



**The Asia-Pacific Network for Sustainable Forest
Management and Rehabilitation (APFNet)**

EVALUATION REPORT (Final)

*Innovative Sustainable Forest Management Education in the
Asia- Pacific Region Project (Phase II)*

[Project ID: 2018P3-UBC]

Prepared by

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ZHUANG Zuofeng

Abbreviations and Acronym

Acronym & Abbreviation	Full Name
APFNet	Asia-Pacific Network for Sustainable Forest Management and Rehabilitation
AP-FECM	Asia Pacific Forest education Coordination Mechanism
BFU	Beijing Forestry University, China
CTLT	The Centre for Teaching, Learning and Technology, UBC
EA	Executing Agency
IA	Implementing Agency
IUFRO	International Union of Forest Research Organization
LFM	Logical Framework Matrix
OER	Open Education Resource
PA	Project Agreement
PSC	Project Steering Committee
QM	Quality Matter
REDD	Reducing Emissions from Deforestation and forest Degradation
SFM	Sustainable Forest Management
UBC	University of British Columbia, Canada
UM	University of Melbourne, Australia
UPLB	University of Philippines-Los Ban ãs, Philippines
UPM	University Putra Malaysia, Malaysia
UF	University of Florida

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Executive Summary

This completion evaluation is an assessment of APFNet supported project of Innovative Sustainable Forest Management Education in the Asia-Pacific Region (Phase II) (Project ID: 2018P3-UBC) by developing a comprehensive systematic SFM online learning program to benefit a wider range of global learners. The purpose of this evaluation is to assess the project performance and determine outcomes and impacts stemming from the project after its completion, and assess its sustainability and provide recommendations for the future actions. The evaluation took place from August to November, 2021. The basic information about the Project is shown as following.

Project Title:	Innovative Sustainable Forest Management Education in the Asia-Pacific Region (Phase II)
Project Number:	2018P3-UBC
Executive Agency:	Executive Office, Asia Pacific Forest Education Coordination Mechanism (AP-FECM)
Duration:	Planned 36 months with a 3 months extension. Actual 39 months in total starting from 1 st April 2018
Budgets (US\$):	US\$ 794,600, in which, APFNet grant US\$ 563,000, counterpart contribution US\$ 213,600
Supervisory Agency:	University of British Columbia
Targeted Area:	Asia-Pacific Region

Context and Background

The concept of Sustainable Forest Management (SFM) has emerged globally as an essential element for the sustainability and conservation of the world's forests. Forest education has shifted away from traditional forestry approaches to methods that focus on SFM and environmental conservation. A joint educational online program entitled Innovative Sustainable Forest Management Education in the Asia-Pacific Region, began its first phase in 2014 and the second phase has been implemented since 2018.

The second phase focused on tropical forest. Newly developed courses provided a systematic knowledge and skill set for forestry professionals to understand plantation forests planning and decision making for tropical forests management and utilization, geospatial technologies in environmental management, climate modelling tools for forestry applications, REDD+ forest measurement and reporting, as well as contextual factors that influence conservation and livelihood outcomes in tropical forest areas.

This project aims to improve access to SFM education, enhance teaching equality, and improve curriculum and research capabilities in the Asia Pacific Region. The online curriculum creates an accessible and flexible resource for high quality forest education to meet the demands of ever-changing societal and environmental conditions and narrowed down the gaps among universities in the Asia Pacific Region. In addition, this project also will increase the equity in forest education and set an excellent example for future course articulation and mutual recognition regionally.

Major Achievements

The project was successful in reaching its overall goal and objectives to generate long-term improvements in forest education and sustainable forest management capacity in the Asia Pacific region and worldwide. Four specific objectives were achieved by the project, namely: 1) Adopt the online platform Canvas to develop new online courses with an emphasis on tropical forests; 2) Enhance the quality of forest education in the region by integrating the Canvas platform with MOOC standards for all developed courses; 3) Provide a foundation for regional universities to further develop an online SFM Master's degree; and 4) Make efforts on increasing equity in forest education by providing more open educational resources and credential programs (Certificate and Master's degree) to global learners. Six major achievements were accomplished by implementing sixteen activities to address the key issues of innovative SFM education in Asia-Pacific region relating to the online course development and application. The six achievements are:

Achievement 1: The AP-FECM Course Completion Certificate Program and UBC's Graduate Certificate Program were established.

Achievement 2: Ten web-based courses for SFM were developed and five courses developed in the phase I were upgraded.

Achievement 3: The emerging educational technologies were integrated in the course development and the course sites on Canvas platform were established.

Achievement 4: SFM courses were piloted and implemented.

Achievement 5: University capacity on higher forestry education was enhanced.

Achievement 6: Courses were well managed and the project were widely promoted.

Issues and Challenges

Quality of some courses need to be improved. Some topics were overlapped or scattered into individual courses; the topic of economics of forest management and conservation was weak; some activities were not strictly implemented as planned and the courses developed were not exact same with courses planned in project document; one course developing was on hold and not completed yet.

Regarding the project management, some requirements in the Project Agreement were not fully complied. Due to the COVID-19 pandemic, no mid-term evaluation was

conducted, no semi-annual or quarterly reports were found, project duration was extended twice, regular PSC meeting was replaced by the online consultation with PSC members individually.

Lessons Learned

a team-based approach with online pedagogy, technology and contents could be successfully integrated to produce an effective teaching and learning model for higher forestry education; Student-centered pedagogical model and learning activities were the key for developing and implementing innovative online courses; both self-directed and instructor-led online course learning could improve the time flexibility and engagement of the course taker; Adaptive teaching and learning approaches based on student feedbacks, instructor experience and changing situation played critical roles for effective teaching; COVID-19 pandemic put a big challenge to the project and also provided a great opportunity for the project to promote the online course education approaches.

Conclusions

In general, the project has greatly achieved its objectives and expectations with the APFNet strong finance supports. Excellent progress and outputs have been produced from the project, including ten newly developed online courses, AP-FECM certificate program and UBC graduate certificate program. The courses have been recognized regionally and internationally. The collaboration amongst the participating universities and institutes was reinforced and the capacity of online education was significant enhanced. The online teaching and learning could be used as a supplementary resource to face-to-face in-class teaching, allowing those who live remotely to benefit from a high-quality forestry education. The online learning could likely become more prevalent in the foreseeable future provided the high-quality online SFM package was well developed. Additionally, the influence of APFNet and AP-FECM was significantly consolidated in promoting the online forestry education in the Asia Pacific region.

Suggestions and Recommendations

Recommendations for Executive Agency

- Enhance the project management. Strengthen the communication and coordination between EA and IAs to make sure all implementing agencies follow the overall plan/annual plan to carry out their tasks; Enhance the internal monitoring and reporting to ensure the activity implementing in line with the plans.
- Further communicate with UM to find out the solution for the on-hold course and submit an official letter to APFNet for approval of the changes.

- Extend educational impact and collaboration to the entire Asia-Pacific region. get more universities involved in the project activities, would not only provide greater networking, but would also enhance their capacity on online course development and online teaching skills.
- Help more universities develop the online certificate programs and SFM Master's degree programs.
- Establish the sustainable financing system in a long run.
- Continue to promote the online courses via all possible means.

Recommendations for APFNet

- Explore the alternative ways to strengthen the project management under the circumstance of COVID-19 pandemic. The project management guidelines need further modifications and adjustments. Some important and necessary missions like PSC meetings, external monitoring and evaluation could be conducted based on the document reviews, virtual meetings and online interviews.
- Conduct a professional review or evaluation on the existing OER courses and make necessary adjustments and improvements to meet the requirements of the online Master's degree program in the future.
- Innovate the APFNet scholarship program by integrating the online courses into the curricula.
- Design and develop the certificate programs for the APFNet thematic training program.
- Develop the online courses certificate programs to provide on-job training for foresters in Asia-Pacific region.

Suggestions on the Future Actions

- Develop mid-term or long-term strategy on online course development and online forestry education to guide the design, development and application of online courses on SFM and to direct online education in Asia-Pacific region.
- Develop an overall plan for the SFM online courses development to avoid the topic overlap or missing in course developing process.
- Further review the diverse needs on SFM and identify the potential topics for the new courses.

- Pilot to develop SFM Online Master's Program by upgrading the current OER courses to meet the scholar requirements.
- Pilot and demonstration the approach combining online courses learning with face-to-face indoor teaching.
- Case study or field operation practices could be enhanced in the process of the course development.
- Further improve the accessibility of the courses developed.
- More interacts could be added into the online course development.

I. The project information

As the needs of the environment and society continue to change, forestry professionals need to master new technologies to manage natural resources and need to be capable of creating and implementing effective policies. A joint educational online program entitled Innovative Sustainable Forest Management Education in the Asia-Pacific Region, began development of its first phase in 2014. A series of 5 online self-directed learning courses in SFM was developed with its content as Open Educational Resources (OER).

This Project [PD: 2018P3-UBC] is the second phase of the program “Innovative Sustainable Forest Management Education in the Asia-Pacific Region”. The project was officially launched in 2018 for a 3-year period with a three-month extension.

The overall goal of this project was to develop a comprehensive systematic SFM online learning program to benefit a wider range of global learners by developing new online SFM courses that focused on tropical forests and creating a platform for collaboration between universities and research organizations across the world to promote student mobility, research and educational cooperation, faculty exchange, and mutual course articulation and recognition.

The project was completed in end June 2021. The major project achievements were: 1) Establishment of the AP-FECM Course Completion Certificate and UBC’s Graduate Certificate Program; 2) Development of ten SFM courses and upgrade of five existing courses; 3) Integration of emerging educational technology in the online courses and establishment of course sites on Canvas platform; 4) SFM course implementation; 5) Building capacity for higher forestry education; 6) Promotion and management of the project.

Project Identification:

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Supervisory Agency:	University of British Columbia
Targeted Area:	Asia-Pacific Region

II. Purposes and Scope of the Evaluation

The primary purpose of this evaluation was intended to assess the project performance and determine outcomes and impacts stemming from the project after its completion, and assess its sustainability to evaluate the feasibility of a phase III project, specifically seeks to: 1) Assess whether the goal(s) and objectives of the project are met and whether extension is needed; 2) Provide evidence of results to meet accountability requirements; 3) Assess the efficiency, effectiveness, sustainability of the project; 4) Promote operational improvement, learning and knowledge sharing through results and lessons learned; 5) Summarize the achievements of the project and assess how the achievements can be sustained; 6) Analyze the impact/potential impact of the project for better promotion and dissemination; 7) Identify lessons of operational relevance for future project formulation and implementation; 8) Provide suggestions on the feasibility and suitability.

The evaluation was expected to cover the following components: 1) Establishment of the AP-FECM SFM Certificate Program; 2) Migration to edX platform and upgrade to MOOCs version; 3) Development of new online courses on sustainable management of tropical forests; 4) Promotion and management of Innovative Sustainable Forest Management Education in the Asia-Pacific Region.

The evaluation was conducted to fulfill the following principal tasks. 1) Review and assess the project performance against objectives and activities planned for the project; 2) Assess the impact of the project achievements after the project completion; 3) Summarize the impact and effect of the project on contributing to forestry education in national and regional scale; 4) Analyze and identify the problems/challenges of the project; 5) Provide recommendations to the sustainability of the project and the necessary improvements for a phase III project.

III. Evaluation Methods

Due to the COVID-19 pandemic, the evaluation was conducted mainly through the documents review, online interview and questionnaire survey to collect information and data. Two necessary visits to the Executing Agency and technical support partner CTLT of UBC were planned. The total duration of the evaluation was 12 days within the period of August – November 2021.

i. Evaluation Preparation and Desk Review

- Communicated the APFNet Project Officers in Beijing to clarify evaluation matters and discuss evaluation plan;

- A desk review of the terms of reference (ToR) for project evaluation and the project documents;
- Design the detailed evaluation scope and methodology and draft the evaluation plan.
- Finalize and submit the Evaluation plan.

ii. Visit Project Management Office in UBC

- Two visits to UBC were conducted on October 19 and 28, 2021, respectively.
- Meet with the project director and relevant faculty and staff to get the directly reflection on project implementation.
- Briefings, interviews and discussions were conducted regarding project performance, key achievements, challenges, follow-up actions, etc. with project leaders, faculty and staff.
- Briefings and interviews as well as tours of relevant facilities (i.e., the Centre for Teaching, Learning and Technology (CTLT) at UBC) were conducted.

iv. Questionnaire Survey

Questionnaire form (Annex 1) was developed to collect the feedbacks from relevant stakeholders about the project outputs and impacts as well as the suggestions for the future actions regarding the online course development on SFM and online forestry education in the coming years.

v. Elaboration of the Report

- Draft the evaluation report and submit to APFNet Office.
- Revise the draft evaluation report by incorporating the comments from APFNet and late feedback from questionnaire survey.
- Finalization of the report was submitted by November 30, 2021.

IV. Key Findings

Based on the desk document review, site visits and feedback of questionnaire survey, the key findings were identified and summarized as follows:

i. Project Performance

Funds were mobilized timely as per the PA and project work plans. The project has not been finally audited at the time of project evaluation. According to the PA, the total budget of the project was USD794,600, of which US\$563,000 was granted by APFNet and US\$213,600 was contributed by EA and IAs. As of the starting date of this valuation in early October 2021, APFNet has disbursed the project funds to EA in three

installments, US\$168,880 in July 2018 (the 1st project year), US\$168,880 in November 2019 (the 2nd project year) and US\$138,000 in June 2021 (the 3rd project year). The rest amount of APFNet grant will be transferred after the project fully completion based on the project financial statement and the final audit report. The timely disbursement of the APFNet grants guaranteed the successful implementation of the project activities.

The project objectives and outputs were successfully achieved. The project designed activities had a strong linkage with project outputs and project objectives as stated in the project Logical Framework Matrix. The outputs had been facilitated with needs assessment, course format development, content quality control, user reviews. The priority of this Project focused on the innovative SFM education exploring by developing the online courses and its applied programs like the online certificate programs and the master's degree programs.

Four outputs were identified to achieve four specific objectives by implementing sixteen activities to address the key issues of innovative SFM education in Asia-Pacific region relating to the online course development and application.

Output 1: Establishment of the AP-FECM SFM Certificate Program, through implementing activity 1.1 – activity 1.4.

Output 2: Migration to the world's leading online program platform (edX Edge) and upgrade to MOOCs version, through implementing activity 2.1 – activity 2.3.

Output 3: Development of new online courses on sustainable management of tropical forests, through implementing activity 3.1 – activity 3.6.

Output 4: Promotion and management of the project in the Asia Pacific region and worldwide, through implementing activity 4.1 – activity 4.3.

Horizontally, the project was successful in reaching its goal and the objectives to generate long-term improvements in forest education and sustainable forest management capacity in Asia-Pacific region and worldwide. Four specific objectives were achieved by the project, namely: 1) Adopt the world leading online course platform (Canvas) to develop new online courses with an emphasis on tropical forests; 2) Enhance the quality of forest education in the region by integrating Canvas with MOOC standards for all developed courses; 3) Provide a foundation for regional universities to further develop an online SFM Master's degree; and 4) Make efforts on increasing equity in forest education by providing more open educational resources and credential programs (Certificate and Master's degree) to global learners.

The first objective was achieved by adopting Canvas platform to upgrade the five courses developed in Phase I and develop ten new online SFM courses that focused on tropical forests in terms of the topics of forest monitoring, planning, climate adaptation,

carbon management, and community forests and livelihoods.

The second objective was achieved by integrating new technologies and pedagogies to course development process and adopting a team-based approach and QM system to ensure quality of courses;

The third objective was achieved by helping regional universities to build capacity on online course developing and online course teaching, as well as assisting them to develop their own online certificate programs and Master's degree programs that could help to fill the gaps in forestry education across Asia-Pacific region.

The fourth objective was achieved by providing more open educational resources and credential programs to global learner, and by creating a platform for collaboration between schools and research organizations all over the world to promote student mobility, research and educational cooperation, faculty exchange, and mutual course articulation and recognition.

Substantial achievements have been made with strong partnerships and great collaborative efforts between APFNet, AP-FECM, UBC, and participating universities. The SFM education courses developed have been re-purposed and delivered to 15 000 learners from over 130 economies. By increasing access and promoting the sharing of these courses and education materials, the project has contributed to narrowing the gaps in education between forestry institutions in Asia-Pacific region. The combination of emerging educational technologies, high-quality and relevant content, and online pedagogy generated an improved form of forestry education that shared the most current information on SFM and supported the interaction of peers and professionals worldwide without the constraints of geographical location and time. The online courses developed were globally recognized through the 2019 IUFRO Award. During the global COVID-19 pandemic period, this project provided an access to online SFM education for many institutions that were lacking online resources.

ii. Project Achievements

Six major achievements were accomplished by implementing sixteen activities to address the key issues of innovative SFM education in Asia-Pacific region relating to the online course development and application. The achievements in obtaining the four outputs were summarized as followings.

Achievement 1: The AP-FECM Course Completion Certificate Program and UBC's Graduate Certificate Program were established.

Five courses developed in Phase I were updated and repurposed to OER Course Completion Certificate Program. 277 students joined two courses of "Sustainable Forest Management in a Changing World" and "Restoration of Degraded Forest

Ecosystems and Forest Plantation Development”. 118 students received the course completion certificates. The courses developed both in phase I and Phase II met the requirements of certificate programs and this enable participating universities to establish a self-sustaining SFM web-based program regionally.

A Graduate Certificate in Forest Management and Conservation was launched in UBC starting September 2021, which is a graduate level certificate that can be complete in 2 years or less. To be awarded the Graduate Certificate, students must get 15-credits, completing choosing 5 courses from 15 online courses developed by the project. The 5 courses include FOPE 500: Sustainable Forest Management in a Changing World, and four additional courses in the selective pool:

- FOPE 501: Geomatics in Forestry: Data Collection and Management
- FOPE 502: Introduction to Urban Forestry in the Asia Pacific Region
- FOPE 503: Climate Modelling and Forest Applications
- FOPE 504: Structure and Composition of Tropical Forest Ecosystems
- FOPE 505: Ecological Processes in Tropical Forests
- FOPE 506: Forest Conservation in Asia: Challenges and Opportunities
- FOPE 507: International Forestry Issues, institutions, and Multi-Lateral Agreements
- FOPE 508: Forest Ecosystem Services and Community Livelihoods
- FOPE 509: Plantation Design and Management

Achievement 2: Ten web-based courses for SFM were developed and five courses developed in the phase I were upgraded.

The five courses developed in the first phase were self-directed version, each topic typically consists of background information, online video lectures, supplemental readings, and self-directed activities in the form of self-tests, self-directed reflection questions, and/or self-directed forum discussions. In phase II these five courses were upgraded to instructor-led version, adding instructor-facilitated active learning activities and grade assessments. The upgraded courses could fit the CANVAS course development framework.

The newly developed courses were focused on tropical forests and on forestry management in the context of the ever-changing global environment and society. With these 15 courses, a systematic curriculum was created covering a foundation of forest management and governance policies, conservation and forest sciences, and technical training. The newly developed courses provided a systematic knowledge and skill set for forestry professionals to understand plantation forests planning and decision making for tropical forests management and utilization, geospatial technologies in environmental management, climate modelling tools for forestry applications, REDD+ forest measurement and reporting, as well as contextual factors that influence conservation and livelihood outcomes in tropical forest areas.

In the course development process, a team-based approach was adopted consisting of lead professors, regional content experts, project management and instructional design professionals, to ensure high quality and efficient progress. All courses were developed following the same general principles and a consistent format. New technologies such as virtual field trips, VR/AR, were incorporated where appropriate into the courses to promote student engagement as well as peer to peer and student-instructor interactions while providing visualized interactive practical experiences to online learners.

To ensure the quality development of these innovative online courses, three major quality assurance strategies were introduced and implemented. 1) guiding course development following a modified ADDIE course development model going through the process of Analysis, Planning, Design, Development, Implementation, and Evaluation; 2) guiding the establishment of team-based approach during course development and implementation to bring in professional instructional design staff, content developers, and administration support staff at different stages of course development; 3) introducing Quality Matter (QM) quality standard as guideline for course development.

Upon course development, each of the courses went through the self, peer and student review process to ensure the highest possible quality of SFM education using the QM rubric. External review by a guest subject matter expert was organized by UBC Faculty of Forestry to evaluate course quality. A handful of students in target regions were recruited by AP-FECM EO to conduct student reviews for each course.

Based on the surveys conducted in 2018 and 2019, more than 80% of the participants believed that the online course studying met their expectation and they were quite satisfied with the quality of the courses. 88.5% of the respondents felt that the courses improved their understanding about the topics and 83.68% of the respondents thought the online discussions effectively helped learning in the courses. (see annex 3)

Achievement 3: The emerging educational technologies were integrated in the course development and the course sites on Canvas platform were established.

The integration of emerging technologies is one of the key initiatives in the second phase. The project incorporated the up-to-date learning technologies such as lab simulations, virtual reality, and artificial intelligence into the online development process. The emerging educational technologies like web-conferencing system, 2D and 3D images, 360-degree videos, drone, LiDAR, GIS, etc. were also used in the process of online course development. In order to improve both engagement and learning outcomes for the students, creative learning activities and assessment strategies also were incorporated in the courses.

All developed courses were migrated on Canvas learning and management platform and the sites were established on Canvas platform.

Dashboard

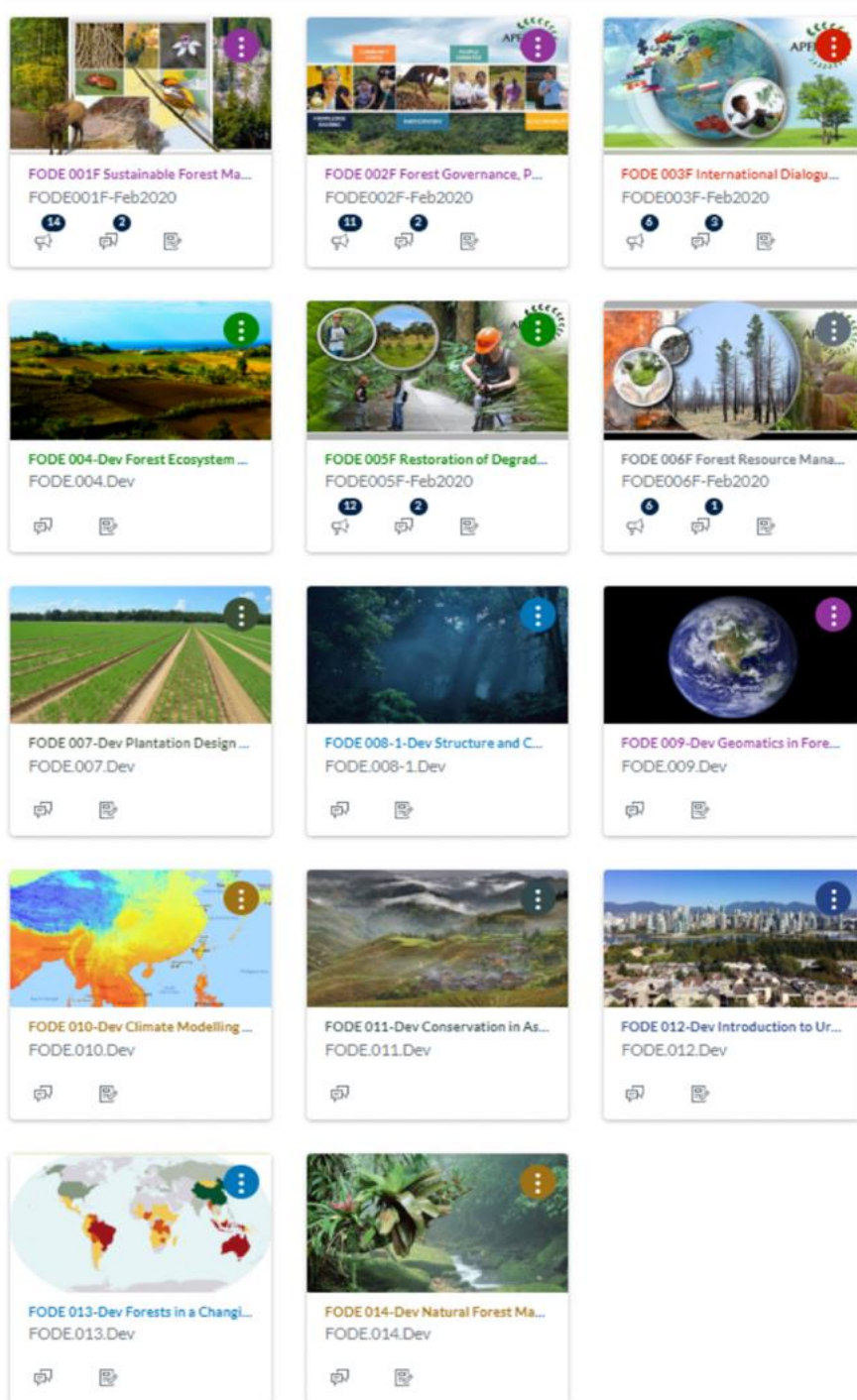


Fig1. Course Sites on Canvas Platform

Achievement 4: SFM online courses were piloted and implemented.

The project established a team-based course operation model to re-purpose the courses developed in the phase I and created an online collaborative learning community to attract a broad global audience of learners. To better engage and retain students in this

type of open-access non-credit online courses, multiple facilitation and support approaches were adopted. Interactions between student-instructor, peer-peer were added and course analytics was embedded into the system to track and monitor the course progress.

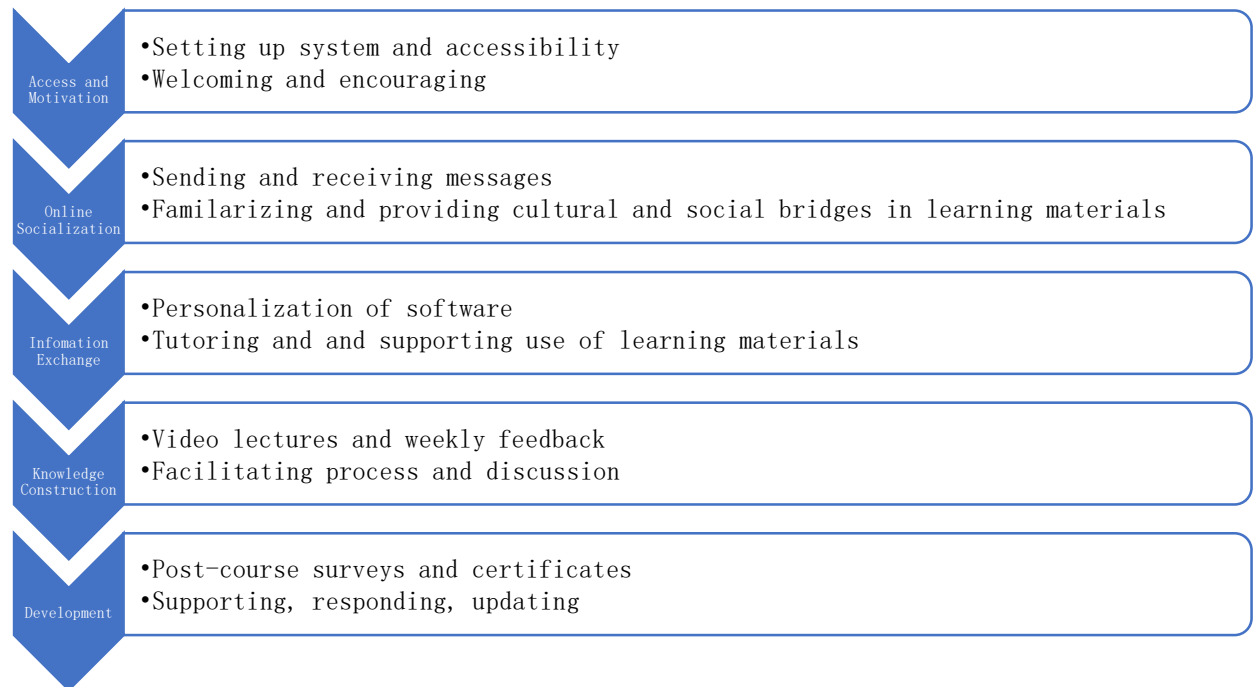


Fig2. Online course facilitation and support model supporting active learning pedagogical concepts and approaches

Instructor-led sessions were delivered. One regular-size instructor-led session provided in 2019 and eight large-scale instructor-led sessions were offered in 2020 amid the global COVID-19 pandemic. More than 35 instructors were involved and these sessions have attracted over 1500 students from 32 Chinese partnering universities. Based on the surveys conducted in 2018 and 2019, 63% of the students successfully passed the courses and more than 80% of the participants are quite satisfied with the quality of the courses. In addition, 88.5% of the respondents felt that the courses improved their understanding about the topics and 83.68% of the respondents thought the online discussions effectively helped learning in the courses.

Five award-winning courses were selected, repurposed, and offered to all AP-FECM members in late 2020. The five award-winning courses were:

- Geomatics in Forestry (Data Collection and Measurement)
- Urban Forestry in the Asia Pacific Region
- Sustainable Forest Management in the Changing World
- Forest Governance, Public Relations and Community
- Development Forest Resource Management and Protection

The five courses were delivered under the guidance of content experts and instructors using the Canvas online learning and management system. Surveys were carried out from the four aspects of effectiveness, attractiveness, engagement and comprehension. 57.2% of the students successfully passed the course, more than 80% of the participants were satisfied with the courses, 89% of the respondents believed that the courses improved their understanding of the topics, 87.4% of the respondents thought that the learning activities effectively helped to facilitate learning in the course.

When the project was completed, all courses were reviewed by Ph. D Jianbang Gan, professor and faculty co-chair of Texas A&M University. The review report showed that the courses developed and planned cover a broad range of topics closely related to sustainable forest management especially in the Asia-Pacific region and constituted a strong curriculum in this field. A uniform course template of Canvas template was well developed to ensure the uniformity of course organization. Many of these courses were well developed, covering appropriate breadth and depth of the subject matters including core concepts and principles, relevant examples and case studies, and hands-on assignments; using different and balanced assessment tools; providing rich and well selected reading materials and references; and encouraging interactions among the students and between the students and the instructors. Most of these courses are ready for offering.

The courses were implemented as open educational resources to ensure accessibility and flexibility, and have been promoted to AP-FECM partner universities. Some selected courses were delivered through instructor-led sessions. Courses implementation maximized the opportunities for student engagement, peer-to-peer interaction, self-reflection and evaluation.

Achievement 5: University capacity on higher forestry education was enhanced

Virtual Lecture Series were delivered on Online Teaching and Learning to the majority of universities across Asia-Pacific region during the COVID-19 pandemic period. Seven open virtual lectures were organized for the instructors from late 2020. Eight professors were invited to share their experience and expertise on the online teaching and learning with faculty members and students. The lectures were focused on essential and emerging topics in the online learning field. Topics included online learning management systems, the application of artificial intelligence, the strategies for motivating and engaging learners, and experiences in SFM online course development. The 2020 virtual lecture series received a lot of attention and recognized by partner organizations.

Agenda for the Online Teaching and Learning lectures

Vancouver Time	Beijing Time	Presenters	Organization	Title
2020-09-15 Tuesday 5pm	2020-09-16 Wednesday 8am	Prof. Chris Cowley Prof. Hailan Chen	UBC CTLT (Center for Teaching and Learning Technology)	"Online Teaching Design, Development and Deliver: A case study from UBC CTLT"
2020-09-22 Tuesday 5pm	2020-09-23 Wednesday 8am	Prof. Nicholas Coops	UBC Faculty of Forestry	"High-techs Application in the Online Courses Development"
2020-10-01 Thursday 5pm	2020-10-02 Friday 8am	Prof. Tony Bates	Ryerson University Contact North	"Leveraging Online Learning Not Only to Increase Access but Also to Develop New Skills"
2020-10-13 Tuesday 5pm	2020-10-14 Wednesday 8am	Prof. Curtis Bonk	Indiana University	"How to Motivate and Retain Online Learners"
2020-10-20 Tuesday 5pm	2020-10-21 Wednesday 8am	Prof. Jiyou Jia	Peking University	"Applying Artificial Intelligence to Enhance Online Learning"
2020-10-27 Tuesday 5pm	2020-10-28 Wednesday 8am	Prof. Yong Liu	Beijing Forestry University	"Hybrid Teaching and Learning Mode During the Post Pandemic"
2020-11-03 Tuesday 5pm	2020-11-04 Wednesday 8am	Prof. Steve Joordens	University of Toronto Scarborough	"How to formally develop skills like critical and creative thought (and interpersonal communication) via online learning"

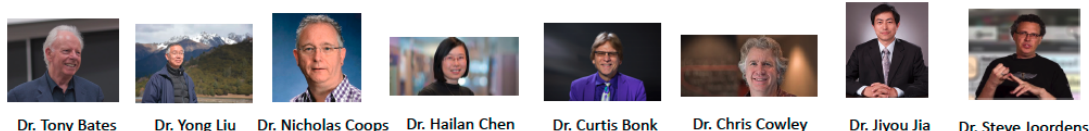


Fig3: List of Online Teaching and Learning Lectures

A regional network for the development of online forestry education resources were established. The network was connecting the professors, instructors, educators and the students in the forestry educational field who have participated the project activities over the first and second phases of the project. The establishment of the network consolidated the cooperation and collaborations in the project online course development and SFM course recognition amongst AP-FECM member universities.

Dialogue with Educational Leaders was initiated in summer 2020. About 58 educational leaders from twelve partnering universities discussed the issues facing in the higher forestry education. The dialogue focused on three themes: Research and collaboration, new online course development, and virtual mobility. Some common challenges were identified including adapting to the rapid transition to online teaching, lack of technological infrastructure, difficulties in providing experiential and international learning experience, and operational obstacles faced by administrators. Several continuous actions were made such as the SFM online course development and implementation, online learning lecture series, and virtual student mobility activities. The AP-FECM was suggested to further explore collaboration opportunities, offer knowledge and technical support, and provide practical recommendations in supporting forest education in Asia-Pacific region.

Achievement 6: Courses were well managed and the project were widely promoted

The project followed a hierarchical management format (see fig4.). The project steering committee was established to monitor the project management and report to APFNet. The Executive Office of the AP-FECM was responsible for the project implementation, coordinating with leading institutions in course developing, and communicating with APFNet.

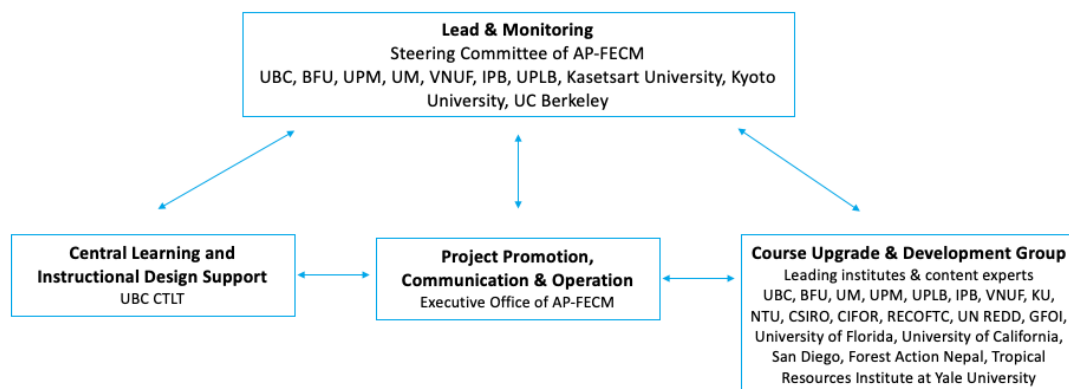


Fig4. Project Management Structure

During the project implementation, the COVID-19 pandemic posed a significant challenge to the project operation and management. However, thanks to the commitments from APFNet secretariat, the educational leaders, dedication of instructors, and strong technique supports of UBC CTLT, the project implementation was properly kept on the right track. There were no much changes of the activities planned in the project document.

Project was widely promoted. The promotional actions were taken, including instructor-led sessions for global learners, attendance of international and regional events, visiting universities and forestry-related organizations in the region, promotion through partner universities, preparing e-news, social media publications, etc. The project achievements were presented and experiences were shared during the World Congress 2019, IUFRO in Brazil and the World Conference on Online Learning 2019 in Ireland. A case study of the SFM online program was published on the proceedings for the 6th International Conference on Higher Education Advances. By the project completion the SFM online courses have attracted 15 000 students from over 130 economies and have been viewed more than 72 000 times.

A global learning community was formed for the co-creation of SFM teaching materials, for collaborative learning, and experience sharing. Surveys and interviews with global learners and partners were conducted periodically to further identify needs of learners and larger society. The efforts on increasing access to high-quality forestry education led the project to win the IUFRO Award for Best Practices in Forest Education, the top recognition in forestry education worldwide.

The results and outputs of the project were presented on AP-FECM's website with links to the Canvas course sites. The project brochures, project fact sheets, short videos, and press articles were produced and delivered at forestry and education related conferences, relevant newspapers, and the media channels such as YouTube, and other social media.

The AP-FECM Executing Office was invited to attend the “Silver Lining for Learning”

TV show to share the achievements on the innovative sustainable online course development and implementation. On this show, the project team shared the story of how the project successfully used a team-based approach to develop a high-quality OER learning program and a credited certificate package, and the future Master's degree program in Forestry. Links for this TV Show:

https://v.youku.com/v_show/id_XNTEyNjU0ODAxNg==.html

<https://www.youtube.com/watch?v=yeEZrUkDiIc>



Fig5. Silver Lining for Learning TV Show Appearance

The table 1: Promotional activities in the year of 2020-2021.

Activities	Promotion Platforms	Date	Funding Source
Promotional brochures for SFM course offering and the Online teaching lectures	APFECM EO has disseminated the brochures to all the APFECM members and related partners	2020 July-August	APFECM
Webinars	Open Virtual Lecture Series on Online Teaching and Learning to Profs and Students in the Asia Pacific region (https://apfecm.forestry.ubc.ca/news-events/2020-2/open-virtual-lecture-series-on-online-teaching-and-learning/)	2020 Sep-Nov	UBC
Social media platform promotion	WeChat News on WeChat Account https://mp.weixin.qq.com/s/cRz2cdQ0E1ma5yO-MhkBJQ https://mp.weixin.qq.com/s/EKlnvbOvGNfEFHZ8Ojjcg https://mp.weixin.qq.com/s/i4Reoa_dIMjNSYQgZl1OmQ https://mp.weixin.qq.com/s/NDzOTPmgkcTsEeY0fMsyDw https://mp.weixin.qq.com/s/567E6Q3QOf74iZCvFqJjoA https://mp.weixin.qq.com/s/uYpDHZtg8OIf9HIBGw4Sw https://mp.weixin.qq.com/s/c3Lz0n3LIp0Ug6gOVFDv5Q	2020 January - Now	APFECM & AFRC
Social media platform promotion	APFECM website (https://apfecm.forestry.ubc.ca/news-events/2020-2/five-sustainable-forest-management-online-courses-will-be-open-in-september-2020/) https://apfecm.forestry.ubc.ca/news-events/2020-2/open-virtual-lecture-series-on-online-teaching-and-learning/	2020 August-now	APFECM
Social media platform promotion	AFRC Twitter https://twitter.com/afrc_ubc/status/1351636766600491010 https://twitter.com/afrc_ubc/status/1319730946946465792 https://twitter.com/afrc_ubc/status/1318577249889611776	2020-2021	AFRC

	https://twitter.com/afrc_abc/status/1314422141878562818 https://twitter.com/afrc_abc/status/1294394495174287361 https://twitter.com/abcforestry/status/1278440775337074696		
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ii. Impacts of Project Achievements

Impact 1: An open access to high quality education is provided.

The project provides opportunity for learners around the world to have open access to high quality education without constraints on geographic location and time. As one of the important open education resources on SFM, these courses allow learners the flexibility to pursue this knowledge whether they are new graduates or forestry professionals or decision makers wishing to improve their skillset about diverse aspect of sustainable forest management. The instructor-led sessions of these SFM online courses significantly improved the critical thinking, evidence-based discussions, effective communication, maintaining academic integrity and writing skills among the learners. So far the project has provided world-class forestry education resources to more than 15000 learners from over 130 economies.

Impact 2: The tropical forest management is benefited

The project has benefited the tropical forest management regionally and the entire forestry sector. In Asia-Pacific region the tropical forests are facing various threats and there is a clear need for high quality education and training in sustainable forest management. The project selected the sustainable management of tropical forests as its key priority to develop the course curriculums. The developed courses cover a wide range of important topics in sustainable forest management and provide a systematic knowledge and skill set for forestry professionals and officers to understand forests planning, decision-making for tropical forests management and utilization, geospatial technologies in environmental management, climate modelling tools for forestry applications, REDD+ forest measurement and reporting, as well as contextual factors that influence conservation and livelihood outcomes in tropical forest areas.

Impact 3: Equity in forest education is promoted

This project has contributed to promoting equity in forest education around the world. Through promoting and improving access to high quality education opportunities in forestry and SFM, this project has contributed to a reduction in observed difference in education between economies in Asia-Pacific region. In addition to the cultivation of high-quality forest learning materials, the workshops, resources, and support provided and offered during this project has introduced new technologies and pedagogies to

various institutions to improve their long-term teaching quality and to advance the learning of an entire generation of new graduates. The project also created a platform for learning, sharing, relationship-building and collaboration between students, educators and professionals in the forestry sector. It has promoted student mobility, faculty exchange, mutual course articulation and recognition, and joint educational and research cooperation in the future.

Impact 4: New methodologies and approaches on SFM are highlighted

The project has introduced and demonstrated new methodologies and approaches on sustainable forest management. When design the structure and content of the course, the instructor has selected the advanced forest knowledge and the successful model to demonstrate the approaches to realize the sustainable management and unitization of forest resources in the context of the global climate change and sustainable development. Going together with the promotion of the online courses, the successfully models and advanced approaches on SFM have also been disseminated to a wider audience.

iii. Issues and Challenges

Although the project was implemented generally in line with the project agreement and made great achievements, there still exist some issues and challenges in the process of the project implementation.

Issue 1: Quality of courses needs to be further improved

The courses developed cover a broad range of topics closely related to sustainable forest management especially in the Asia-Pacific region. All these courses together constituted a strong curriculum in this field. Most of these courses are well developed with an appropriate breadth and depth of the subject matters including core concepts and principles, relevant examples and case studies, and hands-on assignments. The courses are equipped with rich and well selected reading materials and references, different and balanced assessment tools, interactions among the students and between the students and the instructors. However, some issues have been identified and need for further improvements.

- Some topics are overlapped or scattered into individual courses

Both *Course FODE002: Forest Governance, Public Relations, and Community Development* and *Course FODE003: International Dialogue on Forestry Issues* involve forestry governance while FODE002 focusing on community development and FODE003 targeting international dialogue. Both need some revisions for strengthening their respective course content and for better aligning the contents

between them. The content of forestry governance in the course FODE003 could be merged into FODE002.

There are some overlap contents between *Course FODE006: Forest Resource Management and Protection* and *Course FODE007: Silviculture, Plantation Design and Management*, the two courses need to be better coordinated. Course FODE006 covers multiple topics ranging from silviculture, forest mensuration, and disturbances and forest protection to forest policy and economics. Course FODE007 covers a variety of elements in silviculture, plantation design and management.

- The topic of economics of forest management and conservation is weak

The economics of forest management and conservation appears weak and is scattered across several courses. A separated economics course needs to be developed covering topics such as the valuation of forest ecosystem services, timber trade including illegal logging and associated timber trade, deforestation driven by commercial agricultural production and exports, etc. Alternatively, different aspects of forest economics could be included or expanded in multiple existing courses. For instance, valuation of non-timber ecosystem services could be included or expanded in *Course 4: Sustainable Use of Forest Ecosystem Services and Community Livelihoods* or *Course 6: Forest Resource Management and Protection*.

- Some courses need further improvements

Course FODE002: Forest Governance, Public Relations, and Community Development covers three components: Forest governance, public relations, and community development. There is a lack of coverage to integrate or link these three components. The course materials including the lectures and case studies could be enriched, lecture notes including PowerPoint presentations could be added to facilitate different needs of students. The introduction of the course and instructors could also be improved.

Course FODE006: Forest Resource Management and Protection covers multiple topics ranging from silviculture, forest mensuration, and disturbances and forest protection to forest policy and economics. Each topic or module seems to be treated as an isolated course element, and some modules appear quite narrowly focused. For example, the policy discussion was primarily focused on forest policies in China. Integrative discussions, lectures and/or case studies could be added to enhance the course.

Course FODE007: Silviculture, Plantation Design and Management covers a variety of elements in silviculture, plantation design and management. However, these elements appear in an isolated manner. It could be strengthened by better connecting

various elements together. This could be done via adding integrative case studies, lectures and/or discussions.

Course FODE003: International Dialogue on Forestry Issues could be enhanced by adding some more in-depth content and materials that will allow for more critically evaluating and comparing existing institutions and mechanisms pertinent to international forestry dialogue.

Issue 2: Some activities not fully implemented as planned

Regarding the change of the project activities, the PA has stipulated in Section 3.05 “The Executing Agency shall take all reasonable actions to ensure the smooth coordination and cooperation between Executing Agency and all Implementing Agencies. APFNet and Executing Agency shall promptly inform each other of any event or situation which might affect the implementation of project activities and which may necessitate a revision of Project scope, implementation, the agreed budget or other aspects of this Agreement and the Project Document. In case any change occurs in the Project scope, the annual work plans or major activities, Executing Agency shall report to APFNet for approval”.

Name of the courses slightly modified as per the course structure and content. The courses were developed according to the project plan but some of their names were slightly modified by the content experts to represent the most comprehensive and up-to-date course content. Due to the high volume of course content, EA divided the course of “Tropical Forest Ecology” into two separated courses, namely “structure and composition of tropical forest ecosystems” and “ecological processes in tropical forests”. Modifications of the course names, structure and content have been approved by APFNet.

Table 2: Name differences between courses developed and courses planned.

No.	Courses Developed	Courses Planned in Project Document
1	Geomatics in Forestry (Data Collection and Measurement)	Geomatics in Forestry (Data Collection and Measurement)
2	Urban Forestry in the Asia Pacific Region	Urban Forestry
3	Tropical Forests Ecology - Structure and Composition of Tropical Forest Ecosystems - Ecological Processes in Tropical Forests	Sustainable Use of Forest Ecosystem Services
4	Climate Modelling and Forest Application	Climate Modelling and Forest Application

5	Forest Conservation in Asia	Conservation in Asia
6	Carbon and REDD+ Forest Measurement and Reporting	REDD+ Forest Measurement and Reporting
7	Natural Forest Management in the Tropics	Forest Resources Decision Making
8	Sustainable Use of Forest Ecosystem Services and Community Livelihoods	Sustainable Use of Forest Ecosystem Services
		Forests, Livelihoods and Community Forestry at SE Asia
9	Silviculture, Plantation Design and Management	Plantation Design and Management

One course developing is on hold. The course of Carbon and REDD+ Forest Measurement and Reporting, to be developed by the university of Melbourne, was suspended and not completed. The project executing agency tried every effort to catch the leading professor Dr. Chris Weston and Dr. Luba Volkova, but always failed. This course is important aspects of the SFM courses curriculum, adding this course into the whole package of the SFM curriculum could expand choices for the students.

Output 3 is not in line with the project document. The output 3 of “Integration of emerging educational technology in the online courses and establishment of course sites on Canvas platform” does not match the output 2 in the project document “migration to edX platform and upgrade to MOOCs version”. However, the migration of course platform from edx to Canvas has been stated in the progress report of project year 2 and got the APFNet approval.

Issue 3: Project management

The project followed a hierarchical management format. The project steering committee was established consisting 10 members from 10 economies to oversee the project management. The Executive Office of the AP-FECM, as the project executing agent, is responsible for the operation, implementation, and management of the project. Five universities, more than 20 professors and experts, one key technical support agency (UBC CTLT) directly involved in the course development process. Although the project management was arranged with a high efficiency, the stakeholders were motivated and actively involved, some issues were identified following the APFNet project management guidelines.

- no mid-term evaluation was conducted. PA Section 6.02 stated “External monitoring and evaluations may be conducted by independent consultants hired by APFNet, during and after project implementation, if so desired”. As a three-year project, the mid-term evaluation is necessary and essential. However due to the COVID-19 pandemic and the

travel constraints no mid-term evaluation was conducted. The purpose of conducting mid-term evaluation is to assess the continued relevance of project interventions and the progress made towards achieving its planned objectives. The mid-term evaluation could provide an opportunity for the project EA and IAs to make adjustments and modifications to keep the planned activities on the right track to achieve the project objectives and outputs within the lifetime of the project.

- Internal monitoring and reporting system need to strengthen. Reporting system did not work effectively. Progress report was submitted annually (only progress reports for Year 1 and Year 2 were found in the documents list provided by APFNet secretariat), no semi-annual or quarterly reports was found. PA Section 6.03 stated “(b)Semi-annual Progress Reports in the middle of each Project Year should be submitted within 20 days since the end of each reporting period, and (c) Annual Progress Report and Audit Report for Project Year One should be submitted within 30 days since the end of the reporting period”.

- Project duration was extended twice. According to the PA signed on March 28, 2018 between APFNet and UBC, the project last 3 years starting on 1st April 2018. To complete all the project activities and achieve the project objectives the project requested two extensions, one was extended on March 31, 2020 and the other was on December 31, 2020. Finally, the project completed on June 30, 2021. The first extension was impacted by COVID-19 and the second extension was because EA wanted to do self-funded quality review of all courses. Project activities have been completed in the extended period.

- As stated in the PA Section 3.08 “a Project Steering Committee (SPC) shall be established to supervise project implementation and make decisions on crucial issues. The PSC shall meet at least once a year to review annual project progress report and work plan for next project year, to provide guidance to addressing technical and financial issues as well as the policy hurdles, and to approve Project changes such as scope revision, extension, suspension and termination”. The evaluator was told that due to the COVID-19 pandemic no in-person PSC meeting was held. However the EA has reported the project progress and discussed the issues with PSC members individually. No PSC decision document or minutes was found.

iv. Project Sustainability


Sustainability is one of the most important factors to seek the long-term impacts of the project outputs and the stable influence of the project outcome. The need of the project outputs, the quality of the project outputs, the accessibility to the project output, the application of the project outputs, fund availability as well as the technique supports could be the potential factors to affect the project sustainability. Based on the feedback

of the questionnaire survey, 90% of the correspondents believe that financial support is the most important factor which affects the project sustainability, and 80% correspondents believe the quality and the accessibility of the courses developed could affect the sustainable running of the courses significantly. Technique support and the cooperation amongst the universities are necessary to guarantee well running of courses and the application of the project achievements.

To achieve the project sustainability this Project much focused on the course quality control and the access and application of the project outputs.

Four major quality assurance strategies has been implemented to evaluate and guarantee the quality of the development of the online courses. 1) guiding course development following a modified ADDIE course development model going through the process of analysis, planning, design, development, implementation and evaluation; 2) guiding the establishment of team-based approach during course development and implementation to bring in professional instructional design staff, content developers, and administration support staff at different stages of course development; 3) introducing Quality Matter (QM) quality standard as guideline for course development. 4) Self, peer, and student reviews of courses were conducted to collect the feedback for course improvement.

QM rubric is world-renowned standards to assess the level to which a course meets the Standards and highlight areas for improvement. The QM standard consists of 8 key features and each feature consists of sets of sub-questions with Likert-type responses. (see details in the picture below)

<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;">  <p>HE</p> </div> <div> <p>Specific Review Standards from the QM Higher Education Rubric, Sixth Edition</p> </div> </div>		
General Standards	Specific Review Standards	Points
Course Overview and Introduction	1.1 Instructions make clear how to get started and where to find various course components.	3
	1.2 Learners are introduced to the purpose and structure of the course.	3
	1.3 Communication expectations for online discussions, email, and other forms of interaction are clearly stated.	2
	1.4 Course and institutional policies with which the learner is expected to comply are clearly stated within the course, or a link to current policies is provided.	2
	1.5 Minimum technology requirements for the course are clearly stated, and information on how to obtain the technologies is provided.	2
	1.6 Computer skills and digital information literacy skills expected of the learner are clearly stated.	1
	1.7 Expectations for prerequisite knowledge in the discipline and/or any required competencies are clearly stated.	1
	1.8 The self-introduction by the instructor is professional and is available online.	1
	1.9 Learners are asked to introduce themselves to the class.	1
Learning Objectives (Competencies)	2.1 The course learning objectives, or course/program competencies, describe outcomes that are measurable.	3
	2.2 The module/unit-level learning objectives or competencies describe outcomes that are measurable and consistent with the course-level objectives or competencies.	3
	2.3 Learning objectives or competencies are stated clearly, are written from the learner's perspective, and are prominently located in the course.	3
	2.4 The relationship between learning objectives or competencies and learning activities is clearly stated.	3
	2.5 The learning objectives or competencies are suited to the level of the course.	3
Assessment and Measurement	3.1 The assessments measure the achievement of the stated learning objectives or competencies.	3
	3.2 The course grading policy is stated clearly at the beginning of the course.	3
	3.3 Specific and descriptive criteria are provided for the evaluation of learners' work, and their connection to the course grading policy is clearly explained.	3
	3.4 The assessments used are sequenced, varied, and suited to the level of the course.	2
	3.5 The course provides learners with multiple opportunities to track their learning progress with timely feedback.	2
Instructional Materials	4.1 The instructional materials contribute to the achievement of the stated learning objectives or competencies.	3
	4.2 The relationship between the use of instructional materials in the course and completing learning activities is clearly explained.	3
	4.3 The course models the academic integrity expected of learners by providing both source references and permissions for use of instructional materials.	2
	4.4 The instructional materials represent up-to-date theory and practice in the discipline.	2
	4.5 A variety of instructional materials is used in the course.	2
Learning Activities and Learner Interaction	5.1 The learning activities promote the achievement of the stated learning objectives or competencies.	3
	5.2 Learning activities provide opportunities for interaction that support active learning.	3
	5.3 The instructor's plan for interacting with learners during the course is clearly stated.	3
	5.4 The requirements for learner interaction are clearly stated.	2
Course Technology	6.1 The tools used in the course support the learning objectives or competencies.	3
	6.2 Course tools promote learner engagement and active learning.	3
	6.3 A variety of technology is used in the course.	1
	6.4 The course provides learners with information on protecting their data and privacy.	1
Learner Support	7.1 The course instructions articulate or link to a clear description of the technical support offered and how to obtain it.	3
	7.2 Course instructions articulate or link to the institution's accessibility policies and services.	3
	7.3 Course instructions articulate or link to the institution's academic support services and resources that can help learners succeed in the course.	3
	7.4 Course instructions articulate or link to the institution's student services and resources that can help learners succeed.	1
Accessibility* and Usability	8.1 Course navigation facilitates ease of use.	3
	8.2 The course design facilitates readability.	3
	8.3 The course provides accessible text and images in files, documents, LMS pages, and web pages to meet the needs of diverse learners.	3
	8.4 The course provides alternative means of access to multimedia content in formats that meet the needs of diverse learners.	2
	8.5 Course multimedia facilitate ease of use.	2
	8.6 Vendor accessibility statements are provided for all technologies required in the course.	2

* Meeting QM Specific Review Standards regarding accessibility does not guarantee or imply that the specific accessibility regulations of any country are met. Consult with an accessibility specialist to ensure that accessibility regulations are met.

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All courses developed are open education resources and leave access interface for the further development to cater for the diverse needs. The open online courses are structured by modules, which could enable other users like universities to integrate the course material into their current teaching, or customize it with local materials into their education curricula. The SFM certificate program developed by the project could be a good way to attract enrolment and generate income to cover the on-going costs.

However, some issues were identified and may affect the project sustainability. Generally, there was no specific arrangement on how to keep running the online courses

on the platform after the completion of the project. Some issues are not clear, for instance, who will take the responsibility to keep running the online courses? how to do the regular review and keep the online courses updated? what aspects or contents should be improved to meet the changing and diverse needs? How to get more universities actively involved in the online course application and help them to develop their certificate programs on SFM? How to realize the self-sustain of the online course program?

V. Lesson Learned

A team-based approach with online pedagogy, technology, and contents could be successfully integrated to produce an effective teaching and learning model for higher forestry education. This approach ensures the enriched learning experiences of students, wide public access, supports the interaction of peers and professionals around the globe, and provides the necessary information for the next generation of foresters to sustainably manage the world's forest resources.

Student-centered pedagogical model and learning activities are the key for developing and implementing innovative online courses. The pedagogical model used in this project is based on open pedagogy featuring modules broken down to topics, and consisting of background information, video lectures, readings, self-reflection, and discussions. With a module-based format, instructors can easily repurpose and incorporate the necessary content into their courses, and institutions can integrate and combine these courses to fit their curricula and programs.

The pedagogy facilitates both self-directed learning and instructor-led teaching to improve flexibility and student engagement. Various learning activities and diverse content could increase student engagement but would also be affected by credit recognition and time management. More practical experiences should be integrated into the online platform, which stimulated the students to increase peer-to-peer interaction and instructor-led live sessions.

The COVID-19 pandemic put a big challenge to the project and also provide a great opportunity for the project to promote the online course education approaches. During the project implementation, one professor experienced the COVID-19 PANDEMIC and delay was caused in completion of the course. Meanwhile, during the pandemic all partner universities temporarily stopped the face-to-face indoors lectures and were struggling with the lack of online learning resources. The online courses developed by the project played crucial role to fulfill the disruptive university education and create opportunities to collaborate beyond the boundary.

This project has set a baseline and an excellent example for future course articulation

and mutual recognition regionally, which will further promote student mobility and research collaboration. Consequently, the project contributes to significant improvement in forestry education quality and accessibility

VI. Conclusions

In general, the project has greatly achieved its objectives and expectations. Excellent progress and outputs have been produced from the project, including ten newly developed courses, AP-FECM certificate program and UBC graduate certificate program, project promotion and capacity building, as well as online course offerings to students and other forestry-related stakeholders across the world during the COVID-19 pandemic lockdown. The course topics and contents were well received by a wide variety of users (forestry professionals and students), and have had a significant impact among the participating partner universities and have considerable impact in the Asia-Pacific region. The courses have been recognized regionally and internationally.

The collaboration amongst the participating universities and institutes was reinforced and the capacity of online education was significantly enhanced. With promotional efforts the online courses and the influence of APFNet and AP-FECM were significantly consolidated in promoting the forestry education in the Asia Pacific region. The courses provide an education in economic, legal, biological, and ecological approaches to the application of sustainable forest practices, combined with critical thinking and policy planning. The courses are open educational resources which are highly accessible to individuals and organizations as an educational tool. The project has narrowed the knowledge gaps in forestry education amongst the universities in Asia-Pacific region by conducting training workshops on online courses development and sharing the teaching resources. The online teaching and learning could be used as a supplementary resource to the face-to-face in-class teaching, allowing those who live remotely to benefit from a high-quality forestry education. The online learning could likely become more prevalent in the foreseeable future provided the high-quality online SFM package is well developed.

The successful implementation of this project laid a cornerstone to build a certificate program focusing on sustainable forest management for the universities in Asia-Pacific region in the near future. The outcome and achievements of this project will serve as an essential component to expand the territory of online forestry education and, to contribute to the development of a thorough effort from the Asia Pacific region to mitigate climate change through sustainable forest management.

VII. Suggestions and Recommendations

Recommendations for Executing Agency

In general, the executing agency has managed the project effectively and efficiently. Almost project activities were implemented as per the project plan, and objectives in the project document were achieved. However, EA was facing several issues and need to strengthen in the future project management. Some suggestions hereby are offered by the evaluator:

Enhance the project management. Strengthen the communication and coordination between EA and IAs to make sure all implementing agencies follow the overall plan/annual plan to carry out their tasks; Enhance the internal monitoring and reporting to ensure the activities being implemented in line with the plan; Mid-term evaluation is necessary and essential for three-year long project and should be conducted at the mid of project lifespan.

Further communicate with UM to find out the solution for this on-hold course and submit an official letter to APFNet for approval. The similar issue occurred in phase I and the course of “Sustainable Use of Forest Goods and Services” was shifted to the phase II for continue developing. This issue reflects that the project team-based approach still needs further improvement to ensure adequate time and expertise to commit to the project and deliver course objectives.

Extend educational impact and collaboration to the entire Asia-Pacific region. Getting more universities involved in the project activities, would not only provide greater networking, but would also enhance their capacity on online course development and online teaching skills. The phase I and phase II projects only got five universities directly involved in the course development. For the next step efforts should be made to extend project output and achievements to a wider scope of universities by increasing collaborations with major forestry universities in the region.

Help more universities develop the online certificate programs. Universities learned a lot experiences on delivering Online lectures during the COVID-19 pandemic and now are more convinced about its possible to provide lectures and programs Online. The students have accepted and got used to the online learning. This is a good opportunity for the universities to develop and implement their online certificate programs using the current developed courses. AP-FECM could develop overall plan to provide a set of trainings on online course development for the forest universities in Asia-Pacific region to gradually raising their awareness of the importance of online education and enhance their capacity on online teaching skills.

Establishment of sustainable financing system in a long run. With APFNet supports, SFM online courses could be successfully developed. AP-FECM is the best partner to take the responsibility to maintain the operating of the courses. AP-FECM could establish a fund pool to seek financial supports from international society, enterprises or education authorities. On the other hand, to achieve the self-sustainability AP-FECM could get some income by providing services like helping university to develop their online programs, delivering online training courses based on specific needs.

Continue to promote the online courses via all possible means, such as society networking platform, email list, eNews, Newsletter, Ads on related journals, and related conferences. An independent mobile APP on SFM Online Course could be considered to develop in the future so that the people who want search online resources on SFM, just input the key word “SFM” or “forest” in the searching box, the APP on SFM online courses will be shown in the mobile APP store. Then download and install to the mobile and then the subscriber can start learning on his/her phone, which will provide an effective and convenient channel for the users to find and take the course.

Recommendations for APFNet

Explore the alternative ways to strengthen the project management under the COVID-19 Pandemic circumstances. The traditional project management model could not be completely and effectively applied due to the constraints of traveling. The project management guidelines need further modifications and adjustments. The alternative virtual ways like online meetings and workshops should be explored to effectively strengthen the project management and monitoring of the project progress. Some important and necessary activities/missions like PSC meetings, external monitoring and evaluation could be conducted based on the virtual meetings, online interviews and the document reviews.

Conduct a professional review or evaluation on the existing courses developed. A task-force team consisting of reputable professors on forest management from universities and research institutes should be formed to carry out a professional review. Necessary adjustments and improvements of course content should be done under the overall plan. This review will be extremely important to develop the certificate programs and the Master’s degree programs in the future.

Innovate the APFNet scholarship program by integrating the online courses into the curricula. By customizing the online courses APFNet could collaboratively with host universities of APFNet scholarship program develop the online course-based Master’s degree programs under the current fields of Forest Economics and Management, Forestry, Forestry Engineering, Environmental Engineering and Forest Protection. All the graduates could take the online course study and join the live lectures of professor to obtain the credits for Master’s degree. This new model could keep the APFNet

scholarship program running in the COVID-19 PANDEMIC situation, and could be a potential way to expand the scope of APFNet scholarship within the current fund scale.

Design and develop the certificate programs for the APFNet thematic training program. Three online certificate training packages could be developed under the current themes of Degraded Forest Rehabilitation and Management, Forestry and Rural Livelihood Development, and sustainable management of dryland ecosystems. Key topics under each theme could be identified and then developed into online courses. A certificate will be issued to the trainees who successfully completed the online courses. Live lectures and virtual field tour could be organized to interact with lecturers and to experience the forest practice.

Develop the online courses certificate programs to provide on-job training for foresters in Asia-Pacific region. Except AP-FECM, APFNet is operating other four mechanisms of Forestry planning network, APFNet transboundary wildlife conservation initiative, Trainer in Forestry Network, Sino-ASEAN Network for Forest Research Institutes. Online course certificate programs could be developed to provide knowledge refreshing and skill upgrading trainings to forest officers, workers or young researchers. These certificate programs could be developed and provided based on the needs from specific economy, or on the hot spot issues facing the forest management in Asia-Pacific region. Registration fee or training service fee could be collected to use for sustaining the online courses development.

Suggestions on the Future Actions

Develop mid-term or long-term strategy on online course development and online forestry education. Under the newly issued APFNet strategy plan for 2021-2025, the AP-FECM shall develop a strategy on forestry education and online courses development. This strategy will not only guide the design, developing and application of online courses on SFM and direct online education in Asia-Pacific region, but also safeguard the sustainability of the program of Innovative Sustainable Forest Management Education in the Asia-Pacific Region.

Develop an overall plan for the SFM online courses. A comprehensive assessment or survey is need to refresh the changing needs and based on the survey results to identify the topics on SFM. All the topics could be sorted out into several batches under different theme or different programs. This overall plan will avoid the topic overlap or missing in course developing process.

Further review the diverse needs on SFM to identify the potential topics for the new courses. The project team need continue to survey the changing needs in real-world SFM in Asia-Pacific region. Workshops led by the Steering Committee are recommended and should be helpful in this regard. Besides the 15 OER courses, there

are still gaps in basic and applied forestry courses for a complete SFM package. The following topics could be considered to develop new courses in the next phase.

- Forest resources assessment
- Silvics and Silviculture
- Abiotic disturbances
- Biotic disturbances
- Biodiversity conservation and wildlife management
- Watershed management and forest hydrology
- Forest economics and planning
- Sustainable management of non-timber-forest-products (NTFP)
- Agro-forestry

Pilot to develop SFM Online Master's Program. Designate the courses as the required or core courses and the others as electives, and add final research paper or essay for the courses of Master's degree program. To attract students, wide promotion could be done along with the flexible programs in terms of time and funding to accommodate the special need of the diverse learners. For instance, the students enrolled in graduate certificates program should be able to pursue Master degree if they wanted.

Pilot and demonstration the approach combining online courses learning with face-to-face indoor teaching. majority of theoretical concept can be delivered Online including synchronous discussion with instructor at least once a week, discussion about the questions, query while learning specific topic. While hands on programs in skill development should be face to face and field based. By doing this together, this would help students to acquire both theoretical and hands on skills.

Case study or field operation practices should be enhanced in the process of the course development. Forestry is viewed as a practice-oriented field of science requiring a combination of theory knowledge and practical experience. A holistic course structure should incorporate SFM theory and knowledge with case studies or practical experience. APFNet demonstration project experience and best practices could be integrated into the SFM course developing process as a case study. APFNet has developed many best practices on restoration of degraded forest, agroforestry, multi-functional forest management, watershed management, small forest-based community enterprises development, etc by implementing demonstration projects with partners across the Asia-Pacific region. All these best practices on the ground could add extra value to the courses.

Further improve the accessibility of the course developed. The courses should provide equitable opportunity for users from different economies in Asia-Pacific region with different needs. The language problem remains a challenge to limit the impact of this

project. Explore multilingual interface versions or add captions to the course video clips could be beneficial to increase the accessibility of the online courses, especially for forest workers and practitioners on the ground who want to upgrade their knowledge and skills by taking the self-learning online courses.

More interacts could be added into the online course development. Besides discussion board, exam/quiz and emails, more interact ways like the peer-to-peer discussion, video discussion, instructor-led live lecture and the popular social media that can be used across the globe as Bitrix 24, Microsoft Teams, Slack, Facebook, Twitter, Wechat, What's App, etc. could be added into the course to diverse the communication with instructors. Facilitator should be appointed to facilitate the session of discussion.

Reference

1. Project Agreement and Project Document
2. Project Completion Report
3. Course Review Report by Expert
4. Course Review Report by Students
5. Summary of Online Student Experience Results
6. Project Annual Progress Report and Work Plan
7. Online Courses web Linkage: <http://apfecm.forestry.ubc.ca/sfm-online-courses/>
8. APFNet website: www.apfnet.cn
9. APFNet Strategic Plan for 2021-2025
10. Project Change and Extension Requests

Annex

1. Summary of questionnaire survey and feedbacks
2. List of courses developed
3. Students review summary