Summary of the second FishPhytO Project Science Team Meeting

The second meeting of the Project Science Team (PST) for the project on *"Creating a phytoplankton-fishery observing program for sustaining local communities in Indonesian coastal waters"* (a.k.a FishPhytO), funded by the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan, through the Fisheries Agency of Japan (JFA), was held from 09:00–17:00 on October 20, 2023, in the St. Helen Room at the Westin Hotel, Seattle, USA, prior to the PICES 2023 Annual Meeting.

The main objectives of the meeting were: (1) to analyze the outcomes of the July 2023 activities in Indonesia, (2) to assess the current state of data collection in the Lombok/Gili Matra region and the development of a feasible sampling program in Indonesia, (3) to review the updates in the FishGIS smartphone application, and (4) to discuss a workplan for the rest of Year 1 and for Year 2 of the project.

1. WELCOME REMARKS, INTRODUCTIONS, ADOPTION OF THE AGENDA

The meeting was opened with welcoming remarks to participants (*Appendix 1*) and brief comments on the purpose of the meeting by Dr. Mitsutaku Makino. Dr. Vera Trainer joined the meeting later in the day due to her participation in another workshop, and Dr. Moonho Son participated remotely for some time in the afternoon. Two PST members, Dr. Seung Ho Baek (Korea, representing MEQ) and Dr. Vladimir Kulik (Russia), were unable to attend this meeting. Invitees to the meeting were a representatives of MAFF, Dr. Yutaka Hiroe, Dr. Suhendar I Sachoemar (BRIN and ITI, Indonesia), and Ms. Ruo Yu (SIO, Ministry of Natural Resources, China).

Following introductions, the attendees reviewed and adopted the provisional agenda circulated prior to the meeting (*Appendix 2*). Dr. Mark Wells served as the rapporteur.

The second FishPhytO PST meeting (October 20, 2023, Seattle, USA) in session.

2. REPORT OF THE MAFF CIGUATERA PROJECT AND INTRODUCTION TO FISHPHYTO PROJECT

Dr. Makino provided a detailed summary of the previous (2020–2023) MAFF-funded project for "*Building local warning networks for the detection and human dimension of ciguatera fish poisoning in Indonesian communities*" (Ciguatera), which has laid the foundation for the current FishPhytO project. This summary was based on the Ciguatera final report that now is posted on the PICES website.

Dr. Makino re-emphasized that the overall objective of the current 3-year (2023–2026) MAFF-funded FishPhytO project is to establish, in collaboration with local fishers, research institutes and universities, a phytoplankton-fishery observing program in the Lombok Island region (Indonesia) using tools developed and modified/refined during the previous two PICES-MAFF projects (2017–2023) in order to provide local communities with the capacity and knowledge to sustainably manage their fisheries resources and ensure seafood safety. The project is also expected to identify potential research needs for deploying the FishGIS application in PICES member countries.

3. INTERMEDIATE REPORT OF PROJECT ACTIVITIES IN YEAR 1

a) July 2023 training workshops in Lombok

The workshop report highlighted the successes of the selected training approaches. Dr. Mark Wells summarized the Planktoscope training led by Mr. Adam Larson (Prakash Stanford Laboratory). Dr. Shion Takemura reviewed training in using the FishGIS and HydroColor smartphone applications. Dr. Charles Trick and Dr. Naoki Tojo described fisheries sustainability/management training. One problematic issue that came up was that many individuals had difficulty operating the HydroColor application, which was not the experience at the January 2023 workshop. Dr. Wells will contact Dr. Thomas Leeuw (HydroColor application developer) to ask about whether there was a version update, as permissions do not seem to be working.

b) Data collection (Phytoplankton, HyroColor, Fish images) in Indonesia

Dr. Sachoemar presented results of data collection in Indonesia. The current plan is to establish a link between PICES, the National Research and Innovation Agency of Indonesia (BRIN) and the Institute of Technology of Indonesia (ITI), but there are other universities, local governments and NGOs who are interested in the FishPhytO project. These other potential partners might be able to join in data collection/submission, but this is beyond the scope of the project. They could though participate with their own budget, and we would be working only in an advisory role. Dr. Sachoemar has already accepted a proposal to BRIN to support sampling, education, and mitigation efforts. The proposal would use Planktoscope on East Borneo (Mulawarman University), on Seribu Island (local government), and on Belitung Island (local government). The field sampling began in Belitung in September 2023, with the next planned visits to Lampung Bay, Seribu Island, and Lembeh Strait to demonstrate the use of the Planktoscope. Two biology students at ITI worked with the Planktoscope from April to June 2023 for their thesis. They already submitted a manuscript for publication, and a second paper will be submitted shortly (both to Indonesian journals). Ichthyology students at the University of Mataram (Lombok), plan to use the FishGIS application to collect fish data in Mataram after mid-semester exams. PST members were unanimous in agreeing that we need to develop and implement a help strategy for users of our tools in Indonesia. These strategies should run through Mr. Arief Rachman (BRIN), who will be working directly with the Stanford Laboratory when Planktoscope issues arise. The PST should also look into setting up a series of lectures with Mataram students on use of the FishGIS application, environmental sampling, and fisheries sustainability.

c) Update on smartphone applications

Dr. Takemura pointed out that a new version of the FishGIS application was released from Apple Store and Google Play on October 17, 2023, and reviewed the most recent updates to the application, which include: (1) an option to choose the application language among English, Indonesian-bahasa, Chinese, Japanese, Korean, and Russian (multilingualization of the application is essential for deploying this tool in PICES member countries), (2) a reporting function enabling users to select image size from high- to medium- to low-resolution (the later is needed to lower costs for image transmission and/or in weak cellphone coverage zones), and (3) a reporting function allowing users to add comments to the image file. He expressed special thanks to Dr. Vladimir Kulik, Moonho Son and Pengbin Wang for support with translation to their native languages. It was also indicated that work is in progress on updating an account authorization function for PC management page (Dashboard). This effort is expected to be completed in November 2023.

Dr. Takemura reported an increase in the number of observations submitted to the database (more than 500 reports in the first six months of Year 1), and that datasets can be now downloaded as CSV files. This change will facilitate data analyses by government officers, managers, students and community members. Programs for data analysis are readily available on the web, so it is possible for students to conduct their own projects using the database. We would ask that students upload data they have collected to the fisheries database to ensure that it is retained.

Sorting fish images is difficult, and an important issue here is the identification of species using local names, for which Dr. Sachoemar's help is required. Dr. Tojo is working with Dr. Takemura to refine the segmentation approach in the FishGIS application, and there are also plans to write a concept paper about using community-based science to generate fisheries data. On a broader perspective, Dr. Takemura has done outreach in Japan about the FishGIS and HydroColor applications, and there have been enquiries from the Fisheries Research and Education Agency, Mizuho Bank, and Prefectural Research Institutes, all reflecting diverse needs which could be supported by these smartphone applications. Thus, it might be useful to consider the data policy for paid distribution of the FishGIS application (see item 7 below).

There were questions raised about who will have access to which data with the current database structure. This topic will need clarification moving forward given that the FishPhytO project will be adding more data. Is there a need to limit data access to non-Indonesian government users (communities, foreign interests)? How might this be structured?

After discussion ending, the PST was reminded that a catalog for the FishGIS smartphone application for collecting coastal fisheries and environmental information developed during the Ciguatera project was published in September 2023 and could be downloaded from the project website and from the website of the Japan International Research Center for Agricultural Sciences (JIRCAS).

4. SUMMARY REPORT ON THE PROJECT BUDGET

Dr. Alexander Bychkov provided a summary of the Year 1 budget, showing the expenditures to date and the funds remaining ($23,388, or $17,797 if we are to cover expenses for the Stanford Laboratory). The central message was that, most likely, there is insufficient funding to organize another training workshop of the same scale as in July by the Year 1 end. There was discussion about whether to have a smaller, more focused workshop in February–March 2024, or to enquire MAFF/JFA about the possibility of holding these funds over until Year 2 and to conduct a larger workshop in April–May 2024. It was decided to request permission to roll over a portion of the Year 1 budget to Year 2.

5. RELATED INFORMATION TO THE PROJECT (BY VIRTUAL PARTICIPANTS FROM KOREA AND RUSSIA)

There were no additional inputs to the project from Russia or Korea.

6. WORKPLAN FOR THE REST OF YEAR 1 AND YEAR 2

The specific plans for the remaining months in Year 1 depend largely on the outcome of the funding enquiry to MAFF/JFA whether a portion of the Year 1 budget could be rolled over to Year 2. Thus, the discussion instead centered on more general strategies/approaches for moving forward. It was decided that the focus be on University of Mataram students and faculty who would be interested in collaborating in the project or in using the FishGIS application and Planktoscope for related projects. There was question about whether we might also invite government officials and NGOs who wish to participate by using these tools, including perhaps those identified by Dr. Sachoemar (see item 3b) on East Borneo (Mulawarman University), on Seribu Island (local government), and on Belitung Island (local government), assuming they will join at their own expense. It was suggested to consider conducting a one-day workshop in Mataram (at the University?) which could be joined easily by local participants, and then, perhaps, work more individually with interested groups to design their projects. It was clear that the next training workshop has to demonstrate how the information is going to be used (that is, data analysis and interpretation). It may be possible to do some of this as on-line training before or after the workshop.

7. DISCUSSION ON DATA POLICY AND SMARTPHONE APPLICATION USE BY OTHER ORGANIZATIONS

As noted in Item 3c, there have been enquiries from commercial and research enterprises about the potential use the FishGIS application in their projects. We currently lack a data policy to deal with this encouraging development. Dr. Takemura presented three potential options that could be applied in different situations:

(A) Allow for free distribution and use of the application, with collected data being stored in a database managed by PICES. This option was envisioned for other researchers (*e.g.*, Universities, NGOs) gathering environmental data for scientific reports and publications. PICES would retain access to the reported data and use these data with the consent of the reporter.

(B) Create a paid distribution option, where users collect and store data in a database independent of PICES. In this case, the PICES data policy would need to be revised to state that PICES would not have access to the collected data.

(C) Allow GFL (Green Front Laboratory) to develop enterprise versions of the application, designed for specific uses by primarily government or commercial entities. In this case, PICES would not have access to the collected data. This option also would require modifications to the PICES data policy.

It was noted by PST members that funding support will be needed to maintain and update versions of the FishGIS application after the MAFF project is completed. Charging user fees for the application would limit its use by researchers in developing nations, and perhaps NGO's, but modest user fees would not be problematic for commercial and government enterprises. It was decided to explore more options A and C, given that GFL would be the natural provider for application maintenance and database operation. A fee structure will need to be developed that is graded for different users (*e.g.*, commercial vs. governments in developing nations).

8. CLOSING

In closing, it was decided to schedule an online PST meeting in late November/early December. By that time, we should know the remaining Year 1 funds and whether a portion of the Year 1 budget could be

rolled over to Year 2. This information will enable us to determine the timing and structure of the next training workshop in Lombok.

Appendix 1

Second Project Science Team meeting participants

<u>Members</u>

Daisuke Ambe (Japan, representing TCODE)
Mitsutaku Makino (Co-Chair; Japan, representing HD)
Shion Takemura (Japan, representing HD)
Naoki Tojo (Japan, representing FIS)
Vera Trainer (USA, representing MEQ; only in the afternoon)
Charles Trick (Canada, representing MEQ)
Pengbin Wang (China, representing MEQ)
Mark Wells (Co-Chair; USA, representing MEQ)
Alexander Bychkov (PICES, *ex-officio*)

<u>Members (remotely)</u>

Moonho Son (Korea, representing MEQ; only afternoon)

<u>Other</u>

Yutaka Hiroe (MAFF/JFA, Japan)
Suhendar I Sachoemar (BRIN and ITI, Indonesia)
Ruo Yu (SIO, Ministry of Natural Resources, China

Appendix 2

Second Project Science Team meeting agenda

Friday, October 20, 2023 (09:00 – 17:30)
St. Helens Room at the Westin Hotel, Seattle, USA

1. Welcome remarks, introductions, adoption of the agenda and nomination of the rapporteur
2. Report of the last MAFF project (Ciguatera) and introduction to this project (FishPhytO)
3. Intermediate report of project activities in Year 1
   a) July 2023 training workshops in Lombok
   b) Data collection (Phytoplankton, HyroColor, Fish images) in Indonesia
   c) Update on smartphone applications
   d) Others (Project Design Matrix, etc.)
4. Summary report on the project budget
5. Related information to the project (by virtual participants from Korea and Russia)
6. Workplan for the rest of Year 1 and Year 2
7. Discussion on data policy and smartphone application use by other organizations
8. Closing