



Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

Third Expert Workshop on the Pilot Project of SEAGOOS on the Monsoon Onsets Monitoring and its Social and Ecosystem Impacts (MOMSEI)

Manila, Philippines

25-27 November 2009

**Third Expert Workshop on the Pilot Project of
SEAGOOS on the Monsoon Onset Monitoring
and its Social and Ecosystem Impacts
(MOMSEI)**

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**UNESCO/IOC SUB-COMMISSION FOR THE WESTERN PACIFIC
(WESTPAC)**

**Third Expert Workshop on the Pilot Project of SEAGOOS on the Monsoon Onset
Monitoring and its Social and Ecosystem Impacts (MOMSEI)**

Manila, Philippines, 25-27 November 2009

Summary Report

1. OPENING

1. The Third Expert Workshop of the IOC Sub-Commission for the Western Pacific (WESTPAC) on the Pilot Project of SEAGOOS on the Monsoon Onset Monitoring and its Social & Ecosystem Impacts (MOMSEI) began in the Philippines International Convention Center, Manila, at 0900 on 25 November 2009 in conjunction with the East Asian Seas Congress 2009. The workshop was organized by the IOC Regional Secretariat for the Western Pacific (WESTPAC Secretariat) in collaboration with the First Institute of Oceanography, State Oceanic Administration of China. Dr. Somkiat Khokiattiwong from Phuket Marine Biological Center was nominated as the Chairman for the workshop in his capacity as SEAGOOS Coordinator.
2. Dr. Somkiat Khokiattiwong opened the meeting by welcoming all participants to this workshop and extended his special thanks to the First Institute of Oceanography for the financial support provided and Mr. Wenxi Zhu, Head of WESTPAC Secretariat for organizing this meeting. He also expected substantial agreement could be reached from this workshop and more support could be gained in the implementation of MOMSEI project. He finally hoped MOMSEI could be developed as the most successful pilot project of SEAGOOS.
3. On behalf of the IOC Sub-Commission for the Western Pacific (WESTPAC), Mr. Wenxi Zhu, Head of WESTPAC Secretariat, highlighted the outcomes generated from the Second Expert Workshop on MOMSEI in Qingdao, 8-9 August 2009 which refined the collaborative framework for implementing the MOMSEI in the years to come. He further emphasized it was mainly due to the scientific and social significance that MOMSEI provoked wide interests and support from participating countries. In this regard, he thanked the FIO for the kind support provided to this meeting to make this workshop possible, Dr. Weidong Yu, MOMSEI Project Leader and Dr. Somkiat Khokiattiwong, SEAGOOS Coordinator in promoting this pilot project. Finally he stressed the need for each participating country to continuously contribute their expertise and resources available to ensure the success of this project.
4. Dr. Weidong YU from the First Institute of Oceanography (FIO), SOA of China, commended all experts on their efficient work and the spirit of cooperation shown over the past workshops. He highlighted the timeliness of this meeting to address all important issues as reflected in its agenda prior to the official implementation of MOMSEI over the next year. Finally he expressed his appreciation, in his capacity as MOMSEI Project Leader, to all for their hard work done over the past and expected the enthusiasm could be continuously maintained in the future MOMSEI development.

2. SELF-INTRODUCTION OF PARTICIPANTS

5. All participants were invited to give a self introduction to the meeting. The list of participants is attached as Annex II to this report.

3. ADOPTION OF THE AGENDA

6. The Chairperson introduced the tentative agenda prepared by the WESTPAC Secretariat and invited participants to provide comments on it.
7. **The meeting adopted** the Agenda without any modification, which is attached as Annex I to this report.

4. BRIEF REVIEW ON THE MAJOR OUTCOMES FROM THE SECOND EXPERT WORKSHOP IN AUGUST 2009

8. In order to facilitate the ensuing discussion, Mr. Wenxi Zhu briefed the meeting on the following major outcomes generated from the second expert workshop in August 2009 co-organized in the First Institute of Oceanography, including:

- Development of MOMSEI Science Plan

9. *The meeting highly appreciated the science plan prepared by Dr. Weidong Yu and expressed their support for this project and their interest in participation. Extensive discussion was also made on the long term vision, expected outputs, and so on.*

10. **Action 1.** *The meeting invited Dr. Weidong Yu, in close collaboration with Dr. Khokiattiwong to further revise the Science Plan with due considerations to the discussions made and inputs provided, and submit it to the Third Expert Workshop of MOMSEI which was scheduled for 25-26 November 2009 in Manila, Philippines.*

11. *To ensure the high quality of the science plan to be published, the meeting recognized the urgent need for each participating country to provide relevant information if any, covering i) influence of monsoon; ii) relevant research interest; iii) linkage between MOMSEI and national research.*

12. **Action 2.** *The meeting invited Dr. Yu to communicate, together with some guidance for in the response, with each participant for their inputs for the above mentioned questions, and encouraged all experts to submit that information no later than the timeline required.*

13. *The meeting emphasized the importance of building capacity of young scientists in the member states and would explore various possibilities to maximize the benefit of this project.*

14. **Action 3.** *The meeting invited Dr. Yu, Mr. Zhu, and Dr. Khokiattiwong to keep close communication with interested member states on the organization of the annual summer school in 2010 and circulate the information as widely as possible.*

- Implementation of the first MOMSEI cruise in 2010

15. *The first cruise of MOMSEI in April 2010 was primarily based on the bilateral collaboration between FIO and PMBC with one moored buoy to be deployed in the Andaman Sea. Other MOMSEI participants can share the in situ data from the cruise and the moored buoy and join in the post-cruise study.*

16. *The following-on cruises in the Bay of Bengal and tropical eastern Indian Ocean, expected to be organized in 2011, will be implemented on the basis of multi-nation participation.*
- *Cooperation and Cooperation with other Relevant Projects*
17. *The meeting invited all participants to advertise this MOMSEI and help establish links with other on-going relevant international/regional programmes.*
18. **Action 4.** *The meeting invited Dr. Yu to seek for the endorsement from CLIVAR, Prof. Tangang to consider the inclusion of MOMSEI outcomes in the IPCC AR5 if possible, and Dr. Khokiattiwong to disseminate the MOMSEI information at various occasions of Global Ocean Observing System (GOOS).*
- *Scientific Steering Group and its Terms of Reference*
19. *The meeting recognized the need to establish the SSG for MOMSEI, which is responsible to provide scientific guidance on the planning, implementing of this project.*
20. **Action 5.** *The meeting agreed to form the SSG, ideally at the 3rd expert workshop, mainly based on the present experts and those to be nominated later. The meeting further invited Dr. Yu, Mr. Zhu and Dr. Khokiattiwong to prepare the Terms of Reference for this SSG and submit it to the Third Expert Workshop for adoption.*
- *MOMSEI Project Office and its Terms of Reference*
21. *In view of the pure coordination nature of the project office, it was decided that no specific TOR was needed for this office.*
22. **Action 6.** *The meeting invited Mr. Zhu to set up the MOMSEI project office in 2010 within the WESTPAC secretariat, with manpower support from the participating countries.*
- *Contribution of MOMSEI to the 50th Anniversary of IOC*
23. **Action 7.** *The meeting decided to contribute to the 50th Anniversary of IOC through publishing the MOMSEI science plan in 2010, carrying out the first MOMSEI cruise in 2010, and holding one workshop in the end of 2010.*
- *Status Report on the Regional Ocean Observing System*
24. *The meeting emphasized that the status report would be of help in the identification of the gap between the present observing capability and the social, economic, as well as environmental protection needs of the region. It would be also serving as base line for the future development of SEAGOOS pilot project.*
25. **Action 8.** *The meeting decided to start the preparation of this status report as soon as possible, and invited Mr. Adi and Dr. Khokiattiwong to lead the efforts in preparing one user-friendly template and communicate with member states for their inputs. The meeting also encouraged the experts to identify the most suitable experts in their respective countries to join the preparations.*

- Third Expert Workshop of MOMSEI

26. *Action 9. It was agreed that the major agenda for the Third Expert Workshop of MOMSEI would cover: i. the establishment of SSG and adoption of its ToR; ii. the review of the progress made since the Second Expert Workshop; iii. the adoption of MOMSEI Science Plan; iv. the progress on the Status Report on the Regional Ocean Observing System.*

5. PROGRESS MADE SINCE THE SECOND EXPERT WORKSHOP IN AUGUST 2009

27. The meeting reviewed the progress made since the Second Expert Workshop in August 2009, mainly on the following agenda items.

5.1 MOMSEI Science Plan

28. Dr. Weidong Yu, MOMSEI Project Leader, was invited to present the revised MOMSEI Science Plan, which covers scientific background, scientific focus, social and ecosystem application and implementation strategy with due consideration to the suggestions made at the Second Expert Workshop in August 2009.
29. Dr. Yu introduced the scientific background of MOMSEI by referring to the heavy rainfall brought about by Asia Monsoon. He analyzed the onset, seasonal cycle, intra-seasonal, and inter-annual variability of Asia Monsoon, emphasized the role of ocean for prediction of the Asian Monsoon as this climate phenomena evidently were coupled with ocean thermodynamics and hydrodynamics, and stressed the need to fill in the observation gaps in SEAGOOS region, particularly over Andaman Sea and Bay of Bengal in synergy with the on-going observation efforts in the Indo-Pacific region.
30. The role of ocean-atmosphere interaction for monsoon onset was identified as scientific focus in consideration of poor knowledge on the process responsible for the earliest onset at regional scale over Bay of Bengal (BoB) and its vicinity where it was enumerated, through Atmosphere General Circulation Model (AGCM) and observation evidence from the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA), that SST warming played a major role to trigger the onset.
31. He further explained that MOMSEI will demonstrate the value of observations to the social and ecosystem application since the monsoon onset time changes from year to year, the inter-annual variability would have potential effects on the society, by causing the flooding/drought disasters, and on the local ecosystem, especially the coral reef. He also illustrated the coral reef bleaching in the Andaman Sea, which normally occurs in the local hot season, roughly during March and April if the ocean water temperature exceeds 30.5°C and this temperature lasts for over two weeks. However, little research is devoted to explore the linkage between the monsoon onset and the coral reef bleaching.
32. Dr. Yu further outlined the process study on the monsoon onset as the core activity of MOMSEI project to identify the linkage between the SST maximum and the northward propagating ISO. To this end, cruises were proposed to be carried out simultaneously in Bay of Bengal and the equatorial eastern Indian Ocean. To complement the process study, two long-term monitoring buoys were proposed to be deployed under MOMSEI, which would help monitor the monsoon onset in real time and help assess the monsoon impacts on the society and

ecosystem. It was also suggested that some scientifically critical sites be selected, one in the north of Bay of Bengal and the other in the Andaman Sea.

33. The revised Science Plan prompted extensive discussion in term of the long term vision, scope of work to be covered and detailed activities to be implemented.
34. Mr. Wenxi Zhu commented that, apart from the short-term objectives provided, a long term vision for MOMSEI be identified to guide the constant development of MOMSEI over next five years or longer. He also pointed out the need for participating experts to provide more illustrative information on the impacts of monsoon in their countries, including the social and ecosystem loss in quantity or specific cases, to be incorporated into the science plan
35. Dr. Tan Chun Knee from the United Nations University and Prof. Fredolin Tangang from Malaysia suggested the inclusion of Winter Monsoon into the Science Plan in view of the impact by prevailing Winter Monsoon in some South East Asian countries, like Malaysia, Indonesia and Philippines.
36. Ms. Khin Cho Cho Shein from Myanmar shared the experience gained in her country on summer monsoon onset. It was observed that summer monsoon onsets were normally accompanied with storms over the Arabian Sea, Bay of Bengal or South China Sea for strong advancing in April and May. She further explained that cyclonic storms formed over the last consecutive year from 2006-2009 in the monsoon time as a result of the increasing sea surface temperature. She also sought clarifications on the exact deployment location of the buoy proposed to be deployed in the north of BoB to monitor the monsoon onset in real time, and stressed the need for MOMSEI to go through their internal approval procedures prior to the deployment expected in 2011.
37. Dr. Tan from UNU emphasized the importance of the active involvement of Myanmar in the MOMSEI project by explaining the close link of high fishery productivity in the northern Malacca strait and Bay of Bengal with upwelling system there driven by winter monsoon. He also suggested impact study on ecosystem would probably focus on coral reef at the beginning, rather than all ecosystems. In response, Dr. Somkiat clarified that the impact study on other ecosystems, to which the planned Monsoon onset monitoring could provide scientific inputs, could be also incorporated as MOMSEI would be implemented with focus on coral at the beginning of the project implementation.
38. **The meeting highly appreciated** the efforts made by Dr. Weidong Yu in having revised the Science plan over the short time, **and suggested** the inclusion of long time vision as one separate chapter in MOMSEI Science plan, in which winter monsoon onset could be given due considerations. **It was also suggested** that, mainly due to the current poor understanding on the mechanism of winter monsoon, a staged approach be adopted in the development of MOMSEI Science plan to addressing the winter monsoon.
39. **The meeting invited** Dr. Weidong Yu to continuously lead the efforts in further revising the MOMSEI Science Plan and making it available for print by the end of February 2010 with suggestions received from the meeting, and illustrative data, information and diagram, etc to be further collected by all experts on the impact of Monsoon in their respective country.
40. **The meeting considered** the need to start the consultation, as early as possible, with relevant agencies in Myanmar on the deployment of the second buoy which was proposed to be

deployed in the Bay of Bengal with full consideration to the north BOB being the optimum observation site for monsoon onset.

41. **The meeting invited** Ms. Khin Cho Cho Shein to further explain to her agency and other relevant agencies the scientific and social significance of MOMSEI, **and suggested** some missions or visits to Myanmar be conducted by Mr. Wenxi Zhu, Dr. Weidong Yu and Somkiat in order to further exchange the views on the MOMSEI and facilitate the approval of Myanmar authorities on the buoy deployment in accordance with their relevant laws and regulations.

5.2 MOMSEI Steering Scientific Group and its Terms of Reference

42. Mr. Wenxi Zhu introduced this agenda item by stressing the need for the establishment of one Scientific Steering Group and outlining the drafted Term of Reference for this Group.
43. He introduced that the MOMSEI Scientific Steering Group (SSG) should take overall responsibility to provide scientific guidance for the planning and implementation of MOMSEI with specific tasks to: i. provide scientific guidance for and formulate the MOMSEI Science Plan; ii. provide suggestions on and help coordinate the implementation of MOMSEI, iii, establish scientific liaison with relevant organizations and existing programmes, as appropriate, and iv. form, if deemed necessary, task force to address specific issues raised by the Group or other relevant organizations and programmes;
44. He also emphasized that, to ensure the high scientific quality of this group, the SSG is an open ended working group, consisting of well-known experts on monsoon study or relevant fields in the region, who are recommended by either IOC National Focal Point in Western Pacific or other scientific communities within and outside Western Pacific region.
45. Inquiries were made on the number of members of the Group, national representation in this Group, and nomination procedures. In response, Mr. Wenxi Zhu further explained that the Group is open ended one; open to those well known experts who are capable and willing to volunteer their time for this project. He also reminded the meeting of the pure scientific nature of this group when experts will be recommended either from their National IOC focal point or from other scientific communities.
46. **The meeting recognized** the urgent need for the establishment of this Scientific Steering Committee **and adopted** the proposed Term of Reference which is attached as Annex III to this report.
47. **The meeting endorsed** the experts recommended as initial members of this SSG, Dr. Weidong Yu from FIO, China, Prof. Fredoline Tangang from National University of Malaysia, and Dr. Somkiat from the Phuket Marine Biological Center of Thailand, and invite Dr. Mike, Ms. Khin Cho Cho Shin to communicate to WESTPAC Secretariat within one week the name of recommended experts after necessary consultations to be made with their IOC national focal points or experts interested.
48. **The meeting further encouraged** the Group to conduct their work as soon as possible, mainly through correspondence, particularly taking into the consideration the immediate task to finalize the MOMSEI Science Plan by the end of February, 2010

5.3 Establishment of Project Office

49. Mr. Wenxi Zhu briefed the meeting of the WESTPAC Secretariat which has been generously hosted by the Department of Marine and Coastal Resources of Thailand. He informed that the Secretariat was recently moved into new office with enough space provided to accommodate MOMSEI project office. He also expressed the hope, in view of his current overloaded work, that experts were expected to be seconded, as soon as possible, to this project office, coordinating the MOMSEI project implementation on a daily basis, including organizing meeting, communicating with participating countries, outreach activities, under the direct supervision of the Head of WESTPAC Secretariat in close consultation with MOMSEI Project Leader and SEAGOOS Coordinator.
50. The strong need was voiced on the establishment of MOMSEI Project Office within WESTPAC Secretariat in considerations of extremely busy workplan to be fulfilled over the near year. Various possibilities were explored and experience was also shared on the establishment of internship for this project to mobilize more manpower for this project.
51. **The meeting finally decided**, with appreciations to the Government of Thailand, to establish the MOMSEI Project Office within the WESTPAC Secretariat. **The meeting also welcomed** the two experts seconded early next year by the Phuket Marine Biological Center of Thailand and the First Institute of Oceanography of China to this office at the initial stage of MOMSEI Implementation.

5.4 Preparation of Joint Cruise, Summer School and other Matters

52. Dr. Somkiat informed the meeting with regret that the first originally planned MOMSEI joint cruise with buoy deployment over the Andaman Sea in April 2010 has to be postponed till November 2010 as a result of lack of adequate time to go through the internal approval procedures of Thailand. In this regards, the focus of this cruise will be modified on oceanographic survey only during March or April in order to provide oceanographic background for the buoy deployment expected in November of 2010.
53. He further added this joint cruise would also provide opportunity of Training-through-cruise to the young scientists who were expected to get involved in MOMSEI after the cruise. He reiterated the support of his institute in providing the research vessel and ship time and would seek the ship time of the research vessels in other organizations as an alternative in case their own vessel would be in maintenance at that time. Dr. Weidong Yu also informed the meeting that his institute would provide the equipment needed for the first cruise in April 2010.
54. Extensive discussions were made on the timing, geographic coverage and parameters to be observed, as well as logistic arrangements on the first cruise, number of young scientists to be accommodated for the training-through-cruise, and the need to start the consultation with Myanmar authority for their considerations on the deployment of second buoy in the BOB expected in the year of 2011.
55. **The meeting took note of** the modification made on the first joint cruise in April 2010 from buoy deployment to oceanographic survey, **and appreciated** the generous support provided by PMBC and FIO in research vessel, ship time and necessary equipments.
56. **The meeting invited** Dr. Weidong Yu and Dr. Somkiat to finalize, by the end of December 2009, the detailed cruise plan together with the program for Training through Cruise, and submit them to WESTPAC Secretariat for wide distribution and selection of trainees.

57. **The meeting emphasized again** the need to conduct some visits by MOMSEI Group to Myanmar for exchanging views on the future deployment of buoy in the BoB in light of long time needed to seek the prior permission. Other possibilities for facilitating the considerations by Myanmar were also explored, such as the cooperation with UNDP/Bay of Bengal Large Marine Ecosystem Project (BOBLME) which was studying the impact of monsoon on fisheries with Myanmar as one of participating countries.
58. Dr. Weidong Yu briefed that his institute, FIO would organize one week MOMSEI Summer School in Qingdao, June or July, 2010 in collaboration with China Meteorological Service with various lecturers invited from China, US and Europe. The MOMSEI Summer School would focus on basic monsoon science, covering the MOMSEI scientific focus, ocean-atmospheric coupled modes, and monsoon impact on society and ecosystems. He encouraged all participants to nominate suitable young scientists to join this MOMSEI Summer School and expected the MOMSEI Summer School could be conducted on a regular basis and those trainees could play a major role in the MOMSEI implementation in near future.
59. The proposed MOMSEI Summer School generated great interests. Various inquiries were made in terms of the criterion of trainees and selection process. **The meeting recognized** the importance of building capacity of young scientist in the region and **further suggested** the inclusion of capacity building as an integral part of MOMSEI Science Plan. **The meeting invited** Dr. Weidong and Somkiat to provide more details on the MOMSEI Summer School in 2010 and submit the program to WESTPAC Secretariat for wide distribution.

5.5 Preparations of Status on the Regional Ocean Observing System

60. Mr. Tukul Rameyo Adi presented the progress made since the August 2009 on the preparations of one user-friendly template for the compilation of regional Ocean Observing Systems Status based on the experience of Indonesian Ocean Observing System (INAGOOS) and other similar efforts of Euro-GOOS and IOGOOS.
61. Concern was voiced on the difficulties of data sharing in the region and various suggestions were made to further develop the template to collect relevant information in a more friendly manner. In response, Mr. Wenxi Zhu explained that no data would be required to exchange in this process except for the information on the observing capability at national and regional level, which would be of help in the identification of the observing gaps and serving as baseline for the future development of pilot project.
62. Having reviewed the template as presented, **the meeting expressed** its appreciation to Dr. Adi for his hard work done in preparing and submitting the template to the meeting. **The meeting further invited** Dr. Adi and Somkiat to continue the efforts in the development of this template and submit it for considerations by the WESTPAC Panel/Working Group on ocean observations which is foreseen to be established at the 8th Session of WESTPAC in May 2011.

6. PRESENTATION BY INDIVIDUAL EXPERTS ON POSSIBLE LINKS AND/OR CONTRIBUTION TO MOMSEI ACTIVITIES

63. Bearing in mind the scientific background, scientific focus and implementation strategy of MOMSEI, various presentation were presented under this agenda item on the possible links of the activities within each participating country to the MOMSEI project.

64. Dr. Somkiat Khokiattiwong presented the impact of monsoon on the social and marine ecosystem in Thailand and Oceanographic phenomena in Andaman Sea/Indian Ocean related with monsoon onset processes. He also explored the links with MOMSEI by briefing the workshop on two on-going research projects entitled “Summer Monsoon Variability and Its Associated Extremes over Thailand” and “Characteristics of the Monsoon over Southeast Asia Associated with the Winter Cold Surge and the Summer Monsoon Onset and Break”. Finally he introduced the preparation status of Thailand for the MOMSEI Joint Cruise scheduled for April 2010.
65. Prof. Fredolin Tangang from Malaysia presented his recent preliminary result achieved on the “impacts of the Madden-Julian Oscillation (MJO) on the maritime continent’s rainfall”. He suggested the possible inclusion of relevant study on winter monsoon into the present MOMSEI project since Malaysia and other Southeast Asian Countries have been heavily impacted by MJO, one important component/phenomena of winter monsoon system. He further indicated the possible study in the future on the links between MJO and the SST warming over the Bay of Bengal, particularly at intra-seasonal scale.
66. Dr. Kee Alfian Abdul Adzis from Malaysia explored the possible collaborations between monsoon and studies in Malaysia, particularly on biological aspect by identifying the list of potential collaborators and their interests in the correlation of monsoon with coral bleaching, coral spotting, fisheries, seagrass, marine mammals and jellyfish outbreak. He also presented the possible contributions from Malaysia to MOMSEI Project through provision of data and information..
67. Ms. Htay Htay Mon from the Department of Marine Science, University of Mawlamyine of Myanmar, introduced the Status of Coral reef in Myanmar in Relation to Environmental Changes. She concluded that no coral bleaching has been reported or found in Myanmar, except serious impacts of fishing activities including exploding fishing and discarded fishing nets, and of increasing sedimentation on coral reef due to land erosion.
68. Dr. Michael Atrigenio emphasized the importance of MOMSEI project by presenting the monsoon induced extreme weather in Philippines. He also explored the collaboration with MOMSEI project after presenting one on-going governmentally funded multi-disiplinary project “the Integrated Coastal Evaluation Coastal Research Enhancement and Adaptive Management (ICE CREAM) Project: Adapting Wisely to a Changing Philippine Coastal Environment”.
69. Dr. Tan Chun Knee from the United Nation University introduced one research by NASA , showing the high chlorophyll bloom, together with Sea Surface Temperature decrease, leads to a high fisheries productivity in the Arabian Sea over last more than ten years. He further attributed this chlorophyll increase to the strong upwelling directly driven by summer monsoon. The research also showed the link between the decreased snow cover in Himalaya and the intensity of monsoons. He finally raised one issue in the northern Malacca Strait, one traditionally high productivity area, where the concentration of chlorophyll a in December 2008 got increased two times higher than December 1997, and expected this project could generate great social impact if some scientific results could be provided on this phenomenon and its possible links with monsoon.
70. Mr. Tukul Rameyo Adi, Research Center for Maritime Territory and Non-Living Resources Agency for Marine & Fisheries Research Ministry of Marine Affairs and Fisheries, Indonesia, expressed the willingness of Indonesia to join the MOMSEI project through highlighting the negative impacts generated by monsoon on his countries. He introduced the

current of efforts of Indonesia to monitoring the monsoon in order to provide a more accurate forecasting of monsoon.

7. WORKPLAN AND BUDGET IMPLICATIONS FOR 2010-2011 INCLUSIVE

71. The Chairperson summarized the main outcomes generated and timeline agreed upon at this meeting, covering the finalization of MOMSEI Science plan, adoption of the Terms of Reference for the MOMSEI Scientific Steering Group, establishment of MOMSEI Scientific Steering Group, the establishment of MOMSEI Project Office, joint cruise in April 2010, MOMSEI summer school 2010 and the regional status on the ocean observing system. All details were reflected across previous agenda items.
72. Recognizing the success of MOMSEI largely relies on the implementation at national level, **the meeting expressed** its support to the suggestion made by Prof. Fredoline Tangang, Malaysia on catalyzing and integrating national efforts into the MOMSEI implementation through the development of National MOMSEI Science Plan in each participating country based on the regional MOMSEI Science plan. **The meeting agreed** to incorporate this suggestion into implementation strategy of MOMSEI Science Plan. **The meeting further encouraged** Mr. Wenxi Zhu to mobilize some “seed money” to support the development of national MOMSEI science plan. Once finalized, it would be of great help to concert the actions at national level and seek funding from national funding agencies to support the MOMSEI implementation.
73. Clarifications were further made on the integration of winter monsoon into the MOMSEI science plan. In view of poor understanding on the winter monsoon, **it was suggested** the MOMSEI Science Plan propose to identify key scientific issues associated with winter monsoon at next phase based on the available information on the impact of winter monsoon, and limited knowledge and observation efforts on Winter Monsoon.
74. In terms of budgetary implication associated with the workplan, **the meeting decided** to estimate it immediately after the workshop. Apart from in-cash contribution, **the meeting also stressed** the need to specify in-kind contribution to reflect the support from participating countries.

8. COORDINATION AND COOPERATION WITH OTHER ORGANIZATIONS AND PROGRAMMES

75. Recognizing the importance of cooperating with other organizations and programmes, **the meeting invited** Dr. Weidong Yu to seek the endorsement of CLIVAR Scientific Steering Group on the MOMSEI Science Plan, Dr. Somkiat to set links with IOGOOS, Mr. Wenxi Zhu to explore the cooperation with BOBLME. Besides, **the meeting encouraged** all experts to disseminate the MOMSEI at various international, regional and national occasions, such as Coral Triangle Initiative (CTI), Global Ocean Observing System (GOOS).
76. In response to the inquiry on the possible links with IPCC AR5, Prof. Fredoline Tangang, also serving as the vice chair of IPCC WG-1, clarified the working procedures of IPCC and hold the views that outcomes from MOMSEI could possibly be quoted in IPCC AP5 if it could be published before 2013, with particular considerations to the MONSOON being added as one new section in the outline of IPCC AR5 and few publication on ecosystem from this region.

9. OTHER MATTERS

77. The Chairman opened the floor for the suggestion on the venue and date of the Fourth Expert Workshop on MOMSEI. Prof. Fredoline Tangang from Malaysia expressed the willingness to host it in Malaysia.
78. **The meeting expressed** its appreciation to Prof. Fredoline and decided to accept the kind offer to host the next Expert Workshop in Malaysia in the Second Week of October, 2010.

10. CLOSURE

79. Mr. Wenxi Zhu, on behalf of WESTPAC, congratulated on the substantial outcomes achieved from this meeting which provided a clearer road map for the MOMSEI over the next year and years to come. He also thanked all participants for their expertise and the spirit of cooperation reflected across the two day discussions and looked forward to immediate action after the meeting.
80. Dr. Weidong Yu, MOMSEI Project Leader, commended the rapid progress made on MOMSEI since its inception in the March of this year. He also expected to see the success in the near future which could be probably reflected as the inclusion of some outcomes from MOMSEI into IPCC AR5. He finally reiterated the support from his institute, FIO to this project. Ms. Gao Lin from the State Oceanic Administration also expressed her willingness to seek the possible funding from her government in support of this project.
81. Prof. Fredoline Tangang thanked all experts to accept the offer of Malaysia to host the next workshop and expressed they will do their best to ensure the success of MOMSEI.
82. Dr. Somkiat, SEAGOOS Coordinator and Chairperson for this workshop reviewed with satisfaction the progress made over past two and a half years and expected the MOMSEI could be further developed as one core project of MOMSEI. He hoped the successful implementation of MOMSEI could grab more attention of member states to the SEAGOOS and expected more pilot projects could be developed and more support could be gained for SEAGOOS. He finally thanked the FIO, SOA for the financial support provided and WESTPAC Secretariat for organizing this meeting.
83. The workshop closed at 18:00, on Thursday, 26 November 2009.

ANNEX I

UNESCO/IOC SUB-COMMISSION FOR THE WESTERN PACIFIC (WESTPAC)

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 - 5.4 Preparation of Joint Cruise, Summer School and other Matters
 - 5.5 Preparations of the Status on the Regional Ocean Observing System
6. PRESENTATION BY INDIVIDUAL EXPERTS ON POSSIBLE LINKS AND/OR CONTRIBUTION TO MOMSEI ACTIVITIES
7. WORKPLAN AND BUDGET IMPLICATIONS FOR 2010-2011 INCLUSIVE,
8. COORDINATION AND COOPERATION WITH OTHER ORGANIZATIONS AND PROGRAMMES
9. OTHER MATTERS
10. CLOSURE

ANNEX II

UNESCO/IOC SUB-COMMISSION FOR THE WESTERN PACIFIC (WESTPAC)

**Third Expert Workshop on the Pilot Project of SEAGOOS on the Monsoon Onset
Monitoring and its Social and Ecosystem Impacts (MOMSEI)**

Manila, Philippines, 25-27 November 2009

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ANNEX III

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TERMS OF REFERENCE OF MOMSEI SCIENTIFIC STEERING GROUP

The MOMSEI Scientific Steering Group (SSG) takes overall responsibility to provide scientific guidance for the planning and implementation of MOMSEI in order to ensure the integration of the observation, modeling, and process study to produce effective interdisciplinary outcomes with a strong social dimension, which could be specified as:

- provide scientific guidance for and formulate the MOMSEI Science Plan;
- provide suggestions on and help coordinate the implementation of MOMSEI;
- establish scientific liaison with relevant organizations and existing programmes, as appropriate;
- form, if deemed necessary, task force to address specific issues raised by the Group or other relevant organizations and programmes;

The SSG is an open ended working group, consisting of well-known experts on monsoon study or relevant fields in the region, who are recommended by either IOC National Focal Point in Western Pacific or other scientific community to ensure high scientific quality.

ANNEX IV

WORKPLAN AND BUDGET FOR 2010

Project	Activities				Funding Required	Remark
	Activities	Objectives	Expected outputs	Data and place		
Monsoon Monitoring Onset and its Social & Ecosystem Impacts—Pilot Project of Southeast Asian Global Ocean Observing System (SEAGOOS)	1. joint cruise		Provide oceanographic background information for the buoy deployment	April 2010		
	2. Publication of MOMSEI Science Plan		MOMSEI Science Plan	May 2010		
	3. National MOMSEI Science Plan Development		National MOMSEI Science Plan			
	4. MOMSEI Summer School		Building capacity for young scientist on monsoon science	June-July 2010		
	5. Buoy Deployment over Andaman Sea			November 2010		
	6.					