problems	Financial problems	
Economic crisis	Decrease employability	Challenges in future job
Covid-19 pandemic		
Decrease employability		
Competition with human (language and skills)	High competition	
Human will be replaced by technology		
Get job in different fields	Unsatisfied job	
Get low wage job		
Cannot apply knowledge in job	Skills do not match with job requirement.	
Cannot fulfil the high expectation		