

THE TECHNOLOGY OF MICRO-HYDROPOWER PLANTS FOR ALLEVIATION OF POVERTY

Habib Gul*

ABSTRACT

This paper explores the usage of MHPP technology for poverty alleviation. Poverty is not a constant factor it can be reduced or controlled by adopting appropriate measures on micro and macro level through appropriate usage of factors of production. MHPP are one of the options through which poverty reduction can take place in rural areas, jobs created and facilities extended. The value of agricultural produces will be increased.

POVERTY

Poverty is a complex and multi-dimensional phenomenon, which is an act of deprivation or non-fulfilling of certain needs required for leading a peaceful or smooth life. A person is considered poor if his minimum needs are not satisfied. Poverty may be social, pauperism, moral or spatial. Illiteracy, poor health, short life-expectancy, poor law-and-order situation and backwardness in technology and dependence on exhaustible natural resources are the major indicators of poverty. Poverty is not a constant factor and could be controlled or reduced by adopting certain appropriate policies and measures, but cannot be eliminated completely.

There were 1.2 billion people or one-fifth of humanity subsisting on less than US \$ 1 a day in 1999; the number kept on increasing day by day. The Least Developed Countries (LDCs), which were 24 in 1971, increased to 49 in 2001. It was estimated that 80 percent of Gross Domestic Product (GDP) of US \$ 30 trillion has accrued to only 20 percent of the world-population. The major poverty-centres are concentrated in Africa, Asia and Latin America. Majority of the under-developed countries, of this modern world, apparently want to remain poor and drain precious resources and to depend on the North and West.

Poverty in Pakistan

The Planning and Development Division, Government of Pakistan, adopted as yardstick for measuring the official poverty-line in Pakistan on a caloric norm of 2,350 calories per adult per day, equivalent

approximately to per-capita expenditure of Rs. 748 per month in 2000-01. The incidence of poverty in Pakistan declined during the period 1986-91 from 29 per cent to 26 per cent, but accelerated by 5 percentage points to 32 per cent in 2002-03.

The Human Development Index (HDI) of UNDP focuses on the average achievements in three basic dimensions in a country — a long and healthy life, as measured by life expectancy at birth; knowledge as measured by the adult literacy-rate, and the combined primary, secondary and tertiary gross enrolment-ratio and living standard, measured by per-capita income.

Pakistan's achievement in these three dimensions is very discouraging: the life-expectancy at birth is 60.4 years; adult literacy-rate is 44 per cent and combined primary, secondary and tertiary gross enrolment-ratio is only 36 percent. Pakistan's global ranking has plummeted from 127 in 2001 to 144 in 2003, even placing it at the bottom of South Asia!

Options for Alleviation of Poverty

Poverty is the outcome of economic processes, social and political forces. It could be eliminated by means of focused policies and plans of short-run and long-run focussing on poverty alleviation. Peaceful atmosphere, removal of landlordism, non-profligate fiscal and monetary policies, stable exchange-rates, and lower inflation-rates are considered best anti-poverty measures. In the mixed economy, facing the poverty- challenge, the economists also insist on collaboration between public and private sectors, leading to investment in technology-innovation, which may consequently create jobs and increase the income. Certain cultures help in alleviating poverty, through social and religious instruments, like discouraging accumulation of wealth at the level of individual and state and donation and Zakat (donation to poor), etc.

ROLE OF MICROHYDRO-POWER PLANTS FOR POVERTY-ALLEVIATION

Human capital and natural resources are in abundance in Pakistan, but need proper management and

* Deputy Director, PCRET, 18-B/1, Phase-V, Hayatabad, Peshawar.

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exploitation for benefit of the masses. It is said that if we help the masses, they will help themselves to reduce poverty. Passing the benefits of technology to people is possible through developmental stakeholders and thereby poverty can be alleviated by adopting certain measures on micro-and macro-level, through appropriate usage of factors of production. Micro hydropower plants (MHPP) are one of the options, through which the objectives of poverty-alleviation can be achieved in a reasonable way in parts of Northern Mountain Regions: the NWFP, FATA, Northern Areas and Azad Jammu and Kashmir.

The areas where MHP potential exists are deprived of basic amenities, and provision of energy could help in creation of appropriate industrial base at cottage-level. This will create job-opportunities and add value to the agricultural products. Majority of our rural population is engaged in the sector of agriculture. Dehydration of fruits and vegetables would be possible through development of latest techniques, and the export to cities will weaken the vicious circle of poverty. For processing agricultural outputs, machines of low cost, running with electrical and mechanical power, are available in the market, and can be acquired. These machines, besides providing facilities in villages, may also provide employment to the locals and become a source of income for the owners. MHPP can support many schemes, such as rice and flourmills, or even some of the available minerals-based industries.

DESCRIPTION OF MICRO-HYDROPOWER PLANTS

The decentralized hydropower plant upto 100 KW is classified as Micro Hydropower. It is considered appropriate for far-flung areas of Pakistan. It is easy to install, operate and maintain. Except the alternator, the rest of the components of the plant are made in our country. The average costs per KW installation and per KW generation are around Rs. 50,000 and Rs. 3/- respectively, but may vary depending on the size of plant and locality. The installation and generation-cost decrease with increasing rating and capacity of plants. The decentralized plants not only eliminate household problems but provide power for certain industrial activities, specially agro-based processing.

The major objectives of using MHPP are to utilize available natural resources in the most appropriate

manner, harness hydel power and locally available components. MHPP are commonly preferred in the areas where national-grid network is not considered appropriate for extension, due to lack of physical infrastructure, financial constraints and geographically scattered population.

These plants are installed on the banks of perennial streams. The potential of MHPP, though not properly estimated due to financial constraints and non-availability of trained staff, is roughly estimated to be around 300 MW in the northwest mountain region of Pakistan and Azad Jammu & Kashmir. The plants are installed in those villages/settlements where the needed head is available in the vicinity and the plant is easy to construct and accessible.

TECHNOLOGY OF MHPP

Civil, electrical and mechanical works are involved in the construction of MHPP. The common concept in this regard is to utilize maximum indigenous materials, in order to reduce cost and to maximize benefit for its locality/region. These techniques are flexible and appropriate to local conditions, with regard to methodology, management, finance and other aspects. Local technicians, carpenters and masons in the villages can undertake several works to an acceptable standard. The communities have better experience in using their resources. Nonetheless, they do not understand drawings. If drawing is provided, even then they will need technical guidance at more or less all the stages.

This methodology of executing MHPP was developed by Pakistan Council of Renewable Energy Technologies (PCRET) and various NGOs. Indeed, it helps in better operation and maintenance of the schemes in future. Regarding mechanical works of the plant, these are done in a few private workshops in Peshawar, Gujar Garhi, Taxila and Gilgit. The workshops, situated in the towns near the sites, could do the same work with a few days' training.

MHPP is always installed near consumption-centres. Low transportation-cost; appropriateness of technology; operating machines through mechanical power in day-time and generating electricity at night for lighting purpose, increase the importance of this technology. For operating/running machines outside

the power houses, electrical motor of specific horse-power is connected. Activities like rice-husking, lathing, saw milling and oil-expelling are undertaken at these plants in the far-flung hilly areas, which helps in alleviating poverty. Moreover, through PCRET methodology, the beneficiaries are involved in all phases of MHPP's construction, management, generation, transmission and distribution.

CONCLUSION

If the MHPP, at overall average of 20 KW, is constructed by assuming 50 percent potential of 150 MW out of the estimated 300 MW, it would run to 7,500 plants. Two operators would be required for each plant. In this way, 15,000 operators would be engaged under this private-public sectors partnership. The indirect jobs to be created and facilities to be extended, which the Government cannot provide, due to financial hardship, will be an extra benefit out of this entrepreneurial venture. In our neighboring country, China, which is developing faster in the present modern world, there are presently 45,645 mini and micro hydropower plants.

The value of the agricultural produce will be increased. The subjective benefits, like using lights by the

students for their study at night time, will also be enormous. The Government, unable to provide facilities to the poor segment of communities of far-flung areas, can achieve its objectives by extending technical assistance and machinery worth Rs. 80 million to 100 million.

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