WESTPAC-HAB

History of development of HAB science in WESTPAC region through international collaboration

Yasuwo Fukuyo
Leader of IOC/WESTPAC-HAB Project
Professor, Director
Asian Natural Environmental Science Center
The University of Tokyo

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History of development of HAB events and science

- **1960**: Establishment of IOC
  - Collaborative study in the region
- **1962**: Establishment of program group
- **1970**: Red tide/high N,P
  - PSP
- **1980**: DSP
  - PSP
- **1990**: PSP
  - PSP
- **2000**: Red tide/low N,P
  - Red tide/eutrophication
- **2010**: Various TC
  - LTC
HAB science occurred not only in Asia, but also all over the world almost same time.

Development of ISSHA-1

1974: 1st HAB Conference (1st International Conference on Toxic Dinoflagellate Blooms)
Boston, Massachusetts, USA

1978: 2nd HAB Conference (2nd International Conference on Toxic Dinoflagellate Blooms)
Key Biscayne, Florida, USA

1985: 3rd HAB Conference (3rd International Conference on Toxic Dinoflagellate Blooms)
New Brunswick, Canada

1989: 4th HAB Conference (4th International Conference on Toxic Marine Phytoplankton)
Lund, Sweden
Development of ISSHA-2

1991: 5th HAB Conference (5th International Conference on Toxic Marine Phytoplankton) New Port, Rhode Island, USA
1993: 6th HAB Conference (6th International Conference on Toxic Marine Phytoplankton) Nantes, France
1995: 7th HAB Conference (7th International Conference on Toxic Phytoplankton) Sendai, Japan
1997: 8th HAB Conference (8th International Conference on Harmful Algae) Vigo, Spain
2000: 9th HAB Conference (9th International Conference on Harmful Algal Blooms) Hobart, Australia
Development of ISSHA-2

2002: 10th HAB Conference (10th International Conference on *Harmful Algae*) Florida, USA
2004: 11th HAB Conference (11th International Conference on *Harmful Algae*) Cape Town, South Africa
2006: 12th HAB Conference (12th International Conference on *Harmful Algae*) Copenhagen, Denmark
2008: 13th HAB Conference (8th International Conference on *Harmful Algae*) Hong Kong, China
2010: 14th HAB Conference (9th International Conference on *Harmful Algae*) Crete, Greece
2012: 15th HAB Conference (15th International Conference on *Harmful Algae*) Changwon, Korea
WESTPAC and WESTPAC-HAB history -1
1946: Establishment of UNESCO,
1960: Establishment of IOC,
1962: 2nd GA of IOC; the first cooperative study on Kuroshio and Adjacent Areas was adopted as the first project implemented in the region,
1977: 10th GA of IOC; Program Group for WESTPAC was established,
1979: 1st Session of the IOC Program Group for WESTPAC (13 states, Tokyo)
1981: 2nd Session of the IOC Program Group for WESTPAC (12 states, Jakarta)
1983: 3rd Session of the IOC Program Group for WESTPAC (19 states, Townsville)
1985: Red tide workshop organized in WESTPAC
WESTPAC and WESTPAC-HAB history -2

1987: 4th Session of the IOC Program Group for WESTPAC (19 states, Townsville),
1989: IOC GA decided to establish Sub-Commission for WESTPAC to expand its activity with the Regional Secretariat,
1990: 1st Session of WESTPAC Sub-Commission (Hanzhou, China)
   Establishment of WESTPAC-HAB
   Leader: Tomotoshi Okaichi
1993: 2nd Session of WESTPAC Sub-Commission (Bangkok, Thailand)
   Designation of a new leader of WESTPAC-HAB
   Leader: Yasuwo Fukuyo
WESTPAC Office, Bangkok, Nov. 1994
WESTPAC history -4
1995: 1st WESTPAC-HAB Training course
   July at Kitasato U., Iwate, Japan w/ 24 inter. parti.
1996: 3rd Session of WESTPAC Sub-Commission
   (Tokyo, Japan)
1997: 2nd WESTPAC-HAB Training course
   February at U. Tokyo, Japan w/ 10 inter. parti.
1997: 3rd WESTPAC-HAB Training course
   August at U. Tokyo, Japan w/ 15 inter. parti
1998: 4th WESTPAC-HAB Training course
   August at Kitasato U., Iwate, Japan w/ 9 int. parti.
1999: 4th Session of WESTPAC Sub-Commission
   (Seoul, Korea)
2001: 5th WESTPAC-HAB Training course
   March at Chulalongkorn U., Bangkok, Thailand
   w/ 12 int. parti.
2002: 5th Session of WESTPAC Sub-Commission (Pars, Australia)
2002: 5th WESTPAC-HAB Training course
May at U. Philippines, Manila, Philippines w/ 10 int. parti.
2003: 6th WESTPAC-HAB Training course
March at U. Malaysia Sabah, Kota Kinabalu, Malaysia w/ 18 int. parti.
2004: 7th WESTPAC-HAB Training course
August at Nagasaki U., Nagasaki, Japan w/ 17 int. parti.
2005: 6th Session of WESTPAC Sub-Commission (Nha Trang, Vietnam)
2006: 8th WESTPAC-HAB Training course
August at UKM, Bangi, Malaysia w/ 20 int. parti.
WESTPAC history -5

2006: 9th WESTPAC-HAB Training course
August at Insti. Oceanography, Nha Trang, Vietnam w/ 12 int. parti.

2008: 7th Session of WESTPAC Sub-Commission
(Kota Kinabaru, Malaysia)

2010: 8th Session of WESTPAC Sub-Commission
(Bali, Indonesia)

2011: 1st WESTPAC-HAB and TMO Joint Training Workshop, March at Unimas, Kuchin, Malaysia w/ 10 int. parti.

2012: 2nd WESTPAC-HAB and TMO Joint Training Workshop, February at Insti. Oceanography, Nha Trang, Vietnam w/ 10 int. parti.

2012: 9th Session of WESTPAC Sub-Commission
(Busan, Korea)
2006: 9th WESTPAC-HAB Training course
August at Insti. Oceanography, Nha Trang, Vietnam w/ 10 int. parti.

2008: 7th Session of WESTPAC Sub-Commission (Kota Kinabalu, Malaysia)

2010: 8th Session of WESTPAC Sub-Commission (Bali, Indonesia)

2011: 1st WESTPAC-HAB and TMO Joint Training Workshop, March at Unimas, Kuchin, Malaysia w/ 10 int. parti.

2012: 2nd WESTPAC-HAB and TMO Joint Training Workshop, February at Insti. Oceanography, Nha Trang, Vietnam w/ 10 int. parti.

In addition to these international courses, we had many (>20) local training courses, seminars and workshops.

We also had many collaborative field and laboratory studies.

Number of publication made by members are more than 100.

Nha trang, Vietnam w/ 10 int. parti.
2012: 9th Session of WESTPAC Sub-Commission (Busan, Korea)
Efforts to build capacity in the region started from 1980s.

Principal: Increase colleagues working on HABs for our science and to save people

Training course, Workshop and seminar, Information exchange through network, Distribution of reference materials, Provision of teaching materials.

Collaborative field and laboratory study.
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- Workshop and seminar,
- Information exchange through network,
- Distribution of reference materials,
- Provision of teaching materials.

Collaborative field and laboratory study.

Various photos shows many faces of leading scientists of the region, and publications from the region.
The first publication on the regional HAB issues was from SEAFEC in 1985

PSP Poisoning cases from 1970s or earlier

Papua New Guinea: 1972-
Sabah, Malaysia: 1976-
Brunei Darussalam: 1976-
Indonesia: 1981-
Philippines: 1983-
Thailand: 1983-

Problems on HABs and lack of science were recognized commonly in the region.

Few phycologists in identification of HAB organisms
Few literatures on systematic and taxonomy
Lack of sophisticated machine such as SEM
Collaborative research in 1984 b/w Thailand and Japan on HAB occurred in the Gulf of Thailand in 1983

late Dr. Sutichai Tamiyavanich, M. Kodama, Y. Fukuyo and T. Ogata

Finding of a new toxic dinoflagellate first in the world
1984 Thailand, for preparation of 1st Training Course

Late Dr. Sudara Sulaphol, the local organizer of the TC
First Incubator in Thailand and culture of *A. tamiyavanichii*
Dr. Okaichi organized the First WESTPAC Training Workshop on Red Tide in 14-23 March 1985 at Chulalongkorn Univ., Bangkok.

It was before the establishment of WESTPAC sub-Commission and WESTPAC-HAB project.

Workshop
Lecturers: Tom Okaichi, Max Taylor, Don Anderson, Sudara Suraphol, Yas Fukuyo
Participants: >20 from 7 countries
Topics: taxonomy, ecology, physiology and toxicology
leader of HAB science in their home country
Participants of the Training Workshop
Dr. Tomotoshi Okaichi

1985
Training Workshop on *Pyrodinium* held in Brunei in 1989

Fig. 1. Toxic Indo-Pacific red tides, fish kills and paralytic shellfish poison (PSP). Numbers and dates in boxes refer to number of deaths/illnesses and time of first reported incidents. (Updated from Maclean 1989.)

Various types of HABs in Indo-Pacific
People started recognizing problems occurring in the region: HAB occurrence has relation to human activity.

aquaculture
eutrophication

Expansion of area affected by PSP in the Philippines
Parallel increase of red tide occurrences and yellow tail fish aquaculture.

Case can be reduced by ICAM

No data on red tide case number

Relationship b/w human activity and red tide in Japan
People recognized importance of science and management to mitigate HABs

Science on HA and its blooms (HABs)
  Taxonomy (species name, life cycle, etc.)
  Physiology (behavior on various environment)
  Ecology (bloom and expansion mechanism)

Management on HABs
  Mitigation technology
  Prevention techniques and concept

Two types of HABs (toxic plankton and red tide) needs completely different science and management.
History of development of HAB events and science

- **1960**
  - HABs in Japan
  - HABs in tropical Asia
  - WESTPAC-HAB
  - IOC-HAB
  - ISSHA
  - 1960 establishment of IOC
  - Collaborative study in the region

- **1970**
  - Red tide/high N,P
  - PSP
  - 1977 establishment of program group

- **1980**
  - DSP
  - PSP
  - 1985 1st TC

- **1990**
  - PSP

- **2000**
  - Red tide/low N,P
  - Red tide/eutrophication

- **2010**
  - TC
  - LTC
  - Establishment
  - 1991 Planning Mt
  - 1992 Establishment
  - 3rd Conf
  - 4th Conf
  - 5th Conf
  - 6th Conf
  - 7th Conf
  - 8th Conf
  - 9th Conf
  - 10th Conf
  - 11th Conf
  - 12th Conf
  - 13th Conf
  - 14th Conf
St. Pete Beach, Florida October 21 - 25 2002
IOC/UNESCO recognized the importance of HAB science and started its activity from 1991.

Global HAB program
- science component (GEOHAB)
- education component (training course)
- operation component (data base,

(WESTPAC started activity on HAB from 1980s)
Training course generating the global HAB program

2nd from right
Mr. Henrik Enevoldsen

HAB Training Course,
Kristinenberg, August 1990

Dr. Jacob Laresen
Third IOC-DANIDA HAB Training Course, Univ. of Copenhagen 15-26.7 1996