

3 Investigation and Analysis of Environmental Situation

3.1 General of environmental situation investigation

According to the *TOR of EIA* and the requirement of Myanmar government authorities, under the organization of CPIYN, CDC and BANCA, IHE, SCBG, SCIEA and BANCA jointly established a joint investigation group for the ecological environment. It conducted a deep investigation on the baseline conditions of the hydroecology, terrestrial animals and vegetation. It also collected such first hand documents as the attitude of the locals, government and relevant organizations on the hydropower development, the environmental issues concerned and the requirement by means of questionnaire and interview. The joint investigation starts officially in the

middle of January and ends in the middle of May in 2009, lasting for 4 months. BANCA finished other remaining work in July. About 260 people joined the investigation, among which there are more than 100 experts from China and Myanmar .



Group photo of Chinese investigators before investigation



Group photo of Myanmar & Chinese investigators
after investigation



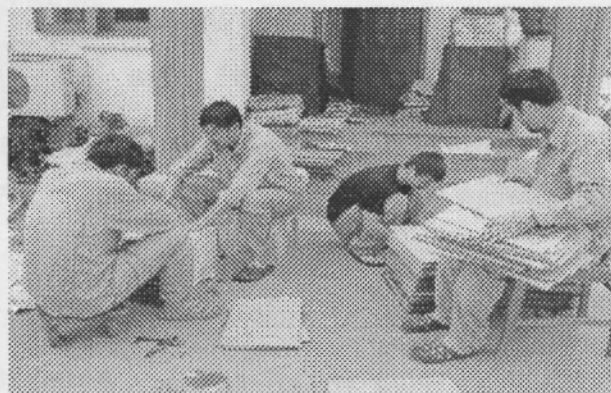
A legion of porters employed during investigation

3.1.1 Terrestrial ecology investigation

The unit undertaking the terrestrial ecology study, Botanical Garden of South China of the Chinese Academy of Science and the South China Institute of Endangered Animal and the experts of terrestrial animals and plants of Myanmar BANCA conducted terrestrial ecology investigation on upper reaches of the Ayeyawady River from Jan. to May 2009, which includes the area below the first grade watershed at both sides of Ayeyawady River Myitkyina ~ Myistone section and that of both sides of from Malinka River estuary to Laza reservoir, and that of both sides of from Enmaynua River estuary to Yenan reservoir, accounting for 33,771km² in total. The key investigation area is the cascade dams site area of the hydropower development and the reservoir inundation area.



Field survey of terrestrial plants



Survey personnel of terrestrial plants are pressing the specimens

The method of combining sampling survey and line survey is adopted for terrestrial plant investigation. For key area (such as dam site area and reservoir inundation area) and the area with good vegetation condition, sampling survey is adopted. Zurich-Montpellier school sample plot recording method is used for sampling survey. GPS is used to determine the sample location. 79 samples are set for this investigation, in which arbor area is 20m*20m, bush area 5m*5m and herbal area 1m*1m. For non-key area (such as the area above the reservoir inundation boundary, area with severe human disturbance), line survey is adopted. A combination of field work, interview and market investigation is carried out for rare or endangered plants. For suspicious plant, economic plant and endangered plant, specimens are collected with pictures taken.

Infrared camera monitoring method, line (strip) survey, capturing method, point survey, interview and documental query method are adopted for terrestrial animal investigation. For beasts, infrared camera

monitoring, beast track collection and verification with the combination of interview and market investigation are adopted to determine categories and quantities. For birds,



Infrared camera monitoring



Terrestrial animal field investigation



Field sampling of aquatic organism

according to bird's habitat environment category and its size of area, lines or points are designed to investigate its category and quantity. For habitat of complicated ecological environment type or with lots of nocturnal birds, net capture method is adopted. Line survey is adopted for amphibian and reptiles in waters and other suitable environment, whose category and quantity are observed in the morning and evening. Line survey is mainly adopted for insects (butterfly), with random net capture method combined to investigate its category and quantity.

Please refer to the attached figures 7~8 for the satellite image and investigation route and sample arrangement of the terrestrial ecology assessment area for the hydropower development of upper reaches of Ayeyawady River. Please refer to the appendix 1 for sample investigation table.

3.1.2 Aquatic ecosystem investigation

The aquatic wildlife experts from IHE and BANCA carried out aquatic ecosystem investigation from Jan. to May 2009 in the area affected by the hydropower development. The scope includes the area between the estuary of Ruili River and Laza reservoir head of and Yen-an reservoir head of Malinka River. The investigation scope of major branches is the section 10km above the confluence.



Numbering fish specimen

Such methods as onsite sampling and fishing, interview with local fisherman and scholars, investing fishery market, inquiring documents are adopted for aquatic ecosystem to carry out investigation, prediction, analysis and assessment. Via field survey, interview and looking up in relevant documentary, technical parameters, reservoir regulating way and relevant hydrology and water quality achievement, upstream terrain, river features, nature and social environment etc. are collected. Documents such as domestic and foreign fish

resources protective technical achievement are investigated via the Internet. The aquatic organism (including fish, phytoplankton, zooplankton, periphytic algae, benthos, and aquatic vascular plant) and their aquatic environment in the basin are understood via field investigation and literature. The situation of aquatic organism (including endangered species) in the upper reaches of Ayeyawady River, the distribution characteristics and habitat characteristics and the resources are also grasped.

During the field investigation, 68 sections of aquatic organism collection, 9 fishery fish collection points, 2 fishery early resource collecting points are set up.

3.1.3 Monitoring and investigation of environmental baseline

The monitoring and investigation of environmental baseline are undertaken by Myanmar BANCA. Relevant experts of BANCA carried out the work at Ayeyawady River basin above Myitkyina from Jan. to May (low flow period) and July to Aug. (high flow period) in 2009.

Monitoring and investigation scope of the environmental baseline is from the border of China-Myanmar of Enmaynua River to Myitkyina city. BANCA established 18 monitoring sections at the China-Myanmar border of Enmaynua River, 7 cascade hydropower stations dam sites, Laza reservoir head and main reach of Namtamai river, Ahkyang, Mekh Rame river, Ngawchahg Hka river, Tmnpang River, Tara Hka river, Nam Tsang river, Hpungcin Hka River, Hkrang Hka River and conducted monitoring to the water quality of the 18 sections. In addition, Initial investigation is carried out on the condition of the pollution source of the drainage basin.

Regular items in *Pollution Prevention Manual* issued by the World Bank is referred to for the monitoring indexes, mainly including water temperature, pH, BOD, COD, TSS, petroleum, phenol, cyanide, total nitrogen, total phosphorus, arsenic, chromium, mercury, nickel, and lead. At the same time, 15 air monitoring points and 7 noise monitoring points are arranged to monitor environmental air and noise in the assessment areas of hydropower development.

3.1.4 Social environment investigation

From July to Aug. 2009, DHPI took the lead to form an investigation group with CPIYN, CDC, AWC and relevant authorities of Kachin to conduct investigation of indexes in terms of material products in Myistone power station dam site and the reservoir. The investigation items mainly include the population and private property in the land acquisition area, religious memorial hall, temple, church, school and hospital and other item, which are categorized into three kinds.



Questionnaire



Resettlement investigation

As the common language of the local residents and immigrants involved in the Myistone hydropower station is Burmese, and that of the residents in the area affected by hydropower stations in upstream of Enmaynua River is the language of local ethnic groups, the questionnaire are focused in such areas as Myitkyina City, Myistone and Chibwe with relatively large population. The public questionnaire of hydropower development started from March 2009 and ended in the middle of May, which last for more than 2 months. In the middle of August, a supplementary questionnaire is carried out against the migrants to be resettled in the hydropower development. From the middle of November to the middle of December, DHPI organized the third questionnaire survey.