

## **1. INTRODUCTION**

The Union of Myanmar is situated between 10N and 28N latitude and 90E and 100E Longitude. It is an immense and diverse region comprising areas with very different sets of environmental, geographic, economic and social characteristics. In recent years, climate change has been obviously found out that the duration of Monsoon period becomes short and the temperature rise is 0.6C in Myanmar. Myanmar is well aware of the threat of climate change and attaches great importance to the UNFCCC as well as to the Kyoto Protocol.

Human and ecological systems can adapt to the negative effects of climate change, including changes in climate extreme and climate variability, through a combination of technological and behavioural adjustment. Technologies which help reduce the impacts of climate change can themselves cause other problems.

In this presentation, the technological needs, barriers to the development and transfer of technology, capacity building for technology transfer, transfer of technology mechanisms and the role of private sector in Myanmar are briefly discussed.

## **2. TECHNOLOGY NEEDS**

### **2-1. COASTAL ADAPTATION TECHNOLOGY RESEARCH AND DEVELOPMENT**

Union of Myanmar has coastal line which is 1350 miles long. It can be divided into three portions which are

- a. Rakhine coastal area
- b. Ayeyarwady deltaic area and
- c. Mon-Tanintharyi coastal area.

Ayeyarwady deltaic area is a main supplier of food for the country especially rice and agricultural products. Mon-Tanintharyi coast has coral islands where pearl producing and fishery are the main income for dwellers of coastal and small islands of Mon-Tanintharyi coast.

Identifying specific technologies needed respond to sea-level rise is a complex task. The following are the needs for the coastal adaptation technology research and development for Myanmar.

- ( i ) Technologies specifically designed to assist in the protection and stimulation of coral reefs;
- ( ii ) Predictive modelling ( sea-level rise, cyclones, but also in the particular model that can downsize from global mean sea-level predictions);
- ( iii ) Data collection and validation/remote sensing technologies;
- ( iv ) Establishment of wider, more effective national networks of wave and tide gauges;
- ( v ) Greater use and diffusion of geographical information systems(GIS) to assess vulnerability and possible responses;
- ( vi ) Diffusion and application of remote monitoring tecnologies
- ( vii ) Tools to educate and raise awareness among stakeholders;
- ( viii ) Buliding with nature technologies (using local vegetation, species)
- ( ix ) Research and development into the specific needs of muddy intertidal areas.

## **2-2. TECHNOLOGY FOR REPLACEMENT OF HOUSEHOLD CONSUMPTION OF BIOMASS**

Wood and charcoal are being used as household energy in Myanmar especially in the rural area. The Government of Myanmar is trying to substitute it by other sources such as rice shell,biogas. The advance technology is necessary for the sucessful implementation of replacement of household consumption of biomass

## **2-3. TECHNOLOGY FOR AFFORESTATION**

The greening project was launched in 1993 for 9 critical districts in the dry zone area in Myanmar. The project has now been extended to cover 13 districts and a Dry Zone Greening Department has also been established to implement the greening programmes. They are planting millions of trees every years with aims to protect local climate change; to prevent soil erosion and to promote habitat and biodiversity.

#### **2-4. TECHNOLOGY FOR ELECTRICIFICATION**

Gas turbine, diesel and hydropower are still being used for the generation of electricity in Myanmar. The following are the needs for the generation of electricity by solar and wind ;

- ( i ) Survey project, including equipments and technology
- ( ii ) Technology for application of solar and wind energy

### **3. CAPACITY BUILDING NEEDS**

#### **3-1. STRENGTHENING HUMAN RESOURCES**

Enhancing and expanding the pool of human resources and skills necessary to identify and implement national and regional technology transfer goals involves the provision of appropriate training at several levels, including Government Departments and national utilities; the private sector; the banking and finance sector; non-governmental organizations; and the local community. The followings are the list of capacity building needs of Myanmar;

- ( i ) fellowships and scholarships for formal training at higher levels, specialized training informal training
- ( ii ) development of a pool of expertise and skills
- (iii) studies such as climate change detection and climate variability, impact assessment, vulnerability and adaptation studies and policy analysis.
- ( iv ) workshops

( v ) exchange programmes with other parties

( vi ) networking and coordination at local, national, regional and international levels.

### **3-2. IMPROVING ORGANIZATIONS AND INSTITUTIONS**

It is necessary to enhance the information sharing and networking among Asian focal points and between the focal points and key national institutions, as well as the strengthening of the capacities of national focal points to develop and implement national programmes to promote the diffusion of environmentally sound technologies and know-how.

It should be supported to assist the development of partnerships between the private sector and non-governmental organizations, such as joint ventures directly with owners and producers of technologies to increase capacity-building and technology transfer.

### **3-3. ECONOMIC AND FINANCIAL BARRIERS**

New and innovative financing mechanisms, as well as appropriate training and technical support should be introduced for local, small and medium-sized enterprises and entrepreneurs to engage in the production or distribution of environmentally-sound technologies, know-how and practices. These financing and training should target the technologies or practices which improve productivity and generate incomes, particularly among the rural poor.

## **4. BARRIERS TO TECHNOLOGY TRANSFER**

The identification and elaboration of barriers to the development and dissemination of environmentally-sound technologies is an important step in conducting a technology needs assessment and identifying appropriate actions to enhance the dissemination of environmentally-sound technologies in Myanmar.

#### **4-1. ECONOMIC AND FINANCIAL**

Myanmar is one of the least developing countries (LDC). The poor economic situation prevents the development and transfer of environmentally-sound technologies. The poor economic based and low incomes lead to low level of savings and investment.

The size of the markets in Myanmar is relatively small. Additional transaction and development costs are incurred by attempting to stimulate the deployment of technologies in small markets. Thus small markets pose a problem to business as they signify lower rates of return on investments.

Environmentally-sound technologies are frequently overlooked by loan providers as they are often viewed as risky investments.

#### **4-2. HUMAN RESOURCES**

The relatively low level of technological capability and the lack of appropriate training is a significant barrier to technology transfer and development.

### **5. POSSIBLE ACTIONS AND INITIATIVES TO REMOVE BARRIERS**

#### **5-1. PROVISION OF FUND**

The diffusion and transfer of technology is mainly through projects, involving foreign, internationally operating consulting. Project funding should be supplied through loans or bilateral and multi-lateral aid.

#### **5-2. PARTICIPATION OF REGIONAL/LOCAL TRAININGS AND WORKSHOPS**

In most developing countries there is a shortage of well trained scientists and managers. An important pathway for the transfer of technology is via the training of professionals from developing countries in developed countries. However training alone is not enough. Training

and awareness-raising is most effective when the newly trained staff can apply their skills. In turn this requires adequate financial support.

## **6. ONGOING AND PLANNED TECHNOLOGY TRANSFER ACTIVITIES**

### **6-1. EDUCATING PROGRAMMES**

The Department of Meteorology and Hydrology have sent their representatives not only to the Conference of the Parties which were held in every year but also to the regional workshops, seminars and the sessions of the SBSTA and SBI. The Department of Meteorology and Hydrology regularly conducts the seminar where the representatives share and transfer their knowledge and technology which they have gained from the conference, workshop, seminar and session.

### **6-2. RENEWABLE ENERGY RESEARCH PROJECT**

The title of the project is a case study on Myanmar for the estimation of natural resource distribution in southeast Asia - An evaluation of the wind and solar energy adapting the numerical weather prediction model. Japan Weather Association (JWA) and Department of Meteorology and Hydrology (DMH) is jointly implementing the project concerning Renewable Energy Research Project of Myanmar using NEDO funds.

#### **6-2-1. OBJECTIVES**

The objectives of the project are as follows;

- (a) to estimate the meteorological conditions in Myanmar by adapting the regional numerical weather prediction model

(b) to observe the wind and solar radiation in Myanmar

(c) to transfer the technology (maintenance of instruments, estimation and calculation of solar radiation and wind energy as well as electric power amount)

### 6-2-2. SCHEDULE

This project has been started in August,1999 and it will be terminated in March,2000. The schadule of the project is as follow.

Year 1999-2000

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Planning	■							
Observation		■						
		Δ	Δ		Δ			Δ
		preliminary survey	set up		maintenance			remove
Land-use		■						
ECMWF data	■							
Model improv		■						
Calculation			■					
Electric power							■	
Report							■	

## 7. KEY ELEMENTS OF SUCESSFUL TRANSFER OF TECHNOLOGY

### ACTIVITIES

( i ) The technology transfer represents an opportunity for international cooperation under the convention. Therefore the principles of such cooperation were neither charity nor goodwill, but could be based on the development of strategic partnerships among the governments, the

private sector and other stakeholders among the full range of developed and developing countries.

(ii) It is necessary to make the best possible use of existing resources and at the same time mobilize private sector investment. The private sector from both developed and developing countries should be given greater encouragement to participate in the activities of transfer of technology.

( iii ) The UNFCCC national focal points or national authorities designated to handle climate change should be strengthened.

( iv ) Setting up collaborating centers on climate change related activities in developing countries at sub-regional or regional levels, and using the centers to promote the transfer of technology.

## **8. CONCLUSIONS**

For the developing countries to engage themselves in the healthy development of the climate regime, should be provided with an adequate financial support and transfer of technology. This will no doubt increase their capacity building and contribute in their pursuit for sustainable development. Although the Buenos Aires Plan of Action (BAPA) outlined the process for overcoming the difficulties to the environmentally sound technologies, it is time to establish the rules on transfer of technology. We believe that this important concern of developing countries would be given particular attention in this workshop.