

## A Note on the Energy Policy of His Majesty's Government of Nepal.

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In the last six periodic plans hydro-electric energy has been considered as one of the main infrastructures required for the economic development of the country. "Therefore, His Majesty's Government of Nepal (HMG) spent a large chunk of the government budget on the development of the infrastructures, considering that the development of infrastructures will bring the economic development automatically. Consequently, 35 to 60 percent of the total development expenditures were used in the transport, communication and power sectors. As a result, more than 60 percent of the total foreign aid flowed into the above-mentioned sectors."

In the early sixties, HMG developed a concept that the surplus land from the landowners in the Terai districts could be used for mobilizing resources required for hydro-power development. The landowners would be issued bonds equivalent to the prices of their land. These bonds would be exchanged for shares of stock in hydro-electric plants. Funds received from the cultivation of their land in payment for land distributed to them could then be used for payment of the local currency portion of the hydro-power plants. It was envisaged that such bond holders would possess 49 percent and HMG 51 percent of the stock. HMG would borrow the foreign currency required for the power plant from an international agency. Such a loan would be paid back from the export of our electricity. The envisaged power stations were 300 M.W.<sup>1</sup>

The new concept which has been publicised so much is that the hydro-power available in Nepal could be useful for the neighbouring countries, e.g., the electro-energy generated from the big mega power stations could reach beyond the border of Nepal. But nobody has realised so far that this is only a dream. The billions of dollars required to construct such power stations are not available with the neighbouring countries. The international donor agencies would not put all their eggs in one basket and hand over to HMG, Nepal. Private banks would not like to take such ventures in view of the high risk involved and the opportunity cost of their capital. Hence, there are no resources available to develop such power stations. Therefore, the concept of developing the huge mega power stations is almost similar to the power stations (300 M.W.) of the early sixties.

The possibility of participation of the private capitals in the hydro-power generation was expected in the early sixties and presently also, HMG clearly indicated in the budget speech of the FY/1984/85, similar expectation by stating the following:

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"If power generation plants of larger than 100 K.W. capacity come up in the private sector, His Majesty's Government will buy power from such undertakings."<sup>2</sup> Such hydro-power plants may not come up in the private sectors because the people have a good opportunity in this country to capitalize their investments in other sectors, particularly trade. Besides, the cost of hydro-power generation is almost twice the selling price. Consequently, nobody may invest in the power sector.

The present HMG policy is to keep the price of the electro-energy at a minimum level despite the fact that the high generation cost is exerting pressure on the national exchequer. "The costs of electro-energy generated by the hydro-stations are currently as high as US \$ 0.14-0.17 per K.WH."<sup>3</sup> Due to the subsidy policy, the urban people are getting more benefits whereas the tax burden is on the overwhelming majority of the rural people.

It was mentioned in the Sixth Plan document that small hydel plants would be developed as an alternative energy to fuelwood; besides, hydro-energy would be utilized to produce nitrogen fertilizer.<sup>4</sup> However, if the proposed small hydel plants<sup>5</sup> are closely looked into, most of these small hydro plants are located nearby the District Headquarters. It indicates that HMG prefers to illuminate the district headquarters.

As the hydro-energy is considered as the primary energy up to the Sixth Plan period, other alternative energy, e.g. renewable energy (fuelwood, solar, wind, bio-gas etc.) and non-renewable energy (hydro carbons) are not included under one energy sector. Consequently, the development of renewable and non-renewable energy took independent courses.

The Department of Forest under the Forestry Ministry is involved in fuelwood development. The Agricultural Development Bank, under the Ministry of Agriculture is responsible for development and instalment of bio-gas plants. The Department of Mines and Geology and the BYS-Sanitary, under the jurisdiction of the Ministry of Industry, are responsible for search of hydro-carbons and for the development of solar water heaters respectively. There is a lack of coordination among these institutions.

There is a Water and Energy Commission under the Ministry of Water Resources. This commission is supposed to plan energy development in Nepal. But the following statement confirms that the commission is primarily focussing on water resources and hydro-energy. "Since water resources loom larger than others in Nepal, it is inevitable that the Water and Energy Commission has tended to focus its attention exclusively on hydro development matters."<sup>6</sup> As such, there is not a single body which deals with all the energy resources in Nepal.

The economic survey report of the Fiscal Year 1984/85 states that "of the total energy consumed, 92.8 percent is obtained from wood, 2.2 percent from agricultural and animal waste. Thus, 95 percent of the energy is obtained from traditional source and 3.6 percent from petroleum. The share of coal and hydro-electricity is just 1.4 percent."<sup>7</sup> This statement indicates that Nepal is heavily dependent upon fuelwood

for a major portion of the energy requirement of the country. Exploitation of forest resources for fuelwood will accelerate deforestation which, in turn, will cause floods, landslides and soil erosion causing damages not only to Nepal but also to the neighbouring countries. There is no immediate possibility of alternative energy to substitute fuelwood; hence, the only remedy is to divert the major portion of resources allocated to the energy sector to afforestation. Large-scale afforestation may be the only solution for the energy problem. Otherwise even if the rural people have cereals, they may not have the fuel to cook their meals.

The Basic Principles of the Seventh Plan (1985-1990) states in its sectoral policy two main policy matters of the power and energy sector-1) development of hydro-electricity and 2) development of alternative energy. Alternative energy means bio-gas, solar and wind energy which can be used as alternatives to fuelwood and hydro-electricity.<sup>8</sup>

In the Seventh Plan, attempts will be made to widen the energy sector from the traditionally recognized hydro-electricity to the alternative energy. However, comprehensive energy plan may be lacking because exploitation of hydro-carbon and development of fuelwood were not included under the power and energy sector; rather than a long-term (25 years) master plan for development of timber, firewood and fodder is included in the forestry sector. Similarly, prospecting for petroleum and natural gas is included under the mineral sector. But the forest alone would meet the requirement of household energy for many years to come. The shares of hydro-electricity and alternative energy will continue to be insignificant. Therefore, the major thrust should be directed to the development of forestry, at the same time giving due attention to the harnessing of hydro-electricity.

#### STRATEGY

The strategy of energy development should be adopted in consideration of the geographical feature of the country. Nepal should be divided at least into three geographical units from north to south: 1) mountains, 2) hills and 3) terai. In the mountains where the growth of trees is very slow, it may take 20-40 years for forests to mature. Hence, along with afforestation, harnessing of other alternative energy, e.g. hydro-energy (mainly mini and micro), solar energy and wind energy should be done.

In the hills where the growth of trees is relatively fast, about 10 years, massive scale afforestation should be undertaken. Such afforestation should be done in the private and panchayat sectors. For such programmes, major resources allocated to the energy sector have to be diverted. Then only, there will be a possibility of meeting the demand of the fuelwood in the hills where the majority of the people still live. At the same time, development of hydro plants (mini and micro), bio-gas plants, solar energy etc. should get attention but do not deserve importance because the alternative energy to fuelwood is not yet possible by any other source of energy until there is any major breakthrough in the technological development in harnessing other sources of energy. The huge potential of hydro-energy may remain as it is for many years to come.

In the Terai also, the major thrust should be on afforestation because only the forest products would meet the demand of the energy requirement of the rural people. But big community bio-gas (100 m) plants may be feasible i.e. may compete with fuelwood but without forest resources, the livestock may not be sustained to have sufficient bio-mass for such plants. Hence, afforestation is the only solution for the rural energy supply.

For industrial development and for meeting the energy demand of the urban people, hydro-power plants (50-100 M.W.) should be constructed at an interval of three years. But the sale of power from such plants should not be subsidized. These power plants should be self-sustaining i.e. the consumer should pay the fair price of energy.

There should be a single institution which deals with all kinds of power and energy. The development of energy as a whole should be seen as a single most requirement of the country. As energy is the basic infrastructure for the development of the country, due attention should be given to this sector. High level organizations responsible for power and energy should be established. Massive investment from the public should be attracted to this sector. This could be done by giving land to the individuals for development of forest. HMG publicly enquires the development of forest but often lacks in implementation. Most of the people have difficulty to acquire government land on lease for forestry development. Even if they acquire, there is no guarantee that they would be able to plant trees on their land because the local people often use the government land as grazing land and would not like such land to be afforested. Hence, the government should give sincere support to the people and the institutions when they are willing to develop private or institutional forests. Lack of such approach but making provision for the forest would not help anymore to develop forestry.

Development of mega power station e.g. Chisapni (3,600 M.W.) would not be feasible considering the following points:

- Resources are not available to construct such power stations even internationally.
- Sales of energy from such stations will not be economical because construction costs of power stations in Nepal are higher than the neighbouring countries where power may be sold.
- Benefits will be available to the few people.
- Energy generated from such power plants will not be able to substitute fuelwood which is still less costly due to lack of opportunity prices of the rural labour.

Presently, the cheapest possible site should be selected and developed.

FOOTNOTES

1. The Economic Affairs Report, Vol. I, No. 1 & 2, 1963, No. 2, p. 13 & 14.
2. Budget Speech of FY 1984/85, HMG/N.
3. Nepal: Issues and Options in the Energy Sector, Aug. 1983, IBRD, p. 52.
4. The Sixth Plan (2037-2042), Part 1, p. 562 (in Nepali).
5. The Sixth Plan (2037-2042), Part 1, p. 566 (in Nepali).
6. Nepal: Issues and Options in the Energy Section, August, 1983, p. 83. Report No. 4474-NEP UNDP/IBRD.
7. Economic Survey, Fiscal Year 1983-84, HMG, Ministry of Finance, p. 29.
8. Basic Principles of the Seventh Plan (1985-1990), p. 49.

## BOOK REVIEW

Kainth, G.S. and Bawa, R.S.; (1985): Economic Development and Structural Changes: An Empirical Investigation, (New Delhi: Inter-India Publications), pp. 159, price I.C. Rs. 180/- (\$ 36).

The present book 'Economic Development and Structural Changes: An Empirical Investigation' is an important addition to the existing literature on the economics of development. The book is an empirical investigation of the development experience of Panjab, a fast developing Indian State with basic agrarian economy. Panjab is a most prosperous Indian State and had the fastest growth experience of all States during last three decades.

The book is split up into six parts. The authors start with the problem of measuring the growth of an economy. Of all indicators such as per capita income, per capita consumption, rate of saving, investment and employment and structural changes in the socio-economic set up; per capita income is chosen as convenient, easily available, easily understood and best single index of economic growth. Hence, the GDP and its composition has become the focal point of the present study. In low per capita income countries the largest portion of income comes from agriculture and a smaller portion from industry and smallest from service sector. With the economic development the share of agriculture falls, of industry firstly increases at a higher rate and then at a lower rate while that of services firstly at a slower rate and then at a higher rate. With these assumptions the authors have tried to visualize the stage of growth in these sectors with the help of the empirical observations of the state of Panjab. The authors have reviewed various literatures available in the field.

The second chapter deals with the data base and methodology for the study. Net Domestic Product is viewed as a function of time. Some six linear and non-linear time trends are proposed. Various factors affecting per capita income have also been specified.

Sectoral growth and determinants of State Domestic Products are analysed in Chapter 3. To study the factors affecting growth of state income and per capita income three basic sets of variables relating to primary, secondary and tertiary sectors are used. In each set 12 variables are considered. All 36 variables are individually regressed with per capita income and each of them has explained significantly the variation in per capita income (on the basis of  $R^2$ ). Some six variable are selected for regression analysis to examine their combined influence on per capita income. However, the authors seem to agree that due to various problems including multicollinearity problem multiple regression analysis could not be an effective instrument for such analysis. But still the authors are able to conclude that the Net State Domestic Product can be increased by increasing primary and secondary sector income.

Chapter 4 deals with the sectoral composition of State Domestic Product, linkages among the sectors and the pattern of their structural changes. The authors have found that the share of primary sector falls

most rapidly in the early stage of development giving rise to rapid increase in the share of secondary and tertiary sectors in total income. The observations accord well with the predictions of development theory - that not only a relative transfer of resources from primary to non-primary sector may be expected as per capita income rises but also (under the assumption of diminishing marginal returns) that the pace of resources transfer will slow down as income rises. At low income levels, when the economy is almost entirely agrarian and marginal productivity in agriculture is low, a large decrement in primary labour force is possible for a given increment in productivity then when the share of primary sector in the total economy is smaller and marginal productivity is higher.

The inter-relationship between growth of agriculture and industry has also been examined in the same chapter. The industry is found more responsive to agricultural production leading to the conclusion that the agriculture can be put forward as a pre-condition for industrial development.

Chapter 5 analyses the terms of trade and sectoral redistribution of income. Sectoral terms of trade can play a crucial role as a steering mechanism to obtain desirable allocation of resources through price system. During the study period of 1960-61 to 1978-79 the terms of trade are found favourable to agriculture. However, the authors have cautioned that the improvement of the terms of trade for agriculture has not benefitted all the categories of the farmers. A large portion of the marketed surplus is contributed by big and medium farmers. Those who have no marketable surplus and are deficit in production will gain nothing, but lose as buyer when agricultural terms of trade improved. The authors mention that as the marketed surplus of the big farmers is very large, both in amount and as proportion of the produce, the rise in the agricultural terms of trade increases the capacity of the big farmers to invest and take advantage of new technology such as use of high yielding varieties of seeds, fertilizer, irrigation etc. On the other hand resource restraints prevent the small-sized farmers from taking advantage of use of the modern inputs. This leads to an increase in the inequality of income distribution in the rural sector.

Finally the authors have summarized their findings in Chapter 6. The authors are successful to present and analyse the facts. However, they are skeptical to present their own views and do not bother to give suggestions for improvement. The query always remains: if this is so, what is next ?

Overall the book is not just for casual reading. The use of mathematical models and statistical data has made the book informative and suitable to the academicians, the researchers, the policy makers and the planner. The book deals basically with the growth experience of Panjab but can be used as a model, with corrections, for many developing countries of the world where dominant agrarian economy prevails.

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