tions of tribal communities, increasing trend of western style of education and culture, and detachment of children from their cultural roots (cf. Kaling Borang, a cultural leader of *Adi* tribe, Pasighat). Nevertheless, learning about biodiversity through barter system is valuable in tribal communities in remote locations of state and contribute to preserve culture and related bioresources, as stated by customary chiefs of NagaGG, Yang and Lumla villages. Based on the discussions held in a series of workshops, the following key points emerged as policy matter:

The biodiversity conservation programmes and planning in state must respect and recognize the value of barter system, and ensure equitable participation of women folk on the issues of biodiversity and livelihood sustainability. In the scenario of social and climate change, a balance between commercial and subsistence economy is required in the northeastern region to enable the participants of barter system and sustain their network and approach of exchanging bioresources. Degradation in forest ecosystems, diverse ecological niches replaced by commercial agriculture needs a synergy and policy support in order to sustain biocultural resources and landscape. The forest and agriculture departments should have strong coordination while planning and making policy on forest conservation and commercial crops cultivation, since it has direct relation with the barter system. Institutional diversity of women of various tribes needs integration and support in the conservation efforts of state biodiversity. State must screen the healthy barter systems which contribute in reciprocal learning and conservation of biodiversity, and must encourage through incentives to bartering institutions. In the remote locations and harsh ecosystems, where barter system is weakened, organizing seasonal state barter festivals after linking with tourism department and rewarding the outstanding players of it. The youth of remote villages need exposure and education about the value of barter system and its role in subsistence economy (different than commercial economy) which sustain not only the ethnicity of tribes but also the respective fragile ecosystems of eastern Himalaya.

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MEETING REPORT

Southeast Asia regional climate change and health issues*

Many of the likely characteristics of the resulting changes in climate (such as more frequent heat waves, increase in frequency and intensity of extreme climate events) can be identified. Because of their negative impacts on human communities (including, for instance, substantial sea-level rise) and ecosystems, climate change and global warming are the most important environmental problems the world is facing. It has been rightly pointed out elsewhere that controlling climate change is more difficult than stopping tropospheric ozone depletion. Therefore, climate change is an inevitable global problem. The consequences of climate change and global warming are going to affect the whole world, and therefore it is the need of the hour to think and discuss how best we can mitigate the effects.

Any change in the environment has direct significant effects on public health. Climate variability causes death and diseases due to the highly responsive nature of fatal diseases to changing temperatures and precipitation. These include common vector-borne diseases such as malaria and dengue, as well as other major killers such as malnutrition and diarrhoea. As suggested by WHO, the impacts of climate change on human health will not be evenly distributed around the world. Developing countries and densely populated coastal areas are considered to be particularly vulnerable.

Fortunately, much of the health risk is avoidable through existing health programmes and interventions. Concerted action to strengthen key features of health systems and the promotion of healthy development choices can enhance public health to reduce the vulnerability to effects of climate change. Therefore, to discuss climate change and health-related issues, an advanced training workshop was jointly organized by National Cheng Kung University, Tainan, Taiwan and South East Asia Regional Committee for START (SARCS). START (global change SysTem for Analysis, Research, and Training) is based in Washington DC and supports region-specific programmes and activities through fellowships, training workshops and advanced institutes. This workshop was attended by participants from India, Philippines, Taiwan, Vietnam, Korea, Malaysia, Thailand, Indonesia, Australia and Singapore.

This workshop was a capacity building programme and was planned to share the knowledge about climate change impacts on health (water-borne disease, vector-borne disease, etc.), present methodologies and tools for assessing the vulnerability of the health sector and to develop a framework for promoting mitigation and adaptation mechanisms, and also the application of climate change modelling and spatial analysis of climate issues.

Colin D. Butler (The Australian National University, Canberra) talked about the climate change policies that include identification and priority setting, addressing a wicked problem and policy solutions to global climate change. The global inequality towards attitude, income, food and nutrition, health and climate responsibility are the major causes for traumatic effects of climate change on public health. Kow-Tong Chen (National Cheng

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Kung University) illustrated the climate change and water-borne diseases. It has been predicted that sustained global temperature rise of 5–6°C could lead to loss of both Greenland and the western Antarctic ice sheets by the middle of the next century, raising sea levels by up to 13 m. Climate change effect on public health together with poverty, inequity, and infectious and non-communicable diseases are major challenges due to which poor countries will suffer the greatest consequences, even though they contribute the least to emissions. Shakoor Hajat (London School of Hygiene and Tropical Medicine, London) gave an overview of heat-related mortality, cold temperature mortality and cardio-respiratory mortality. Patrick L. Kinney (Mailman School of Public Health at Columbia University, New York) said that the mixture of air pollutants produced by burning of fuels can adversely affect human health and promote climate change. In addition, climate change can influence air pollution, resulting in direct health effects. Yuan Shen (National Chung Hsing University, Taichung) emphasized on the potential impacts of global warming to agricultural production. Increasing CO_2 concentration will increase photosynthetic rate, which inhibits photorespiration. Thus, global warming will result in increased yields and pest carryover in winters in agriculture, and change in species and distribution in fisheries. Pei-Chih Wu (Chang Jung Christian University, Tainan) outlined two hypotheses, viz. weather variability versus epidemic, and climate pattern and other factors versus regional vulnerability. It was said that weather can be an effective predictor of the occurrence of dengue fever. In addition, higher temperature and urbanization affect the spatial patterns of dengue fever transmission in subtropics. Juan M. Pulhin (University of Philippines Los Baños, Philippines) said that warming of the climate system is unequivocal increasing the global air and ocean temperatures resulting in rising global average sea level and reductions of snow and ice. Huey-Jen Jenny Su (National Cheng Kung University) mentioned that the CO_2 emission by USA and Europe contributes a half of the world and questioned where are the vulnerable countries? She stressed on the risk population of climate change, which includes women, children, elder and poor. They are more prone to adverse impacts of climate change because their limited capacities arise from prevailing social inequalities and differences in property rights, access to information, lack of employment and unequal access to resources. Shih-Chun Candice Lung (Academia Sinica, Taipei) described the potential public health impacts of climate change which includes the following short-term effects: exacerbation of several forms of respiratory diseases such as bronchitis and asthma, and changes in heart rate variability; and possible chronic effects: increase in the risk of lung cancer, respiratory diseases, cardiovascular diseases and arteriosclerosis.

At the end of the workshop, four projects were formulated by four groups constituted by the participants: (1) Potential impact of climate variability on air pollution-related health effects: six-city study; (2) Linking climate types with ecological and epidemiological vulnerabilities in southeast Asia; (3) Towards a resilience society to climate change-related health; (4) The impact of climate change on tropospheric ozone and the subsequent impact on human health risk in southeast Asia.

The workshop had been aptly planned just prior to United Nations Climate Change Conference at Copenhagen (COP 15) which was held in December 2009. This brought the policy makers under one roof to make them aware of the consequences of climate change and the mitigation effect in terms of human health. This training workshop also provided a better opportunity to the participants to interact with their counterparts from different countries on these issues. It enabled the participants to understand and design the climate change variability and health, which is a growing concern among the policy makers.

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