

**WORKSHOP ON FORECASTING EL NIÑO AND LA NIÑA IN  
INDOCHINA**

**Fortuna Hotel, Hanoi, Vietnam**

**January 21<sup>st</sup>-25<sup>th</sup>, 2002**

**Organized by the Indochina Global Change Network (IGCN)**

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## **Aim of project**

The aim of the training workshop on the development of seasonal climate forecasting for the Indochina region was to develop regional capacity with regard to short-term prediction of El Niño and La Niña impacts. The workshop covered the development and use of statistical and model-based forecasts of the effects of El Niño and La Niña on the climate of Southeast Asia.

Cambodia, Lao PDR and Vietnam are the core nations of the Indochina Global Change Network<sup>1</sup> and the workshop was designed to address the particular needs and experiences of these countries. A representative from Myanmar was also in attendance. The workshop drew on expertise in relevant areas from the United States (Glantz and Mason), Australia (Kininmonth and Stone) and the United Kingdom (Granich and Kelly) and peer-group experience from the Vietnamese participants. See list of participants in Appendix 1.

The workshop was also intended to promote collaboration within the Indochina region and with international groups and should strengthen regional capacity, particularly within the national meteorological services, to respond to global environmental change. The on-going project of which this workshop was a part is coordinated with regional initiatives such as that based at ASMC, Singapore, and with international programmes such as WMO CLIPS. The project complements and supports these programmes by providing training in the methods of short-term climate forecasting tailored to the specific needs, strengths and aspirations of the Indochina nations. Participants are then able to take full advantage of the opportunities afforded by these other programmes.

The workshop took place against the backdrop of the possible emergence of an El Niño event during 2002.

## **Workshop design**

Participants at the workshop *The Impact of El Niño and La Niña on Southeast Asia*, sponsored by APN and held in Hanoi, Vietnam, in February 2000, recommended that:

- monitoring of the state of the global climate system be ongoing in all countries of the region... and that extra effort be made to place the potential impact into a regional context;
- useful statistical forecasts be developed as a matter of urgency; and
- every effort be made to access, and gain the skills to interpret in the local context, the

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<sup>1</sup> The goal of the Indochina Global Change Network is to strengthen the scientific capacity of Cambodia, Lao PDR and Vietnam and hence the ability of these nations to respond to the threat posed by global environmental change and related hazards. Network activities include

dynamical predictions... that are now available.

It was also concluded that “there is a critical need to involve forecast users in the process of forecast development.” (The workshop report is available at <http://www.cru.uea.ac.uk/tiempo/annex/igcn/igcn2000.htm> and a copy was given to all participants.)

The proposal for the current training workshop was based on these recommendations which were then refined into specific goals during a series of consultations with regional and international stakeholders, including meetings in Cambodia and Lao PDR undertaken in February 2001 to review the particular situation in these countries.

The mission for the training workshop that emerged was: “to plan the development of practical seasonal forecasting systems for the nations of the Indochina region, Cambodia, Lao PDR and Vietnam, involving enhanced access to regional and international predictions and the implementation of a new statistical forecast scheme, supported by a regional forum for exchange of experience.”

Participants in the workshop consisted of those concerned with a) seasonal climate forecast production; b) forecast use; and c) related policy. The delegations from Cambodia and Lao PDR consisted of six individuals from each nation. Twenty scientists from Vietnam took part and one from Myanmar. Technical support was provided by five international advisors. The participants list is given in Appendix 1.

The training approach taken during the workshop was “training by doing”. The ultimate goal of the meeting was the development of concrete plans for action by individuals, at the national level and through regional cooperation, that would promote the development of seasonal forecasting capacity over the months after the workshop. This process is being supported by the team of international advisors. Follow-up support has been provided by NOAA for these activities.

The workshop agenda consisted of:

- an initial overview session, documenting the recent development of the science of El Niño and La Niña, which was attended by 80 scientists and policymakers;
- two working sessions during which forecast use then forecast requirements were discussed in detail by four teams;
- two formal training sessions, involving practical exercises, covering statistical forecasting and the interpretation of forecasts (particularly global model-based predictions); then,

- national activities for the coming months to a year were planned and follow-up support was organized in national and issue-based teams.

The full agenda is given in Appendix 2.

During the early stages of the workshop, three multinational teams with equal representation from each of the three core nations and a mix of forecasters and forecast users undertook a series of tasks during the first working sessions. Myanmar was represented in one team. A fourth team was composed of the remaining Vietnamese participants who undertook the same tasks and shared their more extensive experience with the other nations. Peer-group training was an important element of the workshop design. Each team was supported by an international advisor, with consultation with other experts available as required. During the final stages, the participants broke into national teams, then into two working groups to discuss particular issues (plans for forecast production in a forecasters' group and raising public awareness and strengthening government support in another).

A key feature of the workshop was the considerable time devoted to small group work, facilitated by regional experts and the international advisors. For example, in the session on forecast user needs that began the workshop, the four teams worked through a series of tasks, individually then as a group, that led to the definition of the "ideal" forecast they would like to receive. Planning national activities began with a SWOT analysis, to define national Strengths, Weaknesses, Opportunities and Threats in support of the effective identification of priorities. The key tasks that formed the basis of these highly interactive sessions are presented in Appendix 3. Each working session ended with a plenary report-back and discussion and the results were carried forward to the next session.

This format for the workshop was intended to complement the more formal training programmes that are increasingly becoming available. It proved highly successful (see later section on the workshop evaluation), not only in terms of the training goals, permitting a flexible, discursive learning experience, but also in enabling one-to-one interaction in depth between participants. It also resulted in and permitted some modification of the training content of the workshop as specific needs and issues arose. The commitment, sensitivity and creativity of the team of international advisors provided essential support for this workshop structure, as did the enthusiastic involvement of all the workshop participants.

### **Major areas for action**

Towards the end of the workshop, building on previous discussion, each national team identified five areas for action that would result in a strengthening of seasonal forecast capacity. There were many elements in common and the following list synthesizes the results.

- Develop forecasting techniques

The workshop identified three timeframes as a context for activities: first, *past and present* which focuses on the use of the climate data for the region as a means of identifying past climate impacts of El Niño and La Niña and of monitoring on-going trends; second, *long-term* (3 months to a year) which involves the use of forecasts available from the international community of the emergence, development and decay of these events; and, third, *medium-term* (month to a season) within which statistical forecast methods can be developed at the national level, often based on persistence, continuity and lag effects between regions, to provide predictions of local impacts.

- Strengthen national and regional capacity

The development of the considerable human resource of the Indochina region is essential if forecast capacity is to be improved. This applies in all aspects of forecast endeavour, whether it be production or use. Training must be a high priority. This effort must be supported by adequate resourcing in terms of technical needs, communications, staffing and funding. The institutional structures that support the production and application of seasonal climate forecasts must also be effective.

- Strengthen government support and improve public awareness

Government support for the development of seasonal forecasting capacity is variable across the region. Consistent and committed government support is essential if the scientists and institutions involved in this effort are to be appropriately resourced. Often, the immediate gains of weather prediction take priority over the less frequent, but at times considerable, benefits of climate prediction. Equally, public awareness of the significance of climate forecasts and response measures is critical if the full benefits are to be realized. The experience of Vietnam in raising public and government awareness of El Niño and La Niña over the past 10 to 15 years provided many ideas for activities elsewhere in the region. The development of national action plans was put forward as an essential step in coordinating the response to El Niño and La Niña.

- Regional and international cooperation

The review of regional strengths highlighted the fact that, though weaknesses may exist in some nations, they can often be met by strengths in others, pointing towards regional cooperation as an important means of strengthening regional capacity. The international advisors emphasized the benefits to be gained from increased interaction with the wider community, not only through participation in formal scientific programmes but also through informal contact, by email for example, with individual scientists. Science is a global community and it is not necessary to know a fellow scientist personally before making contact and asking for information or advice. Most scientists will be pleased to provide assistance and learn of the work of others.

### **Future activities**

One major outcome of the workshop was the identification of follow-up activities that participants would take on in the months immediately following the meeting. These activities would be practical, with realistic goals. They would be based on existing strengths and resources, consistent with national needs, and draw on support from the region and internationally through the Indochina Global Change Network. Each participant was asked to identify five tasks that they considered could be undertaken, by themselves or their compatriots, taking account of strengths, weaknesses, opportunities and threats. Here, key activities that emerged are defined.

- Development of forecast techniques

a) While a considerable amount of climate data is available for the region, various weaknesses limit its effective use. For example, the operation of the CLICOM system was in need of improvement in one nation. Data were not readily available to all institutions in another. In some cases, the problems could be remedied by action on the part of individuals but in other cases support from international programmes was needed. The team working on this issue identified specific actions that would be taken to address these difficulties. A significant, and lamentable, weakness lies in Cambodia where data availability remains restricted to recent decades. The international advisors will determine whether data from the pre-1970s period survive in their own institutional databanks or in colonial or other archives with a view to returning these data to the meteorological service in Cambodia as a matter of some urgency.

b) A web-based and email distribution system, supplemented by fax or CD-ROM, will be developed for current climate data and international forecasts, with distribution in the appropriate format depending on each nation's communication capability. Distribution will take place on a monthly basis.

Initially, the international advisors will circulate material they regularly access by email to selected participants but a more compressed web-based system for synthesizing this information will then be developed. To avoid delays, the initial development and distribution of this synthesis will be taken on by the Indochina Network with a view towards transferring this responsibility to one of the region's meteorological services (clearly, the appropriate base) as soon as resourcing and approval can be obtained.

c) The development of a statistical forecasting scheme based on persistence and lag effects on the month-to-month timescale is well within the capability of all nations in the region. Indeed, such schemes are already in existence, for example, in Vietnam. There was a clear commitment to implementing systems based on phases of the Southern Oscillation and Pacific/Indian Ocean sea surface temperature patterns and the necessary data were made available at the workshop. Follow-up support and collaboration between the Indochina nations was agreed at the meeting and it is intended that experimental schemes will be implemented this year. Rainfall and tropical cyclone occurrence will be the subject of these initial experiments. A visit will be made to each nation in the Indochina region by members of the international advisory team over coming months to support this important effort.

d) The interpretation of the forecasts of El Niño and La Niña development made by the international community was a major focus of the workshop, and improved access is a goal of the web-based data and forecast system discussed earlier. It was concluded that, for those interpreting the forecasts for local use, experience working with the output of these models alongside the forecasters themselves at their institutions would be an excellent follow-up activity. The possibility of short fellowships, of one to two weeks' duration, for relevant scientists will be explored over the coming months. The possible development of an El Niño event this year, with the related uncertainty in how to interpret predictions, provides an ideal context.

- Capacity strengthening

Four practical actions were identified that would strengthen the capacity of the region over the coming months and seasons. First, as noted earlier, the more effective distribution of information will increase the region's knowledge base. Second, the web-based distribution system will also carry news of forthcoming conferences, workshops, training courses, etc. Participants who wish to attend these events will receive advice on how to achieve this goal. Third, there is a wide range of contacts, experts in many subject areas and disciplines, that can be accessed through the informal network

established at the workshop and that can help with specific requests for assistance. Advantage should be taken of the visits made by foreign scientists to some parts of the region, such as Vietnam. It was suggested that such visits be extended to other countries in the region. Finally, it was noted that the highly successful training approach used at the current workshop could be readily adapted by workshop participants for use in their own country. A shorter variant may be run in Myanmar in the near future with support from international advisors.

- Regional cooperation

A commitment to cooperation between nations was recognized as a key strength of the region and the core nations of the Indochina Network, Cambodia, Lao PDR and Vietnam, agreed that it would be advantageous if the collaboration between these nations should be formalized in some form of regional climate network, perhaps an Indochina Climate Assessment Forum. It was agreed that, initially, cooperation would take place as informal collaboration between scientists but that the possibility of formalizing this with government approval and support would be explored.

- The longer-term

The activities described above will be implemented over the next few months. Later this year, after reviewing progress, the possibility of a region-wide project to develop further these activities with additional resourcing will be given serious consideration.

## **Evaluation**

The workshop participants were asked to complete a short evaluation form at the end of the final session (Appendix 4). They were asked to respond to three questions with a score on a scale of 1 to 10.

The first question was “How useful was the workshop for you?”, considering all aspects of the workshop, including training, advice on their work from experts, new contacts made, etc. The average response from 28 returned evaluations forms was 8.8/10. The second question was more specific, “Do you understand more about El Niño and La Niña?” In this case, the average response was 7.9/10, lower as many, of course, had significant knowledge of these events prior to the workshop. The final question was “Will the training help with your work?” For some, the training would have direct and



immediate relevance for their work, while for others the training may be of less direct value but of long-term benefit. Here, the average response was 8.3/10.

Two general points emerged from the comments made at the end of the evaluation form. The participants found particularly important:

- increased understanding of the El Niño and La Niña with specific reference to better assessment and forecasts of impacts in relation to their individual work areas; and,
- the many opportunities for discussion with the international advisors and with other participants from the region about mutual problems and future collaboration.

These results confirm the very positive reaction of the participants to the workshop that was evident throughout the week.

Feedback during the workshop highlighted a number of scientific issues requiring particular attention. Perhaps the most notable aspect was the need for in-depth discussion of the accuracy of climate forecasts and the meaning of the specific words used in forecast assessments. For example, the word “likely” was taken to mean a probability varying from well below 50% to approaching 100% according to 15 participants in a survey of the meaning of various terms held during the workshop. The consensus view was that “likely” meant a probability of occurrence of around 60%.

Finally, the one practical detail of the workshop that the organizers noted as warranting more attention in future meetings of this kind was the need to organize more effectively the copying of materials brought by the participants to ensure prompt and early distribution.

### **In conclusion**

The workshop organizers, on behalf of the Indochina Global Change Network, would like to thank the funders and sponsors of this project for their support and all who attended the workshop for their enthusiastic involvement. The excellent work of the CERED staff is also gratefully acknowledged. The continuing development of a seasonal forecast capability in the Indochina region is an important contribution to the sustainable development of the region.

## **APPENDIX 1**

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**APPENDIX 2**  
**AGENDA**

# **WORKSHOP ON FORECASTING EL NIÑO AND LA NIÑA IN INDOCHINA**

**Fortuna Hotel, Hanoi, Vietnam**

**January 21<sup>st</sup>-25<sup>th</sup>, 2002**

## **Mission statement**

The aim of the workshop is to plan the development of practical seasonal forecasting systems for the nations of the Indochina region, Cambodia, Laos and Vietnam, involving enhanced access to regional and international predictions and the implementation of a new statistical forecast scheme, supported by a regional forum for exchange of experience.

## **Format**

Following a plenary session during which the main issues are defined in a series of keynote papers, the workshop will consist of a series of working sessions. During these working sessions, the participants will be grouped in teams to plan the development and the implementation of forecasting systems for the nations of the Indochina region. There will be four teams. Three teams will consist of participants from Cambodia, Laos and Vietnam, with an additional participant from Myanmar joining one group, and the fourth team will consist of Vietnamese participants.

## **Monday January 21st**

- |           |   |
|-----------|---|
| 0830-0900 | Registration  |
| 0900-0920 | Welcome addresses: Nguyen Huu Ninh (CERED/IGCN); Vu Tuyen Hoang (President, VUSTA); Vu Minh Mao (Vice Chairman, Committee of STE of the National Assembly of Vietnam; Nguyen Cong Thanh (General Director, Hydrometeorological Service) |
| 0920-0930 | Welcome on behalf of APN: Martin Rice   |
| 0930-0940 | Address by leader of Cambodian delegation, His Excellency Khieu Muth<br>Address by leader of the Lao PDR delegation, Pheng Piengpanya   |
| 0940-0945 | Purpose of the workshop: Mick Kelly (University of East Anglia)   |
| 0945-1015 | The El Niño Southern Oscillation Phenomenon: An overview: Bill Kininmonth   |

(Australasian Climate Research)

- 1015-1030 Refreshments
- 1030-1100 Forecasting the El Niño Southern Oscillation: Simon Mason (University of California San Diego) and Roger Stone (Queensland Centre for Climate Applications)
- 1100-1130 Seasonal forecasting in Vietnam: Tran Viet Lien (HydroMeteorological Service)
- 1130-1200 Assessing user needs and current climate affairs: Mickey Glantz (National Center for Atmospheric Research)
- 1200-1400 Lunch
- 1400-1415 Workshop goals: Mick Kelly
- 1415-1530 Working Session 1: User needs
- 1530-1600 Refreshments
- 1600-1700 Working Session 1: User needs
- 1800 Reception for foreign participants in the Assembly Hall followed by dinner at the Hilton Hotel

## **Tuesday January 22nd**

- 0900-1030 Working Session 2: Forecast requirements
- 1030-1045 Refreshments
- 1045-1230 Working Session 2: Forecast requirements
- 1230-1400 Lunch
- 1400-1530 Plenary: Statistical forecasting for the Indochina region: led by Roger Stone
- 1530-1545 Refreshments
- 1545-1700 Plenary: Statistical forecasting for the Indochina region
- 1900 Workshop dinner

## **Wednesday January 23<sup>rd</sup>**

Field trip to Giao Thuy District

**Thursday January 24<sup>th</sup>**

0900-1030 Plenary: Use of international forecasts: led by Simon Mason

1030-1045 Refreshments

1045-1230 Plenary: Use of international forecasts

1230-1400 Lunch

1400-1530 Working Session 3: National plans: strengths, opportunities and weaknesses

1530-1545 Refreshments

1545-1700 Working Session 3: Report back on national planning session

**Friday January 25<sup>th</sup>**

0900-1030 Plenary: Future plans

1030-1045 Refreshments

1045-1230 Plenary: A regional forecast forum?

1230-1300 Plenary: Final session

1300 Close of workshop

1300-1400 Lunch

Afternoon free

## **APPENDIX 3**

### **WORKING SESSION TASKS**

## **WORKSHOP ON FORECASTING EL NIÑO AND LA NIÑA IN INDOCHINA**

We are using the term ‘ climate forecast’ to describe any information that can give advance warning of an emerging climate event. Forecast information includes: improved monitoring of current climate; statistical predictions; and model-based forecasts.

### **WORKING SESSION 1: USER NEEDS**

#### **Aim**

To identify the most significant climate events affecting each country on the monthly and seasonal timescale and their main characteristics. This information will be used to decide what kind of climate forecasts would be most useful.

#### **Questions**

What is the most significant disruption of seasonal climate that affects your country?

Please describe briefly the impacts of one recent event of this kind. When did this occur?

What could be done in your country to reduce the impact of this kind of event if a reliable climate forecast was available? Please list three actions that could be taken.

### **WORKING SESSION 2: FORECAST REQUIREMENTS**

#### **Aim**

To identify what forecasts are required to improve the response to the climate event identified in Working Session 1. We will consider whether this forecast is possible given the current state of scientific understanding in the following sessions.

#### **Questions**

What kind of forecast would help respond to the climate event identified in Working Session 1? Please consider which variables are needed, timing, spatial detail, how often should it be updated, etc. At present, climate forecasts are not perfect. They are often not detailed in space and time and they are

not 100% reliable. Would a forecast be useful if the prediction was only accurate half (50%) of the time? Would it be useful if it was accurate 75% of the time?

Who needs to know the results of a climate forecast and how should this information be communicated?

### **WORKING SESSION 3: NATIONAL ACTIONS**

#### **Aim**

The aim of this session is to give each country group the opportunity to take what they have learned from the first days of training at this workshop and to decide what they may do to develop their seasonal forecasting (advice!) capacity. Each team will develop a list of 'action points' as a basis for this development.

Each nation will work in their own team with an international expert to give assistance and advice. Each team should choose a reporter and keep good notes of its conclusions for the report-back.

Please focus on what can be done over the next few months to a year given the resources you already have available and additional advice from the international experts at this workshop. Later, we will consider longer-term plans that might need additional resources.

Please be practical when listing things that can be done!

#### **Tasks**

A. There are many actions that could be taken – some are useful, some are practical, some may be a waste of time. In order to decide on what action is most important, it is useful to list Strengths, Weaknesses, Opportunities and Threats. This is known as a SWOT analysis.

As a group, please list: a) three strengths of your seasonal forecasting capacity; b) three weaknesses of your current capacity; c) three opportunities to strengthen your capacity; and three threats that may mean this is not successful.

B. Each individual, working on his or her own, should list five actions that they believe would help to strengthen forecast capacity.



C. As a group, please discuss the action points that have been proposed and choose the five that are most important.

## **EXERCISES FOR SESSION ON USE OF INTERNATIONAL FORECASTS**

Prepared by Simon Mason (UCSD)

## **WORKSHOP ON FORECASTING EL NIÑO AND LA NIÑA IN INDOCHINA**

### **EXERCISE 1**

#### 1. Forecasters

There is a rumour there is going to be an El Niño this year. You have to produce an official statement about the El Niño to be released to the users, and have been offered free access to any information you may require. What information would you like to have? Try to prioritize your list, by listing the most important information first.

Discuss:

- What information do you want?
- Do you know from where to get this information?

#### 2. Users

The forecasters have released a statement that there may be an El Niño this year and that during El Niño years the monsoon season starts on average 3 weeks later than normal. Define a set of questions so that you can get a detailed idea of how credible the forecast is. (It may help to consider what terms are imprecise in the forecast statement.)

### **EXERCISE 2**

#### 1. Forecasters

Your request for information was not as fruitful as you would have liked. You receive the following information only:

	<b>COLA</b>	<b>LDEO1</b>	<b>LDEO2</b>	<b>LIM</b>	<b>NNM</b>	<b>SIO</b>	<b>UOX</b>
<b>Forecast</b>	La Niña	+1.3 C	+2.1 C	El Niño	Strong El Niño	E 55% N 35% L 10%	+ 1.7 C to +2.2 C
<b>Forecast date</b>	Dec 2001	Oct 2001	Dec 2001	Jan 2002	?	Nov 2001	Sep 2001
<b>Forecast for</b>	Jun 2002	JAS 2002	JAS 2002	Aug 2002	Autumn 2002	Jun 2002	May 2002
<b>Skill</b>	1970-95 r=0.67	?	1981-99 r=0.70	1950-00 r=0.60	1970-99 60% correct	r=0.66	r=0.60

Produce a forecast statement of about 5 sentences to be released to the users. The statement need refer only to the El Niño event.

## 2. Users

The forecasters have released the following statement:

There is a 90 % chance that the monsoon season will start later than average over all areas of Indo-China this coming season, a 70 % chance that it will start at least 1 week later than average, and a 50 % chance that it will start at least 2 weeks later than average. The high probability of a late start to the season is a result of an El Niño that is expected to develop over the coming few months.

Prepare a presentation to be given to the Minister of Agriculture (or another government minister of your choice) to inform him/her of this forecast. Focus carefully on explaining probabilistic form of the forecast?

**APPENDIX 4**

**EVALUATION FORM**

# WORKSHOP ON FORECASTING EL NIÑO AND LA NIÑA IN INDOCHINA

## EVALUATION

1. What country are you from?

Cambodia      Lao PDR      Myanmar      Vietnam

Please circle your country

2. How useful was the workshop for you? Please consider all aspects of the workshop: the training; access to new data and approaches; advice on your work from experts; new contacts made with people working on the same subject; development of national action points.

1      2      3      4      5      6      7      8      9      10

Not useful

Very useful

Please circle your choice.

3. Do you understand more about El Niño and La Niña?

1      2      3      4      5      6      7      8      9      10

Not much more

A lot more

Please circle your choice.

4. Will the training help with your work?

1      2      3      4      5      6      7      8      9      10

Will not help

Will help a lot

Please circle your choice.

5. What is your work?

6. What is the most important result of the workshop for you?

Thank you!