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UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

Inception Workshop on Integrating Geospatial Information for Agricultural Crop Monitoring in the Lower Mekong Basin

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

20 – 22 March 2019

Royal Princess Hotel, Lang Luang, Bangkok, Thailand

RADI

Meeting Report

Prepared by the Secretariat

*This document has been issued without formal editing

I. CONCLUSIONS AND RECOMMENDATIONS

A. General conclusions

The Inception workshop on 'Integrating cutting-edge geospatial information for agricultural crop monitoring in the Lower Mekong Basin':

1. Reviewed the progress and practices relevant to crop monitoring within the subregion and noted that significant progress has been made.
2. Noted that systematic, automatic, cloud-based processing is needed for cost efficient crop monitoring in the countries of the lower Mekong region.
3. Encouraged greater cross-sectoral involvement and possible commercial products.
4. Agreed to consider opportunities to integrate cloud computation, big data, AI, DataCube and machine learning to integrate systems.
5. Agreed that the action plans aim to develop tailored CropWatch Cloud upon the request and needs of the pilot countries operationally, in consideration of their existing systems, capacity and resources.
6. Requested continued capacity building and rebuilding to better understand geospatial information applications for resilient agriculture and to continue to operate the crop monitoring system in pilot countries. These can be short sessions or longer master's degrees.
7. Agreed to share the good practices and geospatial information among the pilot countries and cooperative partners related to crop, drought monitoring and water management.
8. Appreciated the existing contribution and support from RADI, FAO, ADPC, AIT, eWater, Asia-RiCE, UNOSAT, GEOGLAM and other partners in the region, and seek to identify opportunities for further cooperation.
9. Agreed to work closely, through ESCAP's regional cooperation platform and in collaboration with global and regional partners, to support the pilot countries towards operationalization of the crop monitoring system.
10. Agreed to establish Community of Practices, in collaboration with UN-GGIM and UN-GGIM-AP, to share the knowledge, experience and data for enhancing capacity of the pilot countries.
11. Agreed to hold a regional workshop annually where participants can share their experience and challenges.
12. Agreed to hold workshops in Cambodia, Thailand and Viet Nam within the first 2 years. Other workshops in Lao People's Democratic Republic and Myanmar will be planned upon request.

B. Country specific needs and plans

13. The Inception workshop identified specific country needs, challenges and plans for implementing crop monitoring systems:

Cambodia

14. The experts from Cambodia discussed their challenges and requirements for establishing a crop monitoring system in their country, including:

- strengthening the cooperation with existing international systems;

- strengthening agricultural statistical information to help build resilience to climate change.
- providing scientific evidence-based advice to ensure sustainable agricultural growth.
- Ensure the system is sustainable after the project is completed and is applicable to agriculture policy-making in terms of accuracy, quality and management of data.
- Greater capacity for data analysis and uses for multiple crop types, food security and safety is a priority.
- The framework of any agriculture survey needs to be clearly defined, especially with regards to different ecological zones and provincial boundaries.
- Cambodia experts believe that remote sensing is a top priority and that the establishment of CropWatch Cloud is the critical task.
- Extra components are needed to support CropWatch Cloud, including data downloading, agro-climatic information, crop condition analysis and the production-area-yield modules.

15. The recommended implementation schedule should be:

- Period 1 (one month): development of a technical manual on CropWatch Cloud
- Period 2 (one month, tentatively proposed as August 2019): training on CropWatch Cloud in Beijing of 3-4 participants from Cambodia
- Period 3 (six months): customize CropWatch for Cambodia, including translation into Khmer, and conduct a training course in collaboration with Cambodia/China /UNESCAP
- Period 4 (6-8 months): operate and calibrate CropWatch-Cambodia. Hold a country meeting in Cambodia and undertake joint fieldwork for calibration.
- Consider scholarship opportunities for Cambodian officials participating in a master's degree (2 years) or Ph D (4-5 years)
- Period 5 (4 months): handover CropWatch-Cambodia and release an agriculture bulletin by MAFF.

Myanmar

16. The expert from Myanmar discussed their challenges and requirements for establishing a crop monitoring system in their country, including:

- Establishment of a thematic crop monitoring system.
- Analyse agrometeorological archived data.
- Obtain assistance from CropWatch Cloud and ASIS to add crop information into existing decadal agrometeorological bulletin.
- Applying a forecasting and warning system to DroughtWatch and develop a decision support tool for drought management.

17. The recommended implementation schedule should be:

- Phase 1: data collection and preliminary CropWatch Cloud and the training program in 2020.
- Phase 2: Field data collection and customization of CropWatch Cloud for Myanmar. In addition, provide extra training and a system upgrade in 2021 and 2022.

- Phase 3: operation of the system and feedback, providing extra training for Myanmar as required. Establish and release a bulletin on crop monitoring information.

Thailand

18. The experts from Thailand discussed their challenges and requirements for establishing a crop monitoring system in their country, including:

- Providing more reliable, accurate, timely information for different agencies and stakeholders;
- Improving the research and knowledge sharing;
- Required operated system and enhancing partnerships and cooperation.
- Thailand experts believe that CropWatch Cloud has potential to enhance the spatial and temporal resolution for crop monitoring by continually building future agricultural models and studies with essential indicators in CropWatch Cloud.
- Thailand participants requested extra requirements on improving and customize the existing crop indicators for Thailand conditions.
- Needs include a timely and accurate seasonal and long-term crop forecasting systems in response to climate change, including seasonal rice mapping, yield forecasting, links between farmers and the government; the use of crowdsourcing; establishing links between other systems.
- Thailand participants also indicated the need for market information such as the global agriculture demand.
- The timely response to crises and logistics management with the support of ASEAN is also required.

19. The recommended implementation schedule should be:

- May 2019: Thailand experts will visit RADI and programmers from both side will discuss face to face and develop API to link CropWatch Cloud and Agri-Map; The two systems will communicate and share the existing data through API;
- December 2019: Improving high spatial and temporal Data under the support and consultation from CUHK.
- December 2019: Collecting and analysing historical satellite, climate data with RADI.
- 2019 to 2020: Operating in-situ measurements in the growing season.
- December 2019: Collecting climate forecasting data.
- 2019 to 2020: Thailand experts also expect to achieve model calibration in cooperation with partner institutes.
- 2019 to 2021: A training and capacity building program, along with system customization, will be required in cooperation with RADI.

Viet Nam

20. The experts from Viet Nam discussed their challenges and requirements for establishing a crop monitoring system in their country. Challenges include:

- Fragmented rice grow area.
- Crop production impacted by disasters and climate change.
- Lack of an operationalized system on crop monitoring.

- Other decision-making tools not integrated (e.g. crop planning, water planning, early warning).
- Lack of tools for crops other than rice.
- Lack of trained staff.

21. The participants from Viet Nam requested one comprehensive system supporting resilience of crop production, which is cloud-based using geospatial and remote sensed information, and is customized and integrated with other existing systems, including for drought management.

22. The recommended implementation schedule should be:

Phase 1 (June 2019):
- Develop a country report identifying the needs and appropriate indices for Viet Nam.
- Undertake an inception workshop to identify the demand for the system, which stakeholders should be engaged, etc.

Phase 2 (August 2019 – August 2020):
- Pilot CropWatch for one selected province.
- Undertake on the job training with RADI.
- Integrate CropWatch Cloud into other existing systems and tools to produce one comprehensive system.
- Assess the efficiency and applicability of the tool.
- Calibrate and validate the system for Viet Nam.
- Identify gaps and potential solutions.

Phase 3 (September 2020-June 2021):
- National workshop demonstrating the system to other stakeholders.
- Upgrade the tool for other regions and/or national use.
- Undertake technical transfer and training.

II. PROCEEDINGS

Organization of the meeting

23. The Inception workshop 'Integrating geospatial information for agricultural crop monitoring in the Lower Mekong Basin' was held 20 - 22 March 2019, in Bangkok, Thailand.

Attendance

24. The meeting was attended by the following ESCAP member States: Cambodia, Myanmar, Thailand and Viet Nam. Representatives from the following United Nations organizations also attended: the Food and Agricultural Organization (FAO), the Operational Satellite Applications Programme of the United Nations Institute for Training and Research (UNOSAT), the United Nations Committee on Global Geospatial Information Management (UNGGIM). Representatives from the following regional and technical agencies also attended: Asian Disaster Preparedness Center (ADPC), ASEAN Plus Three Emergency Rice Reserve (APTERR), Asian Institute of Technology (AIT), the Chinese University of Hong Kong (CUHK), e-Water Australia, the Geo-Informatics and Space Technology Development Agency (GISTDA), the Japan Aerospace Exploration Agency

(JAXA), and the Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences (RADI, CAS). The complete list of participants is included in Annex 2 of this report.

Opening of the meeting

25. Representative of Information and Communications Technology and Disaster Risk Reduction Division (IDD) of ESCAP, highlighted the opportunities and challenges presented by enhancing the access to space applications through regional cooperation. He reiterated the importance of implementing the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018-2030). He also highlighted major achievements of the knowledge products and geospatial information services, in particular on enhancing institutional capacities of developing countries on the effective use of space-derived data and GIS for disaster risk modelling, assessment and monitoring, and drought management. Regarding drought management, he described a joint study with ASEAN entitled "Ready for the dry years: building resilience to drought in Southeast Asia" which is planned to be launched in April 2019.

26. Representative of the Space Applications Section of IDD, ESCAP then elaborated on the work of ESCAP by outlining the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018-2030) in more detail. In addition, she outlined the work of the Regional Drought Mechanism which, through regional cooperation, supports countries establish drought monitoring and management tools and builds the capacity of government officials to use these tools.

Presentations by experts on crop monitoring for Sustainable Development

27. A series of presentations were made by various stakeholders on crop monitoring and management tools and programmes. These expert presentations came from RADI, GISTDA, ESCAP, UNOSAT, e-Water Australia, AIT, FAO, ADPC, Asia-Rice, CUHK, GEOGLAM and the ASEAN Plus Three Emergency Rice Reserve Secretariat.

28. The experts from RADI presented crop monitoring situation and relevant existing systems with focus on gaps of ownership and transparency, and demonstrated the use of CropWatch Cloud, including rice mapping method, the important features of CropWatch Cloud on processing, database, analysis and bulletin, and how the system is used in China and supports stakeholders over the world and other developing countries as in Mozambique.

29. Participants from GISTDA introduced how they apply geo-informatics for rice and other crop monitoring and yield estimation to support the government and local agricultural organizations. GISTDA emphasized their efforts to integrate multiple data sources through one database. They also presented other uses of space applications in Thailand, and how they support other ASEAN countries through capacity building through ARTSA.

30. Representative of the Space Applications Section of IDD, ESCAP presented the work of UN-GGIM and their role as the secretariat of the Asia-Pacific Committee of this programme. This included reviewing statues and guidelines, migration of the UN-GGIM website and upgrading the system, preparing a work plan for 2019-2020, and undertaking consultations on how to strengthen the partnership between UN-GGIM and UN-GGIM-AP and member States.

31. e-Water Australia then presented their work in Cambodia in collaboration with ESCAP and the Australian Bureau of Meteorology and Geoscience Australia. This included a pilot DataCube which incorporates a corrected water accounting analysis to complement the drought monitoring tool being developed and customized by RADI.

32. AIT presented an overview of the various drought monitoring tools for enhancing the resilience of agriculture in Cambodia, Lao People's Democratic Republic, Myanmar and Viet Nam.

33. FAO provided an overview of the Global Information and Early Warning System (GIEWS) for drought monitoring which is a system based on 10-day satellite data of vegetation and land surface temperature. They also demonstrated other systems such as their Agricultural Market Information System and their studies and knowledge products.

34. ADPC then presented their work under Servir-Mekong and demonstrated a pilot system based on the Regional Hydrologic Extremes Assessment System (RHEAS) implemented through the Vietnam Academy of Water Resources (VAWR) and their work with Mekong River Commission (MRC).

35. The Chinese University of Hong Kong (CUHK) introduced their advancements in the use of big data which combined both traditional data such as statistics and satellite imagery, with and the new types of data such as social media, camera and GPS from smart phones. They emphasized that the fusion of the data can play critical role in characterizing land use which can help researchers obtain better quality information.

36. The Asia-Rice programme was presented showing a rice-mapping algorithm based on time series agriculture-related indicator NDVI from remote sensing data. The use of UAV and other sensors to collect data was also presented.

37. The Director of the Statistics Division of ESCAP discussed the importance of linking geospatial data with official statistics and presented tools such as the DataCube and the System of Environment Economic Accounting which can support this work.

38. UNOSAT presented their work in the Pacific on CommonSensing for improving national resilience to climate change using satellite and space technologies. The CommonSensing project involved supporting data and decision-making tools and capacity building for experts, decision makers and specialists.

39. APTERR Secretariat provided a brief overview on their work on strengthening food security through a regional mechanism in Asia and the Pacific for establishing and stockpiling an emergency rice reserve.

40. The participant from NECTEC demonstrated their Agri-Map system which includes rice land usage, suitable and unsuitable land for rice production, historical rice field, agriculture income, and debt for households to analyse rice production comprehensively.

41. The GEOGLAM programme was then presented which includes crop monitoring, capacity building, assessing the value of Earth observation and research and development. The priorities for 2019 were outlined and GEOGLAM work in Africa was also presented.

Country presentations and discussions

42. RADI also presented the CropWatch Cloud in more details and what would be involved in the project. Participants were requested to identify their existing activities, needs and develop an action plan for implementation of customizing CropWatch Cloud in their own country. These key points of discussions are summarized under part B of the Conclusions and Recommendations of this report.

Closing

43. ESCAP then delivered some closing remarks and summarized some of the key outcomes, presented under part I of this report.

List of Annex Documents

Annex 1. Agenda of the meeting
Annex 2. List of Participants