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National Strategy for Sustainable Development (nssd)

Status Review and Dialogue

Land and Agriculture

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CONTENTS

I PURPOSE

This is a review of the current state of policies, programmes, legislative framework and institutions that singly or in combination concern sustainable land use policy, land management and agricultural development in the country. This review seeks to achieve two main goals, namely: (a) provide an insight into the planning, budgeting/annual programming, implementation, monitoring and evaluation processes and the role of and the extent of involvement of the major stakeholders, including the intended/target beneficiaries; and (b) draw lessons/principles for use by the concerned authorities in Nepal both in ongoing plans/programmes/projects and those in preparation, and also for the guidelines of donors in providing aid to Nepal.

The country's efforts toward sustainable development, achievements made thus far, and gaps and weaknesses could not be comprehended properly without first tracing the historical process of interventions. Hence this paper starts with such a review of the past, and goes on to the current status. Finally, based on the past experience, implications are drawn for future actions that could guide the government and the donor community in more effectively promoting sustainable development in land use and agricultural development.

II CONTEXT

Historically, economic development has been the principal preoccupation of the government ever since the overthrow of the Rana Rule in 1951. Planned development began in 1956 with the launching of the First (five-year) Plan that year, and the country is mid-way into the implementation of the Ninth (five-year) Plan. On the other hand, sustainable development is relatively a new concept in the development history of Nepal.

For the past nearly four decades, the agriculture sector of Nepal has been caught in a spiral of low growth (see APROSC and JMA 1985, chapter 1). Yet, little analytical work appears to have been undertaken to ascertain the principal determinants of this phenomenon, and much less on initiating effective remedial measures. All we know in general terms is that this predominant sector of the economy is still overwhelmingly subsistence-oriented, highly diversified at the farm level (an antithesis of specialisation and commercialisation), and grossly ill served with access to modern productive inputs and technology delivery services.

In recent years (1984/85-1999/00), Nepal's GDP in real terms has grown at an annual rate of slightly less than five percent (Table 1). In contrast, agricultural GDP during the same period grew only by less than three percent. These growth rates were still lower during the period 1974/75-1983/84. However, these differences are mainly due to the official revision of agricultural and national GDP series from 1984/85 onwards, rather than due to a perceptible shift in the overall structure of the economy and on the technological frontier. In any case, these trends, when compared to the annual population growth of about 2.5 percent, present a quite disturbing picture.

Table 1: Growth in Real GDP, Nepal, in Percent

Items	1974/75-1983/84	1984/85-1999/2000

Total GDP	2.95	4.93
Agricultural GDP	1.73	2.90
Nonagricultural GDP	5.23	6.87

Note: These are annual average growth rates computed by fitting least-squares log-linear regression lines.

Source of basic data: HMGN, Ministry of Finance, Economic Survey (1999/2000).

The production of the two principal food crops (paddy and maize) over the period 1974/75-1996/97 grew nationally by less than 0.5 percent per year, with negative to near zero growth in the mountains and hills. These alarming trends for paddy and maize were to some extent compensated for by the rather encouraging growths in wheat and potato (Table 2).

Table 2: Average Annual Growth Rates in the Production of Four Major Crops, 1974/75-1996/97, in Percent

Regions	Crops			
	Paddy	Maize	Wheat	Potato
Nepal	0.37	0.47	3.78	4.01
Mountains	-0.32	-0.35	5.36	3.43
Hills	-0.02	0.13	2.99	3.33
Terai	1.68	1.88	4.16	5.62

Note: Calculated the same way as Table 1.

Source of basic data: HMGN, Ministry of Agriculture.

The rather insignificant three percent growth in the country's predominant economic sector—employing more than 80 percent of the economically active population and contributing around two-fifths to the gross domestic product—is quite inadequate to meet the country's growing food demand, and to trigger a process of overall economic transformation.

It is also noteworthy that the proportion of the economically active population depending on agriculture has fallen by about 13 percentage points in the past two decades, from 94 percent in 1971 to 81 percent in 1991. On the other hand, the share of this sector in the GDP has dropped more sharply, from around 72 percent in 1974/75 to 40 percent in 1997/98. These disproportionate drops in the sector's share in the total employment and income indicate a declining productivity within the sector.

III POLICIES AND PROGRAMMES

Government policies, strategy and priorities as reflected in the two previous periodic plans (Seventh and Eighth Plans) and the current Ninth Plan, among others, are: (a) high priority to the provision of production inputs in irrigated areas for food production, and around the processing plants for supplying industrial raw materials; (b) concentration of efforts for the production of perishables such as fruits, vegetables, milk and fish in accessible areas; (c) protection of tenants through rent fixation; (d) expansion of irrigation, particularly hill irrigation; and (e) afforestation through a participatory approach (NPC 1985, 1992, 1998). Following the preparation of the Agriculture

Perspective Plan and its endorsement by the government in 1995, the Ninth Plan has reiterated the crucial importance of the agricultural sector in the overall economic transformation by adopting an agriculture led growth strategy.

A comparison of the objective statements of the previous Seventh and Eighth Plans and the current Ninth Plan indicates broad similarities both at the aggregate and at the sub-sectoral levels, although the Eighth Plan put more emphasis on regional balance and the need to take advantage of the ecological diversity of the country, while the Ninth Plan has relied heavily on effective implementation of the Agriculture Perspective Plan. Similarly, a concern for environmental protection and preservation of the country's biodiversity is explicit in the Eighth and Ninth Plan documents. Insofar as the issue of poverty alleviation is concerned, the Seventh Plan document has treated it through the "fulfilment of basic needs, and increasing productive employment opportunities", while the Eighth and Ninth Plans have devoted separate chapters on this issue. In fact, the Ninth Plan's main objective is to reduce poverty through the implementation of programmes in the identified priority sectors such as agriculture; water resources; social sector; industry, tourism and international trade; and physical infrastructure.

The distinguishing feature of the Ninth Plan is the adoption of a 20 year perspective and its emphasis on an agriculture led and integrated cross-sectoral development approach.

IV NINTH PLAN

The strategy of the Ninth Plan is "integrated development of agriculture and forestry sectors and high, sustainable and poverty alleviation-oriented economic growth with a focus on those sectors" (NPC 1998; p. 73). The plan seeks to achieve high economic growth through effective implementation of the Agriculture Perspective Plan by increasing agricultural productivity by "guaranteeing the safety of land ownership, giving the landless access to land, extending land ownership, and alleviating poverty through the promotion of economic growth and employment by establishing, developing and expanding agro-based industries" (Ibid., p. 73).

Environment and sustainable resource management is recognised in the Ninth Plan as well. It defines resource management from the standpoint of sustainable economic development as fulfilling the needs of the present and future without depleting the available stock of resources (p. 270).

The following are the objectives of the plan regarding environment and sustainable development (p. 275):

- Consolidate the functions of the environment cells and planning sections of various ministries to ensure integration of environmental considerations in the overall economic development process;
- improve the work efficiency of human resource engaged in environment related areas;
- establish coordination among the agencies concerned with environment and development;
- adopt an integrated approach toward environment and development;
- formulate and coordinate legal provisions related to national resource conservation';

- expand the coverage with respect to biodiversity;
- continue scientific approach to forest management;
- fix emission and effluent standards and enforce mandatory and voluntary measures for pollution control;
- devise legal measures to effectively mobilise the nongovernmental organisations and private sector in environmental protection, public health and waste management;
- adopt consistent policies related to economic and fiscal matters and the environment; and
- minimise the loss to life, property, national heritage and development infrastructures arising from natural disasters, establish an appropriate organisation for natural disaster management and develop national capacity for disaster control.

A separate section is devoted to "environment and agriculture" (Chapter 10, Section 11) under which emphasis is given to the need for balanced use of fertilizers and integrated plant nutrition management (IPNM), integrated pest management (IPM), appropriate land use, conservation of the Siwalik zone, community and leasehold forestry programmes, application of bioengineering methods in the construction of agricultural roads, and promotion of perennial horticultural and cash crops in the mountains and hills.

The plan spells out the following 20 different areas as the major sectors of development thrust (Ibid., pp. 76-104), and these do not include sustainable development: (i) Macro-economic stability; (ii) poverty alleviation; (iii) population planning and family welfare; (iv) human resource development; (v) domestic savings mobilisation; (vi) development of private sector and enhancement of competitiveness; (vii) science and technology; (viii) information technology; (ix) development of agriculture sector; (x) electricity development; (xi) tourism development; (xii) utilisation of ecological variations and biodiversity; (xiii) regional balance; (xiv) development of backward regions; (xv) productivity enhancement and quality management; (xvi) development of agro-industries; (xvii) decentralisation and strengthening of local self-governance; (xviii) mobilisation of NGOs for local development; (xix) women's development and empowerment; and (xx) administrative reforms.

However, interrelated areas such as (i) environment and natural resource management, (ii) land use plan and land reform, and (iii) forest development appear in a separate chapter (Chapter 9) entitled "Environment and Sustainable Resource".

4.1 AGRICULTURE IN THE NINTH PLAN

Sector objectives in the Ninth Plan are the following:

- Poverty alleviation through increased productivity of resources and inputs;
- prevention of adverse environmental impacts of external (purchased) inputs and natural resources through their balanced use;
- Promotion of agro-based industries and industrialization through diversification and commercialization of agriculture;

- Enhancing women's participatory role in agricultural development and develop their leadership in productive activities; and
- Improve the people's nutritional level and food security through the production of food and nutritive products.

The Ninth Plan treats agriculture as the lead sector, meaning that developments in other sectors and subsectors (such as irrigation, roads, electricity, industry and trade) would be designed with a view to making a positive contribution toward meeting the objectives of the agricultural sector. The plan envisages to restructure and reorient the programmes, budgetary allocations, human resource mobilisation and institutional resources along the priorities mentioned in the APP. Consistent with the APP strategy, the plan seeks to adopt an integrated approach by simultaneously dealing with interrelated areas such as land reform (limited to removal of dual ownership and attention to squatters and *kamaiyas*), irrigation, agricultural roads, agricultural cooperatives and agro-industries.

V RESOURCE ALLOCATION

In terms of allocation of public sector resources, the agricultural sector (broadly defined to include agriculture, forestry, fisheries and irrigation) has been receiving the highest share of public expenditure, particularly since the Sixth Plan period. Of the total amount of Rs 19,815 million spent on this sector in real terms during the period 1984/85-1994/95, the share of agriculture proper was 38.7 percent, while that of irrigation was 43.8 percent. Forestry accounted for the balance (16.7%), while land reform received only a marginal (less than 1%) amount (Table 3).

Table 3: Public Sector Development Expenditure in Agriculture (Rs.'000), (1984/85-1994/95)

	Agriculture			Irrigation			Land Reform			Forestry			Total		
Year	Nominal	Real	%	Nominal	Real	%	Nominal	Real	%	Nominal	Real	%	Nominal	Real	%
1984/85	703.6	703.6	42.28	652.2	652.2	39.19	17.9	17.9	1.08	290.4	290.4	17.45	1664.1	1664.1	100.00
1985/86	856.2	738.1	41.03	846.7	729.9	40.57	18.9	16.3	0.91	365.0	314.7	17.49	2086.8	1799.0	100.00
1986/87	681.7	516.4	35.07	846.8	641.5	43.57	26.7	20.2	1.37	388.4	294.2	19.98	1943.6	1472.3	100.00
1987/88	928.9	623.4	41.24	854.7	573.6	37.94	19.6	13.1	0.87	449.6	301.7	19.95	2252.8	1511.8	100.00
1988/89	1016.2	627.3	31.51	1623.2	1002	50.33	29.3	18.0	0.91	556.7	343.6	17.25	3225.4	1990.9	100.00
1989/90	1183.5	650.3	62.62	1204.8	66.2	40.51	38.8	21.3	1.30	547.2	300.7	18.39	2974.3	1038.5	100.00
1990/91	1534.6	787.0	48.66	1118.9	573.8	35.48	40.4	20.7	1.28	460.1	235.9	14.58	3154.0	1617.4	100.00
1991/92	1276.0	550.0	28.97	2212.2	953.5	50.23	31.3	13.5	0.71	884.3	381.2	20.08	4403.8	1898.2	100.00
1992/93	2077.2	827.6	41.31	2017.3	803.7	40.11	5.9	2.3	0.12	928.8	370.0	18.46	5029.2	2003.6	100.00
1993/94	2300.3	842.6	35.37	3232.1	1183.9	49.70	4.2	1.5	0.06	966.5	354.0	14.86	6503.1	2382.0	100.00
1994/95	2348.0	801.4	43.56	2637.1	900.0	48.92	1.7	0.6	0.03	404.0	137.9	7.49	5390.8	1839.9	100.00
Total	14906.2	7670.7	38.71	17246.0	8674.3	43.78	234.2	145.4	0.73	6241.0	3324.3	16.78	38627.9	19814.7	100.00

Source: HMGN, Ministry of Finance, Economic Surveys.

Within the irrigation subsector, a large chunk of the resources has gone to large and long-gestation surface irrigation projects whose reliability, utility and cost recovery have been widely questioned. The Eighth Plan itself says: "Construction works of big projects planned to provide irrigation facilities to large areas [are] not being completed in time and completed projects [are] not operating in full capacity. [There is] no timely availability of water required for irrigation and [there is] increasing financial burden on HMG due to disappointing realization of water cess and consequent need to make large annual budgetary investments in repair and maintenance of the system. Per hectare costs of projects constructed at the government level [are] higher" (NPC 1992, p. 262). Yet, the share of resources allocated to the large projects in the total public sector outlay for irrigation is higher (75%) in the Eight Plan as compared to the Seventh Plan (66%). The reason seems to be the commitment made with the donors during the past plans and protracted delays in their completion.

A study on public resource allocation to agriculture (Thapa 1994) showed that the resources allocated particularly for research and extension services is declining in real terms. The same study also indicated that a substantial portion of the budget allocated to agriculture proper (i.e., crops, livestock and fisheries) was for the purpose of subsidising fertilizer prices (withdrawn recently).

VI CONSTRAINTS AND AWARENESS REGARDING SUSTAINABLE DEVELOPMENT

6.1 MISPLACED PRIORITIES

A serious weakness lies in the way main development problems and constraints are identified in one way and policy prescriptions and development programmes are implemented another way. For instance, lack of physical and institutional infrastructure, rugged terrain, and land-locked geographic position and open and porous border with India are often cited as the main hurdles to Nepal's development. The array of macro-economic policy prescriptions made by the influential donors in the wake of 'liberalisation and privatisation', for example, suffer from this fallacy. The hasty move to privatise some of the activities dealing with the distribution of critical and sensitive production inputs such as chemical fertilizers without considering the prerequisites of prior preparation is an example of the false assumptions related to institutional infrastructure[1]. Of direct concern to the agriculture sector is the confusion created by such false assumptions regarding the role of the government and the private sector in the actual distribution of farm inputs and outputs vis-a-vis assurance of quality and safety of the products and services traded.

A prudent approach under such a situation would be to give priority to the development of basic physical and institutional infrastructures. The rugged terrain and the land-locked situation in fact imply the need for more of physical infrastructures such as transport and communication networks than are required under relatively easier geographic conditions. Another important requirement is to strengthen the key

[1] For a recapitulation of such false assumptions and the resultant anomalies, see Devendra P. Chapagain (1999), *Liberalisation, or Strangulation? An Overview of Liberalisation and its Effects on Agriculture and Poverty in Nepal*, a paper presented to the Institute for Integrated Development Studies, Kathmandu, Nepal.

institutions and develop the country's internal capacity to recognise the changing internal and external milieu and to adjust itself accordingly. It includes the development of internal capability to redefine the role of the existing institutions rather than to destroy them to create yet another unsustainable (hence temporary) institution. Unfortunately, destruction of the existing institutions, mostly at the behest of the 'donors', has become a predominant feature of the recent past.

6.2 ADMINISTRATIVE INSTABILITY

Destabilisation of the administrative machinery seems to be an endemic phenomenon in Nepal. It manifests itself in the all too frequent personnel turnover. Every time a minister changes, a wave of personnel turnover takes place at all the levels, starting with the Secretary of the concerned ministry and then on to the lower echelons pervading the entire organisation. Considering the fact that the Nepalese bureaucracy is relatively young and that personal attention and attitude of the managers still heavily influence most of the development activities, the effects of such turnover is detrimental. Since the country is extremely diverse, full knowledge of the socio-economic and agro-ecological nuances is a *sine qua non* for any programme to succeed. Viewed from this angle, the effect of the frequent personnel turnover on agricultural development is disastrous.

The turnover rate was equally high in other entities, such as the Agricultural Inputs Corporation (AIC) (responsible for fertilizers and seeds), Agricultural Development Bank (ADBN) (which provides credit), and the Ministry of Water Resources (MOWR) and the Department of Irrigation under it (which is responsible for irrigation).

Lack of continuity in the programme is an immediate effect of such personnel changes. As a result, the same or similar programmes are repeated time and again. A new donor may pick up a programme as a new one, especially if the programme is initiated after some hiatus and the initial donor or collaborator has withdrawn. This leads to frustration among those who have seen such repetition time and again. With the passage of time, these frustrated individuals become senior staff members in the administration. This tendency in itself has become a serious constraint to Nepal's agricultural development as the available scarce resources are wasted.

Therefore, the real challenge lies in avoiding such a tendency. The best strategy to do so would be to empower the entities that provide continuity through full decentralisation. This means *delegation* of authority to the point of action within the organisation, and *devolution* of authority to the local bodies and people's representatives at the grass-roots level, and to the lower echelons of bureaucracy.

Considerable stability potentially exists at the District Development Committee (DDC) level since its members are elected for a term of five years, and the chair rarely changes during that period. Besides, according to the recent decentralisation move, the DDC is expected to play a coordinator's role and serve as the focal point for all the development activities at the district level. As will be referred to later also, this is the brightest spot on the scene that should be capitalised for agricultural development as well.

6.3 EXCESSIVE DEPENDENCE ON DONORS

About two-thirds of the development budget (capital expenditure) of His Majesty's Government of Nepal (HMGN) is derived from external sources either as grant-in-aid or as long term loan[2]. In the recent years, the proportion of external loan is rapidly increasing as compared to grant-in-aid. All political parties that have formed the government since 1991 have taken the instance that higher levels of foreign aid are an indicator of their popularity among the donors. As a result, regardless of their preaching and ideological orientation, all the governments formed since the general election of 1991 have given priority to increasing the volume of foreign "assistance", while relegating the relevance of the "assistance" to secondary or tertiary level. This tendency has contributed to increasing the already high level of external dependence. It has also become a constraint to efficient resource allocation as most of the domestic resources including technical manpower are tied to the "assistance" as counterpart contribution.

The destabilised bureaucracy hardly gets any chance to maintain continuity and the associated advantage in negotiating with the 'donors'. The mandate and priorities of the various 'donors' operating in Nepal seem to be constantly changing, regardless of Nepal's needs and priorities. In a situation like this, it is easily conceivable that the real priorities of Nepal are relegated to a secondary position[3]. Thus such a heavy dependence on the donors has become a serious constraint to maintaining the minimally required continuity in any programme, let alone the question of assessing its long-term sustainability[4].

In effect, the above situation demands a much higher degree of professionalism, continuity, and a full understanding of the country's basic problems and requirements on the part of donors and cooperators. Given its level of development, the possibility of Nepal's essential requirements differing from the priorities and the agenda of the donors should not be ruled out. Therefore, the issues are how to: (a) insure that the country's requirements receive priority considerations; and (b) avoid potential wastage of resources and frustration.

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2 The average figure for the last three years, i.e., the years ending in the budget for 1999/2000 is 62.74%. This figure includes only the amount that passes through the books of the Comptroller General of Nepal. A significant proportion of the technical assistance particularly for expenditures on the experts/consultants and training/fellowships that constitute an integral part of the development expenditure does not pass through the Comptroller General's office as these are handled directly by the respective donors/cooperators. Thus the above proportion tends to underestimate the actual volume of external assistance. For recent trends, see for example, MOF (1999), *Economic Survey, Fiscal Year 1998/99*, Table 8.1 and the following tables, or the Budget Speeches of the Finance Minister.

3 Although all the donors officially say that they are merely responding to the 'national priorities' and as per the government's 'request', the reality, especially in the recent years, seems to be the other way around. Generally, the donors will tell the government of their priorities. The government's role then is reduced to merely responding to those priorities. The donors "assist" the government by drafting and finalising the "official request" on behalf of the latter.

4 For a succinct description of the way in which the priorities are distorted by the donor agencies and the effects of such distortions in terms of the failure to reduce poverty, see John W. Mellor (1999), *Why Has Foreign Aid been So Ineffective in Reducing Poverty?*

VII SECTOR SPECIFIC ISSUES AND CONSTRAINTS

The sector specific policy and institutional issues and constraints are manifest in a number of ways. The frequently cited cases include the unavailability of good quality seeds and chemical fertilizers, inadequacy of irrigation facilities, lack of technical know-how, inadequacy of the extension services, disease and pest infestation problems, lack of market opportunities, and inadequacy of credit facilities. To facilitate the analysis and identification of policy actions, these constraints could also be reclassified as: (a) domestically produced inputs which include seeds, planting and breeding materials, and irrigation facilities; (b) internationally procured inputs such as chemical fertilizers, pesticides and herbicides; and (c) support services such as agricultural credit, markets and marketing facilities. In general, their origins lie in the lack of prioritisation. Wherever a semblance of priority existed in the past, they either lacked continuity or were uncoordinated with other activities.

7.1 SEEDS AND PLANTING MATERIALS

Inadequacy, lack of timely availability, or poor quality of seeds and planting and propagation materials are repeatedly cited among the avoidable, yet the most serious, widespread and recurring constraints. Unavailability of seeds of high yielding cereal varieties at *affordable prices* cited as one of the constraints faced by the farmers has two dimensions. The first is related to the actual physical shortage or unavailability. The second is related to the price or 'affordability'. Both are interrelated. A variety of approaches have been tried in the past to remove these constraints, and yet, they persist. It is a result of the predominance of subsistence production on small farms across the diverse agro-ecological conditions amidst rudimentary transport infrastructure throughout most of Nepal. The situation does not favour large-scale production and distribution of limited varieties of any given crop and to take advantage of economies of scale. On the contrary, these physical limitations contribute to increasing the cost of distribution, especially the seeds of cereal grains. The varieties have to be commercially attractive and promise high returns. On the other hand, the research system is compelled to recommend only those varieties that are suitable for relatively low fertility and low-external inputs regime because fertilizer is not easily available and most of the Nepalese agriculture is still rainfed. The latter situation and its requirements somehow lead to selection of varieties that do not yield much.

Table 4 presented below indicates the results of such a policy. Ever since its establishment in the early 1960's, the agricultural research system of Nepal has recommended 44, 15 and 27 improved varieties of rice, maize and wheat, respectively. The highest average yield levels achieved in the research stations under optimum technical conditions are taken as the potential yields of the recommended varieties. Measured against this yardstick, the potential yield of the highest yielding variety of paddy is just about 50 percent higher than the average yield achieved by farmers of Kathmandu, the district which recorded the highest average yield for that crop in 1998/99. The situation is slightly better for wheat and maize. Yet their potential is still lower than the national average yields of the country with the highest yields of these crops within the Asia-Pacific Region save the case of wheat for New Zealand.

Table 4: Potential Yields of Recommended Varieties of Paddy, Maize and Wheat in Comparison with the Highest Actual Yields Obtained within Nepal and in the Asia-Pacific Region

Yield Range (Mt/Ha)	Crop			
	Paddy		Maize	Wheat
	Early	Summer		
3.0 to < 3.5	-	2	2[3]	-
3.5 to < 4.0	3	5	2	-
4.0 to < 4.5	3	8	7	8
4.5 to < 5.0	4	3	2	3
5.0 to < 5.5	-	1	1	11
5.5 to < 6.0	-	2	-	4
6.0 to < 6.5	-	3	1	-
6.5 to < 7.0	-	4	-	1
7.0 to < 7.5	-	2	-	-
7.5 to < 8.0	-	4	-	-
Total	10	34	15	27
Average yields (1998/99) of:				
Nepal	-[4]	2.45[2]	1.68	1.70
District with highest yield		Kathmandu	Bara	Rautahat
Yield	-[4]	5.00	2.72	2.40
Asia–Pacific (AP)[1]		6.50	6.53	1.94
Highest country in AP		Australia	New Zealand	New Zealand
Yield	-[4]	10.27	9.78	5.19

Notes: (1) Figures for the Asia-Pacific region refer to the year 1998.
(2) The figures refer to the average of both early and summer paddy.
(3) The yield of one variety was as low as 2.2 mt per ha.
(4) Separate figures are not available for the yield of early paddy.

Sources: MOA (1999), Statistical Information on Nepalese Agriculture 1998/99; and FAO (1999), Selected Indicators of Food and Agriculture Development in Asia-Pacific Region, 1988-98, Regional Office for Asia and the Pacific.

Most of the seed production and distribution in Nepal is traditionally extremely decentralised. It is still in the hands of millions of farmers, and it is explained, at least partly, by the above reality. It should be taken as the major determinant in designing a seed production and distribution strategy. Yet, it seems consistently ignored. On the contrary, attempts were made in the past to produce and distribute seeds through a centralised system via the AIC. All decisions would take place in Kathmandu in the headquarters of the AIC as this approach is bureaucratically convenient. This is the crux of the problem. They failed, as was to be expected.

It should be clear at this point that the problem was not with the AIC as an institution as such. It is with the enforcement of a centralised system of planning and control. The extreme ecological diversity together with physical inaccessibility due to poor transport and communication facilities has created a variety of isolated micro-economies in Nepal. This reality demands a decentralised management system. What has actually been adopted in Nepal is a centralised system. Hence the anomaly.

The issue of ***affordability*** has three aspects which need attention. The first is related to the actual cost of production and distribution. The preponderance of small-scale production of several varieties of a given crop is a reality dictated *inter alia* by diverse

ecological conditions of the country. As mentioned above, decentralised production and distribution is the only policy option in this situation to reduce the cost of production, especially to ensure proper distribution in the short run. In the medium to long run, however, improvement in transport is necessary in order to reduce the cost of distribution. The second aspect of the issue of affordability is the factor-product price regime. The existing price regime vis-a-vis the expected yield from the open pollinated varieties of cereal crops does not make them commercially attractive. The third aspect is related to expectation. Thanks to the donor driven projects and programmes, farmers expect free or highly subsidised distribution of production inputs at their doorstep. "In spite of the farmers' willingness to use improved seeds, they perceive that the price of AIC seeds is high", as reported in the Shakya study[5]. It is essentially a reflection of such expectations created by the earlier donor sponsored interventions. Donors' cooperation is necessary to rectify the situation.

What has been said about the seeds of the cereal crops is true of fruit plants and young animals as well. Shortage of seeds, planting materials and the like (in the livestock sub-sector) has become a constraint of generic nature. Despite years of 'efforts', and a very high potential to produce these critical inputs domestically, a lasting solution is yet to be found. Generally, the search has been for a solution from within the hard-core agriculture sector, that too confined to the technicalities. A sustainable solution, however, requires more investment and effort outside the realm of the hard-core agriculture sector. This is the crux of the problem.

7.2 UNAVAILABILITY OF CHEMICAL FERTILIZERS

A study mentioned earlier observed that "low crop yields in Nepal are mainly due to severe soil fertility constraints. This in turn is due to slow growth in fertilizer use and declining availability of organic manure. Chronic inadequacy of aggregate fertilizer has been, and continues to be, the most binding constraint to rapid growth of fertilizer use in the country. Analysis of both demand and supply bear this out"[6]. This constraint has become more serious recently as the result of a confluence of policy rigidities on the domestic front and developments in the external sector.

A brief recapitulation of the historical background to fertilizer marketing and pricing is necessary in order to understand fully the underlying reasons behind this situation. Mineral fertilizer was introduced to Nepal as late as in 1960/61. Until 1965, import and distribution of fertilizer was in the hands of the private sector traders without government interference[7]. To begin with, the government accepted the donors' recommendations to popularize the use of fertilizer[8] as a mean to increasing food production. A number of donors supported this policy. They not only provided fertilizers on a grant basis[9], but they also helped to create the Agricultural Supply

5 Shakya, P. B. (1998).

6 Obaidulla Khan (1998).

7 Tamrakar, A. M. (1979), "A General Review of Fertilizer Marketing System in Nepal".

8 Available records indicate that 98 mt of ammonium sulphate was imported in the financial year 1960/61 (2016/17 B.S.). See for example, Ministry of Land Reform, Food and Agriculture (1967), *Progress Report 2023/24* (in Nepali), pp. 15-16.

9 According to a FADINAP report of 1983 which is based on the information provided by AIC, the share of fertilizers provided on grant by the donors in the total fertilizer import, although fluctuating, was as high as 81% until 1978, which decreased to 52% in 1982 (FADINAP, 1983, "Marketing, Distribution and Use of Fertilizer in Nepal".

Corporation (ASC) as the sole agency for fertilizer procurement and distribution, and in rapidly expanding it. In essence, the present AIC[10] is a reorganised ASC. Thus, it were the donors, which pushed for the government's heavy involvement in fertilizer trade.

On the pricing front, until 1972, fertilizer prices were determined on the basis of cost (to AIC) plus principle although AIC and its predecessor organisations were created for service, not as a profit making organisation. Generally, a donor would provide fertilizers on grant. These fertilizers would be sold at a predetermined price, which would generally be close to the sales price in the adjoining areas of India. It would also consider the international cost-insurance-freight (c.i.f.) price up to Calcutta, the port of entry, plus the cost of transport and marketing. The sales proceeds after deducting the AIC's costs were deposited in a specially created 'counterpart fund' account of the respective donor. The monies so generated in the counterpart fund were then spent on mutually agreed project(s). In general, there was no subsidy to the fertilizer consumers as the prices were reflective of the international prices also. Whenever some element of subsidy appeared due to the movement of prices in the international market, the entire cost, as was generally expected, was borne by the donors.

Similarly, until 1972, the AIC had different sales prices for the Tarai and for the hills and mountain regions. From the financial year 1972/73, responding to reports of acute food shortages in some hill districts, the government adopted a policy to subsidise fertilizer price by bearing all transport costs up to the respective district headquarters[11]. Prices in the Tarai region were revised upward to prevent leakages to the south across the border. By that time, the popularity of fertilizer had increased. Any move to increase its prices tended to invite strong political resistance especially in India, and Nepal would also follow the same suit. Thus a policy of keeping fertilizer sales prices close to the price across the border along with a uniform domestic sales price was adopted.

India has a much larger economy relative to that of Nepal, and it is also the principal buyer of Nepal's farm products. These two countries share an open and porous border. India continues to subsidise fertilizer prices. Given this situation, Nepal had to adopt a policy of maintaining parity in price to avoid cross-border leakages of fertilizer The government expected the donors also to understand this situation. This policy continued until 1992 when the government eliminated subsidy from all non-urea fertilizers[12].

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10 Available documents, viz., T. Sakiyama (1971), "International Assistance to Nepalese Agriculture (1951-70)", indicate that the Agricultural Supply Corporation (ASC) was established in February 1966 with the assistance of USAID. In 1972, ASC was merged with the then Food Management Corporation (which was responsible for food distribution to form an Agricultural Marketing Corporation (AMC). Three years later, i.e., in 1975, AMC was bifurcated to create the present Agricultural Inputs Corporation (AIC) and Nepal Food Corporation (NFC). A number of bilateral and multilateral agencies including those that are currently determined to see immediate abolition of AIC and NFC were responsible for the massive investment in expanding these institutions.

11 Tamrakar, A. M. (1979).

12 Pashupati Gautam (1999). "*Agricultural Inputs corporation in the Deregulated Fertilizer Market: Challenges and Opportunities"*, paper presented at a National Workshop on Fertilizer Marketing Systems and Related Government Policies in Nepal, Kathmandu (mimeo).

Following the government's embarkation on the World Bank/International Monetary Fund (IMF) sponsored Structural Adjustment Programme in 1985, the Nepali Rupee was floated with respect to the major convertible currencies while maintaining a fixed exchange rate regime with the Indian Rupee. Also, a ceiling seems to have been imposed on the total budget allocated to subsidise fertilizer price to maintain the budgetary deficit within limit. These policies led to a radical change in the fertilizer sector, especially since the early 1990's. First, the Nepali Rupee, as compared to the major convertible currencies[13], rapidly depreciated while the exchange rate remained the same with respect to the Indian Rupees[14]. This made the fertilizers expensive, in terms of the Nepali Rupee, at the point of procurement itself. Yet, due to the government's above mentioned policy of maintaining price parity across the border and continuation of subsidy in India, the sales prices were not revised[15]. Nor was AIC provided with the requisite capital to cover its losses in time. The financial position of AIC deteriorated[16].

To improve the situation, the government approached the donors for help as they were providing the bulk of the fertilizers being sold in Nepal on a grant basis. The donors, especially the international financial institutions, responded by providing limited capital assistance and tied them with 'Technical Assistance' (TA). In effect, it meant involving themselves in the AIC management via the TA, an area in which they should have carefully evaluated their own capability. This was the second development. Since the problem had a political origin, the plethora of TAs imposed on the AIC contributed to frustration among the staff as it introduced a new variety of distortions, thus making the problem worse.

The problem of inadequacy of financial resources provided to AIC to back up the government policy to distribute fertilizers at a subsidised price remained unattended, thus worsening AIC's financial position. The Corporation started to adjust (effectively reduce) the quantity of fertilizer import only to the extent the amount allocated for subsidy could sustain. Thus over the years, the quantity of fertilizer distributed started to decline drastically, so much so that the total quantity of fertilizer (nutrient) distributed in the financial year 1997/98 was the lowest in the decade as is evident from Table 5. In summary, while the government policy to keep fertilizer prices at par with the prices across the border could be considered sound in view of the fact that

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13 For example, in July 1995, the exchange rate was Rs. 50.94 per US$. By December 1999, the rupee depreciated by roughly 35% and the exchange rate was Rs. 68.80 per US$.

14 The exchange rate is fixed at Nepali Rupee 1.6 per Indian Rupee.

15 For example, in February 1993, the sales prices of urea, complex, diammonium phosphate (DAP) and potash were fixed at Rs. 5600, Rs. 10000, Rs. 12500,and Rs. 8500 per metric ton, respectively. The prices of urea and DAP remained constant until mid-April 1997. The price of potash was increased to Rs. 9350 in April 1998. In the case of Complex fertilizer, the sales price has remained constant ever since April 1993 (See Ministry of Finance 1999) for further details.

16 Although the figures regarding the actual cost and loss to AIC seem to differ from each other, the following recent papers provide a general picture of the sector in the recent years: (i) Pashupati Gautam (1999) (ii) A. M. Tamrakar (1999*), "Private Sector Participation in Fertilizer Marketing in Nepal",* paper presented at a National Workshop on Fertilizer Marketing Systems and Related Government Policies in Nepal; (iii) Manfred Jeebe (1999), *"Fertilizer Policy in Nepal: International and Regional Perspective",* paper presented at a National Workshop on Fertilizer Marketing Systems and Related Government Policies in Nepal.

India is the major buyer of the Nepalese farm products, it however lacked financial resources to effectively implement the policy.

Third, and perhaps the worst of all, is the increased political interference in fertilizer procurement. In summary, the country's policy is fuelling the fire of distortions in the fertilizer sector of Nepal that was lit by the donors.

Table 5: Recent Trends in Fertilizer Consumption

(quantity in metric tons of nutrients)

Year	Nitrogen	Phosphorous	Potash	Total (Nutrient)
1987/88	38,112	15,211	858	54,181
1988/89	39,801	15,268	1,770	56,839
1989/90	49,206	16,742	1,338	67,286
1990/91	51,929	19,257	1,533	72,719
1991/92	59,956	22,833	1,602	84,391
1992/93	60,447	21,595	1,289	83,331
1993/94	55,385	17,149	1,278	73,812
1994/95	64,385	24,300	1,578	90,263
1995/96	46,448	21,306	2,400	70,154
1996/97	43,231	19,284	1,635	64,150
1997/98	32,629	13,124	1,257	47,010

Source: Ministry of Finance (1999), ***Economic Survey***, *Fiscal Year 1998/99*.

7.3 POOR TECHNICAL KNOW-HOW

Irregularity in cultural operations (particularly weeding and application of irrigation), complaints related to storage problems, low levels of application of agro-chemicals to control diseases and pests in spite of reports of frequent occurrence of diseases and pests are in a way the manifestations of poor technical know-how. The situation has arisen because of the low levels of education, on one hand, and the poor extension and technology dissemination system, on the other.

The counterproductive educational system of the country has alienated the rural youth from agriculture. Those who are unable to attend school may have learnt some practical skills from their parents. But those who had the opportunity to go to school could acquire such skills neither at home as they had to attend school, nor in the schools as the schools do not provide any practical skills. As a result, those without schooling are left with the age-old traditional knowledge and skills while those who had some schooling are deprived of even those traditional skills and knowledge. Thus the majority of the young farmers, especially those who had some schooling, report lack of know-how about the basics of agriculture. This is one of the underlying reasons behind the poor technical know-how reported. This situation requires redressing from the short, medium and long-term perspectives. In the long run, a radical change in the educational system to a skill-oriented system is necessary.

In the short to medium term, however, the existing extension and technology transfer system needs redressing. The farmers' technical knowledge is generally upgraded by organising effective farmers' training and extension services in the field. According to Shakya (1998), about 65 percent of the households in the hill sites and 60 percent in the Tarai sites where a special production programme was launched were reported to

have emphasised the need for practical farmer oriented seasonal training on improved farming from the existing institutions including the District Agricultural Development Office (DADO)[17]. This indicates the need for an effective technology transfer system.

To organise skill oriented training as desired by the farmers, it is necessary to train the extension workers and the trainers first on two critical aspects of agriculture. First, they have to possess the requisite knowledge and skill related to the technology, say the 'hardware' side of the technology and its management under a given agro-ecological situation. Second, and equally important, they should be fully equipped to transfer such knowledge and skills to the clientele, i.e., the 'software' of technology transfer. At present, the extension workers are ill equipped on both aspects. Due to this handicap, they are reluctant to face the farmers. No wonder a recent UNICEF sponsored survey found that "*only 3% of the households have ever been visited by a government agriculture/livestock extension worker and only 2% by a non-government extension worker*"[18]!

Officially, the DOA is organising two types of training. One is a skill oriented training. This type of training which is longer in duration is expected to provide in-depth technical knowledge on specific subjects to the farmers. The second type is refresher training courses conducted generally for shorter durations to update the farmers' knowledge in the subjects already known to them. The training is conducted by the JT/JTAs who are already suffering from the handicap mentioned above. The venue is their respective Agricultural Service Centre (ASC). It is reported that these training courses are without adequate preparation. Mostly, they lack practical sessions in the absence of logistic support. Nor do they receive any guidance from the respective subject matter specialists (SMS). As a result, most training programmes are not effective.

Yet, notwithstanding their poor quality, the farmers attend such training for two reasons. The first is their felt need for reasons mentioned above. Second, given the high level of unemployment, underemployment and disguised employment in the rural areas, even a more attractive immediate reason perhaps is the financial benefit they receive in the form of "allowances" for participation in "training", especially if they have to stay over night outside their homes.

Thus instead of using the extremely limited financial resources for qualitative improvement and ensuring sustainability, an unsustainable and corrupt approach of literally bribing the farmers has been followed, especially in the recent years. It requires immediate rectification.

7.4 AGRICULTURAL CREDIT

Inadequacy of agricultural credit facilities is generally reported. The problem is more pronounced for the smaller and marginal farmers. As a result, the farmers have to depend on the local moneylenders who charge high interest rates. Those farmers who received bank loan also expressed their dissatisfaction over the lengthy procedure and the need for repeated visits to the bank before loan approval. The bank managers on

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17 Shakya, P. B. (1998).

18 NPC (1998), "*Service Delivery Survey: Health and Agriculture Services, Nepal Multiple Indicator Surveillance Sixth Cycle*, p. 15.

their part insist that production loans are available in adequate amounts for crops, livestock and irrigation. This situation clearly indicates that the recipient farmers are not fully aware of the procedure and requirements of the banks. At the same time, the banks lack in a programme to create awareness among the farmers.

In summary, the issues related to agricultural credit requiring rectification are nonavailability of the facilities wherever such facilities exist, on one hand, and cumbersomeness and nontransparency of the process and procedures, on the other. Th problem is more pronounced with respect to the small and marginal farmers.

7.5 IRRIGATION FACILITIES

There are three interrelated issues concerning irrigation that require attention. First, lack of irrigation facilities is one of the major constraints to enhancing and stabilising agricultural production and productivity. This requires increased investment in irrigation, as prioritised in the APP.

Second, wherever an irrigation system exists, it may not be functioning properly. A variety of reasons may be responsible, including those related to wrong or inappropriate policies. Damage to the system by landslide and flood is one of them, which requires provisions for immediate repair and maintenance. Many systems do not have branch canals and proper distribution systems. This is due to the wrong policy of ignoring the distribution system and on-farm water management. Indeed, until now the tendency has been to take construction of canal as an end in itself rather than a means to increase and stabilise agricultural productivity. After initial construction, these systems are rarely maintained, and therefore rarely usable. The agency-managed systems[19] are constructed without involving the farmers. Lack of farmer cooperation in maintaining these systems is a rule than an exception. Since the systems seldom deliver water, especially when required by them, their reluctance to pay the established water cess is understandable. The system therefore does not generate any resource for its maintenance.

The farmer-managed systems including those that have officially organised water users' groups (WUGs) or water users' associations (WUAs) may not be fully functioning either. The groups may be suffering from poor leadership. A provision for farmer training and technical backstopping on the part of the public sector entities is also lacking to make these groups fully functional.

Even those systems which are fully functional from the perspective of water supply, including the farmer-managed systems, suffer from the problem of low efficiency due to the lack of knowledge and skill related to on-farm water management. This is the third issue.

As stated earlier, water has yet to be effectively recognised as an important input to enhance and stabilise agricultural production and productivity. Construction of an irrigation system howsoever incomplete has become an end in itself. Heavy

[19] The irrigation systems existing in Nepal are broadly classified as agency-managed and farmer-managed. The former refers to those systems that are constructed, operated and managed by the government. The latter refers to those that are designed, constructed and managed by the farmers themselves.

investments have been made in the construction of a variety of irrigation systems. Yet, neither the national agricultural research nor the technology dissemination system has a unit to assess and advise the farmers on location specific water requirements of the various crops grown under different agro-ecological conditions. As a result, the farmers are left alone to grapple with the technicalities of on-farm water management. No wonder that one can easily observe wheat crop fields being flood-irrigated as if these were rice paddies! This is a pitiable situation. *It is also a classical example of an unaccounted gross negligence on the part of both the government and the donors and cooperators assisting Nepal*.

The Ninth Plan mentions the following as the existing challenges facing the irrigation subsector (NPC 1998, pp. 520-521):

- Public participation is poor in the construction, operation and repair maintenance of the irrigation projects;
- Nonreliability of the irrigation service due to inefficiency in the repair maintenance, operation and management of the established irrigation projects;
- Inaccessibility of irrigation service to the targeted command area by surface and ground irrigation projects due to relatively lower efficiency in water utilization;
- Failure in achieving the expected benefits from the irrigation projects due to shortcomings in the identification, design and quality of these projects;
- Problems in irrigation management since the land to be irrigated are divided into smaller parts and are in the ownership of different people;
- Increase in the construction cost of the irrigation projects;
- Inability in getting Nepal's part of water and benefit accruing from irrigation as per the provision of international treaty/agreement;
- Inability in getting foreign economic aid for irrigation projects to be constructed in medium and big rivers;
- Adverse impact upon the source of irrigation projects and reserve of ground water resource due to deforestation in the watershed area of rivers and recharge zone of water resource;
- Nonavailability of foreign economic aid for the feasibility study of trans-basin and big multipurpose projects; and
- Lack of execution of adequate number of training programmes for the development of irrigation institutions.

Table 6 summarises the situation described in a study report (Shakya 1998). Even after two years of direct support from a special programme, problems related to canal damage, water distribution, and on-farm water management were still the significant problems in the selected sites, and it is manifested in the form of farmers' noncooperation and conflicts encountered in water sharing.

Table: 6: Percentage of Farmers Reporting Various Types of Problems in the Operation of Irrigation Systems

S.N.	Problem Types	Hill Sites		Tarai Sites	
		Collaborators	Non-Collaborators	Collaborators	Non-Collaborators
1	Canal damage due to landslide, floods	40.09	44.87	36.20	38.04

2	Unequal distribution of water (conflict)	8.11	5.13	6.13	5.98
3	Lack of cooperation among the farmers	15.77	20.94	12.27	8.15
4	Lack of branch canals	15.32	12.39	14.72	10.87
5	Nonexistence of permanent irrigation system	0.45	0.00	7.36	16.85
6	Poor water distribution system	4.05	0.85	7.98	6.52
7	Lack of knowledge	5.41	2.56	0.61	1.09
8	Inactive WUAs	5.41	4.27	1.23	5.43
9	Weak or absence of diversion structure	4.05	5.13	6.75	3.26
10	Breaking of lining	0.90	0.00	1.23	0.00
11	Inadequate water	0.45	3.85	0.61	1.63
12	Expensive construction materials/services	0.00	0.00	4.91	2.17
Total		100.00	100.00	100.00	100.00

Source: Shakya, Padma B. (1998), Table 10.2.

7.6 AGRICULTURAL MARKETING

In essence, the often cited problems related to agricultural marketing are manifestations of the lack of basic transport facilities in most parts of the country, on one hand, and lack of managerial and technical know-how to effectively utilise whatever facilities and opportunities that are available, on the other. In turn, the latter problems are related to the lack of technical and managerial know-how about production, packaging, processing, storage and distribution that can take advantage of the existing facilities and market opportunities. Physical isolation due to the terrain, to site an example, is a constraint to marketing. It can also be an asset for producing hybrid seeds. Therefore, the issue is not confined to the development of transport and communication facilities alone. Even more importantly, it is perhaps related to capacity development for efficiently utilising the comparative advantages offered by the country's low-wage rural labour, agro-ecological diversity and geo-physical location. By their very nature, these issues require a medium to long term vision and commensurate action, perseverance and patience.

Some of the marketing related problems such as unavailability of production inputs have already been dealt with. Others such as unavailability of inputs at affordable prices (see Table 5 above) are, as already mentioned, in essence the results of the false expectations created by the past policies. Still others such as the lack of a market for any given commodity is a result of the lack of market assessment capability on the part of the extension workers who often give overly optimistic advice to the farmers. It is also a result of incomplete information. Appropriate training to the extension workers together with the establishment of an efficient and sustainable market information system need serious consideration to improve the situation in the short to medium term.

7.7 DISEASES AND PESTS

Occurrence of diseases and pests are a common phenomenon. Yet at the national level, the average rate of application and the total quantity of agro-chemicals, especially pesticides, used to control plant diseases and pests, is reported to be very low. This situation should be taken as a blessing in disguise, considering the recent global consciousness regarding the environmental implications of indiscriminate use of pesticides.

VIII SUSTAINABILITY ISSUES

Nepal's main environmental issues are related to the country's excessive dependence on the already overstretched natural resource base amidst a high rate of population growth, predominance of literally stagnating subsistence agriculture, growing urbanisation, and recent trends in industrialisation. From the policy perspective, on the other hand, it is a result of the lack of recognition of: people's proven ingenuity in managing the fragile eco-system, and of the limitations of the public sector's capacity in directly managing the common resources. Although His Majesty's Government of Nepal (HMGN) had diagnosed some of these underlying problems as early as the late 1950's and early 1960's, with some isolated and generally fragmentary efforts to address them, an earnest realisation of the urgency of some of the environmental issues facing the country had to wait until the beginning of the Fifth Plan period (1975-80).

Some groundwork was laid, however, for soil conservation and watershed management, and national parks and wildlife protection during the Fourth Plan period (1970-75). A separate department was created for each of them in addition to launching a few pilot programmes for soil conservation and watershed management, and establishment of seven national parks and wildlife reserves[20]. During the Fifth Plan period (1975-1980), the priority was on capitalisation of the infrastructures already created for increased production and utilisation of the labour force, and on regional balance and economic integration of various regions. At the same time, attempt was made to adopt a comprehensive population and employment policy and strengthen the efforts related to soil conservation and watershed management and establishment of new national parks and protected areas as a measure for environment protection[21].

The Agriculture Perspective Plan (APP)[22] shows that, in recent years, the country's agriculture has been growing at around three percent, while population has grown by 2.5 percent. This rather insignificant per capita growth in the country's predominant economic sector—employing more than 80 percent of the economically active population and contributing more than two-fifths (42%) to the gross domestic product(GDP)—is quite inadequate to absorb the nearly 250 thousand new entrants to the labour force each year, and to meet the country's growing food demand.

The failure in achieving a reasonable and sustained growth rate in the agricultural sector means that farmers and the landless labourers in the rural areas have to continuously expand cultivation in the economically less productive and environmentally fragile lands which otherwise would remain under some kind of permanent vegetation. It also means

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20 HMG, NPC (1975): The Fifth Plan (1975-1980), p. 262-3.

21 Ibid.

22 Agricultural Projects Services Centre (APROSC) and John Mellor Associates (1995): Nepal Agriculture Perspective Plan (Final Report), Main Document.

that farm sizes have continuously been fragmented, and there is less food available per household which has adversely affected their food security.

Expansion of cultivation on ecologically sensitive uplands has led to accelerated erosion of productive soils, undermining the productivity of farm land, and increased sedimentation in downstream areas.

Although much of the Tarai region and valley bottoms in the hills have high potential for increased food production, this has not been realised due to a variety of reasons that are correctly analysed in the APP. These reasons include the failure in the past to adopt a clear and consistent policy in favour of a rapid transformation of the agricultural sector, and to direct the limited physical, financial, institutional and trained manpower resources to a well-defined priority package of actions and interventions.

Around 90 percent of the population reside in the rural areas whose primary occupation is agriculture and related activities, and practically no growth is occurring in those areas. It is hence not surprising that the problem of growing poverty and worsening environmental health of the country have become mutually reinforcing.

IX ENVIRONMENTAL CONSIDERATIONS AND THEIR INTEGRATION PROCESS

An explicit concern is expressed in the Sixth Plan (1980-1985) about the deteriorating state of the country's environment. It stipulated a number of policy measures for conservation and sustainable use of natural resources, improved productivity of land, population control, urban planning, and mitigation of the problems associated with industrial development. This concern was reiterated in the Eighth Plan (1992-97) which emphasised sustainable economic growth as one of the three main development objectives (the other two objectives being poverty alleviation and regional balance). In the Eighth Plan document, there is a separate chapter on environment and resource conservation which envisaged the following:

> (i) Measures will be initiated at the very outset of project design to minimise adverse environmental impacts likely to result from projects involving large-scale physical construction and industrial development (p. 636).
>
> (ii) Necessary financial and procedural incentives will be provided for promoting voluntary initiatives from the industrial sector in achieving sustainability in environmental protection and utilisation (p. 637).
>
> (iii) A high-level Environment Protection Council will be set up under the chairmanship of the Prime minister to formulate policies, give directives and establish inter-ministerial co-ordination and monitoring related to environmental management (p. 637).
>
> (iv) Guidelines will be formulated for environmental impact assessment for various sectoral agencies. Prior to carrying out large-scale development projects (especially roads, hydro-electricity, industry, irrigation, housing, drinking water, sewerage, etc.), priority will be given to obligatory assessment of environmental impacts at the time of conducting their feasibility studies. On the basis of these

studies, adequate funds will be allocated in the project budget for minimising adverse effects on the environment. Provisions will also be made to monitor whether or not such environmental impact assessments have been made (pp. 638-9).

In the environment-related sectoral programmes as well, various provisions have been made. Some of them are as follows:

(i) In order to minimise the negative impacts from industries on the environment, an Environmental Pollution Control Act will be formulated along with the rules, regulations and guidelines required to implement the act. (p. 389).

(ii) In accordance with the new industrialisation policy, a separate unit will be set up at the Ministry of Industry to prepare necessary policies, guidelines and standards in order to control industrial pollution and to monitor diverse impacts of industrialisation on the environment. Similarly, a system will be followed for studying the impacts on the environment prior to granting permit to establish an industry. The Nepal Bureau of Standards and Metrology will prescribe and monitor the levels of industrial pollution and the effects of environmental pollution caused by industries (p. 396).

(iii) In order to prevent the misuse of pesticides in view of their possible impact on the country's environment and public health, the plant protection service will be responsible to provide clear-cut guidelines at the national level for registration, licensing, determination/testing of quality standards, and judicious use and regular disposal of agricultural pesticides produced in or imported into Nepal (p. 183).

(iv) Food contaminants resulting from the use of insecticides and pesticides in agriculture will be studied and analysed. Information about the safe limits of insecticides and pesticides for human health will be made known to the farmers through the agricultural extension and communication services (p. 204).

During the past one decade, as indicated in the earlier paragraphs, Nepal has made significant strides in the environmental field. The National Conservation Strategy (NCS) of 1988 signified the first serious attempt to formulate a national environmental policy framework for the country[23]. This document was instrumental in paving way for a series of policy pronouncements and programme interventions that followed in the ensuing years.

The Nepal Environmental Policy and Action Plan (NEPAP) was formulated in 1993 as a further refinement of the National Conservation Strategy. NEPAP covered the major sectoral areas such as natural resources (land, forest and rangeland, water), health, education, natural and cultural heritage, urban and industrial development, and the cross-cutting issues of population, poverty, legislation, institutions, and public resource management[24].

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[23] HMG, NPC and International Union for Conservation of Nature and Natural Resources (IUCN) (1988): Building on Success: The National Conservation Strategy for Nepal.

[24] HMG, Environment Protection Council (1993): Nepal Environmental Policy and Action Plan.

Implementation of the broad actions identified in the NEPAP required formulation of sectoral action plans with a list of identified project profiles. This task was accomplished in a follow-on exercise (NEPAP-II) carried out in 1996. NEPAP-II has prepared detailed action plans and identified priority projects for implementation in three sectors (forestry, water resources and industry) and associated cross-sectoral areas[25].

The new umbrella Environment Protection Act 1997 has been legislated in response to the long standing concern that an adequate legal instrument was lacking to effectively respond to a number of emerging environmental problems which were not being fully addressed by the existing laws and regulations. A legal framework did not exist to enable concerned agencies to formulate and effectively enforce standards on air and water pollution, enforcement of IEE/EIA guidelines for the design and implementation of environmentally sensitive projects, and a clear delineation of responsibility and authority on the part of the stakeholders and government agencies.

The new act explicitly recognises the close interdependence between economic development and environmental deterioration and lays out specific procedures to be followed in preventing and mitigating adverse environmental effects of development projects, as well as in safeguarding national heritage. It has provided the necessary legal mandate to the Ministry of Population and Environment and other concerned government agencies to implement concrete actions in environmental areas.

The national EIA guidelines were approved in 1993 and a number of sectoral guidelines have either been already issued (viz., for forestry and industry), or are in the process of preparation and finalisation. Effective enforcement of these guidelines was hampered due to the absence of an enabling legislation which would now be resolved with the implementation of the umbrella act.

In view of the recent policy pronouncements, legislative action and other initiatives, it appears that the government is fully aware of the main environmental issues facing the country and it has accordingly begun to take appropriate measures. There has been a gradual process of integrating environmental considerations into the national development process, and a great deal of reflection of environmental considerations in domestic policies.

At the central level, a number of advisory, policy-making and implementing agencies have been created such as the Parliamentary Committee on Natural Resources and Environmental Protection, Environmental Protection Council, and Ministry of Population and Environment. A new umbrella legislation has been enacted. A national policy and action plan have already been officially adopted for the overall environmental health of the country, and actions to elaborate them further at the sectoral level have begun. EIA guidelines have been formalised for adoption by all the stakeholders carrying out activities that could have a potential impact on the environment.

The above initiatives are however quite recent and they have yet to produce results. Wide gaps still exist between the well-intentioned policies and their actual implementation at the operational level. The greatest problem at all levels is the absence of an integrating mechanism through which all major environmental concerns are

[25] HMG, NPC (1996): Nepal Environmental Policy and Action Plan, Phase II, Sector Action Plans (Forestry, Industry, Water Resources), Vol. I Main Report).

adequately addressed while implementing macroeconomic and sectoral programmes, and in properly co-ordinating sectoral and cross-sectoral initiatives and implications. Besides, institutional capacities are extremely limited, and the concerned agencies lack adequate trained manpower and financial resources.

X PAST POLICIES AND THEIR IMPACTS

Nepal's agricultural development strategy has historically emphasised the promotion of the so called improved farming practices, dominated by the promotion of high-yielding varieties of crops, cross-bred livestock, chemical fertilizer and irrigation. The seed-fertilizer technology suitable to the irrigated flat lands has also been pushed to the hills and mountains where the fragile ecological conditions and resource endowments are quite different. Crop-dominated farming systems have not proven effective in these areas, in terms of both increased food production and soil fertility maintenance. Crop yields have declined consistently over time, threatening the food security of particularly the small landholders and marginal farmers. These trends have a direct relationship with the deteriorating fertility of soil (EPC 1993; Shrestha and Katwal 1992). Intensive cultivation and insufficient application of nutrients in the soil have led to situations where the farmers are forced to completely abandon their land because of the extremely low yields.

On the other hand, works carried out at the British-supported Lumle Agriculture Centre (LAC) in the Western Hills demonstrate that significant progress was possible with respect to vegetable seed production, rice production, and cattle and buffalo rearing on a sustainable basis when the research and extension system properly integrated five key elements, namely, a strong institutional foundation, a comprehensive understanding of farmer's conditions, the participation of farmers in all stages of research and dissemination, the interdisciplinary interaction of all sections of LAC, and the synergistic effect of having research, extension and training under one organisation (Pound, Budathoki and Joshi 1992). Similar experience is reported from the Pakhribas Agriculture Centre in the Eastern Hills (Chand and Thapa 1992).

All periodic plans, strategic documents, and action plans have invariably emphasised the need for giving high priority to soil fertility maintenance, particularly in the hills and mountains. However, the continuously declining crop yields and ever worsening process of land degradation indicate that these policies have failed.

Major indicators of unsustainability and declining trends in Nepal's hill and mountain agriculture are summarised in Table 7.

Partap and Watson (1994) elaborate on the important contributing factors and issues, among the range of causes and symptoms of decline. The two critical problems commonly faced by the mountain farmers in general and the Nepalese farmers in particular are: degradation of land, and the extent of land degradation. The area of degraded lands in Nepal is estimated to be 1.8 million hectares. Similarly, estimates on the magnitude of soil erosion from the hill and mountain areas of Nepal are compiled from various sources and presented in Table 8.

A study conducted by Banskota (1992), cited in Partap and Watson (1994), indicates that the total amount of nitrogen lost from level terraces (365,000ha) and sloping farmlands (816,00ha) is about 27,000 metric tonnes, whereas the total amount of nitrogen fertilizer used in 1987/88 was only 24,320 metric tonnes. The total loss of combined nutrients exceeded the level of inputs used in 1987/88.

The value of nutrient loss has been estimated at over six million rupees for paddy and over 54 million rupees for maize, at 1987/88 market prices. The implications in terms of equivalent foodgrain loss are even more significant. The total losses were equivalent to about 75,000 mt of paddy and 747,000 mt of maize. These large losses indicate the difficulties experienced in sustaining food production when soil fertility is being depleted at massive rates.

Declining crop yields: Farmland productivity in the upland areas measured in crop yields has either remained steady or declined (Partap and Watson 1994). For instance, average crop yields declined within the range of 5 to 30 percent during the past few decades in a number of mountain watersheds in Nepal, along with the Indian Himalayas and the Tibet Autonomous Region of China.

Increasing food insecurity: An ICIMOD study in the mid-hills of Nepal (Panday 1992) highlights the increasing food insecurity situation among the mountain farmers in resource poor areas. The study revealed that 86 percent of the households in Bhardeo village were experiencing food deficits to varying degrees. Among them, over 50 percent suffered food deficits for at least six months each year. It further concluded that the production of adequate amounts of food on small landholdings, with ever–declining farm productivity, is almost impossible. Bhardeo depicts the worsening trend of food insecurity in resource poor, heavily populated mountain areas (Partap and Watson 1994).

Besides, worsening trends of soil acidification, siltation, flooding and landslides have been reported (NPC 1992).

Table 7: Indicators of Unsustainbility/Decline in Hill and Mountain Agriculture
(Time frame: approximately four decades spanning the period 1954-91)

Indicators	Rates of Change	Indicators	Rates of Change
I. RESOURSE BASE		**II. PRODUCTIVE FLOW**	
1. Landslides	100-300%	18. Fall in average crop yields on sloping lands: (a) Maize and wheat, (b) Millet	(a) 9-15% (b) 10-72%
2. Gully formation on sloping lands	High-Medium	19. New land under cultivation	5-15%
3. Soil erosion rates on sloping lands	20-30%	20. Human population	60-65%
4. Abandonment of agricultural land due to decline in fertility	3-11%	21. Decline in the application of compost (organic manure)	25-35%
5. Appearance of stones/rocks on cultivated land	130-200%	22. Additional labour demand due to falling land productivity	35-40%
6. Decline in the size of livestock holding per family (LSU)	20-55%	23. Forestry-farming linkages	Weak
7. Decline in the area of farmland per household	30-10%	24. Foodgrain purchases from shops	3-50%

8. Decline in forest area	15-85%	25. Need for external inputs for crop production	High-Medium
9. Decline in pasture/grazing area	25-90%	26. Fuelwood and fodder scarcity in terms of time spent in collection	45-200%
10. Decline in good vegtetative cover on common property lands	25-30%	27. Fodder supply: (a)Decline from common land, (b) Increase from private land	(a) 60-85% (b) 130-150%
11. Fragmentation of household farmland (in number of parcels)	20-30%	**III. RESOURCE MANAGEMENT**	
12. Decline in the size of land parcels of families	20-30%	28. Emphasis on monocropping	High
13. Distance between farmland parcel and home	25-60%	29. Cultivation expansion on steep slopes (above 30%)	10-15%
14. Decline in foodgrain production and self-suffiency	30-60%	30. Use of weeds and herbaceous crop products as fuelwood	200-230%
15. Permanent outmigration of families	None-5%	31. Conversion of marginal lands into cultivation	15-40%
16. Seasonal migration	High	32. Decline in fallow periods	From 6 to 3 months
17. Conversion of irrigated land into dry farming due to water scarcity	7-15%		

Source: S. Shrestha (1992). Crisis Area Study, conducted by ICIMOD'S Mountain Farming Systems Programme (MFS), Discussion Paper NO. 32, cited in Partap and Watson 1994).

Table 8: Soil Erosion from Different Land Use Types

Types of land use	Soil Erosion (MT/Ha/Yr)
Grazing lands (support lands)	100
Rainfed terraces (slopping terraces)	5
Irrigated terraces (level terraces)	0
Sloping farmlands under farmers` practice	38

Source: Partap and Watson (1994).

XI LAND SYSTEMS

The land system of Nepal is probably unique due to its extreme variability with respect to topography, soils and climate. The altitudinal and agro-ecological diversities across narrow stretches of geographical territory pose a challenge in identifying and adopting an adequate system to classify land units. Efforts have been Yet, attempts have been made in the past to develop a more scientific system of land classification based on altitude, landscape, soils and climate (e. g., Nelson 1980; LRMP 1986; Carson 1991; and Carson and Sharma 1992). By and large, these classifications are either in terms of physiography, or in terms of land capability, or in terms of current uses.

Physiographically, the land area of Nepal is divided into five major regions: Tarai, Siwaliks, Middle Mountains, High Mountains, and High Himal. They represent well-defined geographic areas with distinct bedrock geology, geomorphology and climatic and hydrological characteristics. Soils and land units within these regions are significantly different from each other. Table 9 lists the areas occupied by the

different physiographic regions within each Development Region[26]. The major characteristics of these physiographic regions are provided in Annex Table 1.

The most common land classification is the division of the country into the Tarai, Hill and Mountain regions. Due to its simplicity, this system is widely adopted to classify districts with similar characteristics. However, in many instances, the demarcations are not very clear, and regional units are not homogeneous, particularly in the hills and mountains. Within a given hill or mountain district, one can observe the occurrence of deep, incised and low altitude valleys together with steep side slopes and high altitude pastures. For instance, districts like Gorkha and Dhading are commonly grouped as hill districts, while considerable proportions of these districts actually lie in the High Himal physiographic region. Similarly, Chitwan and Dang districts are classified as Tarai although they belong to the Siwalik physiographic region.

Table 9: Distribution of Total Land Area of Nepal by Physiographic Region ('000 ha)

Physiographic Regions	Development Regions					
	Eastern	Central	Western	Mid-Western	Far-Western	Nepal
High Himal	470.5	224.3	882.9	1502.5	269.0	3349.2
	(16.5)	(8.2)	(30.0)	(35.1)	(13.8)	(22.7)
High Mountain	531.1	366.9	489.8	1147.5	424.0	2959.3
	(18.6)	(13.4)	(16.7)	(26.8)	(21.8)	(20.1)
Middle Mountain	980.9	931.2	1011.8	803.3	716.4	4443.6
	(34.4)	(34.1)	(34.5)	(18.8)	(36.8)	(30.1)
Siwalik	251.2	629.6	237.2	570.2	197.5	1885.7
	(8.8)	(23.0)	(8.1)	(13.3)	(10.2)	(12.8)
Tarai	620.4	582.1	313.8	256.7	337.4	2110.4
	(21.7)	(21.3)	(10.7)	(6.0)	(17.4)	(14.3)
Total	2854.1	2734.1	2935.5	4280.2	1944.3	14748.2
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Note: Figures in parentheses represent percentages.
Source: LRMP Economics Report (1986).

These physiographic regions are further divided into relatively homogenous land systems on the basis of landforms, geology, slope and arable areas. Each land system may have several land units. A total of 17 land systems have been identified that are broken further into 46 different land units. They are summarized in Annex Table 2.

In terms of capability, six different land classes (I through VI) are defined. The landscape and climate under Classes I, II and III are suited to agricultural cropping and are separated from each other on the basis of slope. Due to the limitations imposed by slope, Class III land can be cultivated only with terracing. The upper limit of cultivation with terracing is considered to be 30 degrees. Class IV land is too steep or too cold to support agricultural cropping, but supports productive forest suited for exploitation. Class V land is either too cold for natural forest or is geomorphologically unstable, but it supports vegetation suited for grazing. Class VI

[26] For the purpose of development planning and administration the country is divided into five development regions from east to west.

land is too steep and too unstable to support normal forest use and is very sensitive and liable to degrade rapidly even with very slight disturbances (Sharma 1995).

According to the third criterion of land classification based on current use, common land use types are agriculture, forest, grazing and others. The extent of these land uses juxtaposed with the physiographic regions is summarized in Table 10. It shows that nearly 27 percent of the total land area of the country is under agriculture, which includes about 7 percent non-cultivated inclusions within the agricultural land; about 12 percent under grazing; 43 percent under forest; and about 19 percent under other land uses which include snow, ice and rock outcrop.

Table 10: Major Land Uses of Nepal

Area in '000 ha

Physiographic Regions	Land Uses						
	Agriculture			Grazing	Forest	Others	Total
	Cultivated	Non-Cultivated*	Total				
High Himal	8	2	10	884	221	2234	3349
	(0.2)	(0.06)	(0.3)	(26.0)	(6.6)	(67.0)	
High Mountains	245	147	392	510	1813	245	2960
	(8.1)	(5.0)	(13.2)	(17.2)	(61.2)	(8.3)	
Middle Mountains	1222	665	1887	293	2202	61	4443
	(27.5)	(15.0)	(42.5)	(6.6)	(49.6)	(1.4)	
Siwaliks	259	55	314	21	1477	74	1886
	(13.7)	(2.9)	(16.6)	(1.1)	(78.3)	(3.9)	
Tarai	1234	117	1351	50	593	116	2110
	(58.5)	(5.5)	(64.0)	(2.4)	(28.1)	(5.5)	
Total	2968	986	3854	1758	6306	2730	14748
	(20.1)	(6.7)	(26.8)	(11.9)	(42.8)	(18.5)	

Note: * These are non-cultivated inclusions within the mapped agricultural land.
Figures in parentheses represent percentages.
Source: LRMP Economics Report, 1986.

It is evident from Table 11 that, of the total agricultural land of the country, the Tarai possesses the largest proportion (64%). It is closely followed by the Middle Mountains with nearly 43 percent of its land under agriculture. The Siwalik is geomorphologically the most fragile physiographic region with 17 percent of its land under agriculture.

About 13 percent of the land area of the High Mountains is under agriculture. Cropping patterns, cropping intensity and productivity in this physiographic region is limited by temperature, particularly in the higher altitudes. A very insignificant part (0.2%) of the High Himal physiographic region is under agriculture.

The existing production systems as summarized in Annex Table 1 consist of irrigated rice cultivation on lowlands (*khet*), rainfed cultivation on uplands (*pakho* or *bari*), livestock raising, and forestry. All these production systems are found all across the country at various degrees of intensity. In the hills and mountains, rainfed agriculture and livestock raising predominate.

Agriculture is by far the largest sector of the Nepalese economy contributing 40.5 percent to the total GDP (1995/96) (MOF 1998), and 81.2 percent to the employment

of the "economically active" population (CBS 1994). About twenty years ago, these proportions were 71.6 percent in GDP (1974/75), 94.4 percent in employment (1971), and 82.5 percent in export earnings (1974/75).

In the early 1960's, the per hectare yields of Nepal's major crops such as paddy, wheat and sugarcane were significantly higher as compared to those of other South Asian countries. Presently, Nepal's yield rates of these crops fall far short of those realised by other countries (APROSC and JMA 1995). In other words, with the successful introduction of the green revolution technologies beginning from the late 1960's, Nepal's neighbouring countries have made long strides in raising their agricultural productivity while Nepal has largely been bypassed by the these changes. Consequently, with the initial impetus provided by a rapid agricultural growth, those countries have been able to sustain a respectable overall economic growth.

XII LAND TENURE

12.1 HISTORICAL BACKGROUND

Land and land-based resources have been the principal source of economic surplus generated by the ruling classes. Concentration of land in the hands of a few elite classes and severe exploitation of the peasantry through the excessive expropriation of labour and land revenue have been the principal policy adopted by the rulers through much of the nation's history[27].

Following the overthrow of the Rana Regime in 1951, a number of interventions were initiated by the state to reform land tenure. Significant among those are:

- formation of the Land Reform Commission in 1953;
- promulgation of the thirteen-point programme in 1956;
- Preparation of Land and Cultivators' Records Act 1954;
- Lands Act 1955;
- Abolition of Birta Land Act 1957; and
- Agriculture (New Provisions) Act 1960.

All these measures were largely ineffective since the government was not serious about genuine reform. The overwhelming concern was to perpetuate the status quo, which was to safeguard the interests of the high-caste privileged classes.

The Lands Act of 1964 was the most comprehensive of all the past measures.

- It fixed ceilings on land holdings—25 bigha (16.93 ha) in the Tarai and inner Tarai, 80 ropani (4.07 ha) in the hills and mountains, and 50 ropani (2.54 ha) in the Kathmandu Valley);
- protected the rights of the tenant;
- fixed rents at 50 percent of the principal crop grown in a year;
- abolished the birta[28] system; and

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27 See Regmi (1971, 1978) for further details.

28 Birta is a land grant made by the state to individuals, usually on a tax free and inheritable basis (see Footnote 4 also).

- introduced a compulsory savings scheme to generate investible capital in the rural areas.

The act, initially implemented in 16 districts, covered the entire country by 1966. Landowners were informed well ahead of time when the act would be effective. Such prior information and phase-wise implementation of the act allowed ample time for the large landowners to redistribute surplus land above the ceiling among their near and distant relatives, or otherwise conceal their actual possessions. In retrospect, it could be said that the state allowed this in order to protect the interests of the landed gentry, while at the same time trying to project a populist image of a regime concerned about the welfare of the majority poor mass comprising landless households, small holders and tenants who depended on the large landowners.

The objective to redistribute land among the landless and small holder peasants appeared noble on the surface. However, due to the above-mentioned reasons, the state could identify and redistribute only 1.5 percent (29,124 hectares) of the total agricultural land. This appears to be an insignificant achievement in view of the fact that about one-fourth of the farmers at that time were pure or mixed tenants.

Safeguarding the rights of the tenant was ensured through the provisions of protection against eviction, entitlement of one-fourth of the rented land area, or equivalent money value, to the legally registered tenant, and redressal of grievances at the court of law. Rent fixation at 50 percent of the principal crop was also done for this very purpose. On the other hand, the act created a situation of "dual ownership" of land, in that both the land owner and the tenant could now lay claim on the same piece of land, albeit in varying proportions.

One of the distinguishing characteristics of the Lands Act 1964 was the compulsory savings scheme. The scheme required all farmers to deposit a portion of their produce in kind[29] as savings in the local ward committee. Later, depositing cash equivalents was allowed instead of in-kind payment. The resources thus generated were to be utilised in granting loans to the participating members to undertake various income generating activities. The scheme was to mature in five years after which the farmers were promised full return for their deposits along with an annual 5 percent interest. However, massive irregularities and misappropriations soon began to emerge in the scheme. Thus a scheme which could have gone a long way in transforming the traditional rural economy of Nepal through internal resource mobilisation was massively abused, and it collapsed prematurely.

12.2 CURRENT STATUS OF LAND TENURE IN NEPAL

Currently prevailing tenure types are *raikar* and *guthi*, and the government has initiated the process of converting *guthi* lands into *raikar*, except certain types of *guthi* such as *raj guthi*.

[29] 1.5 maunds (55.99 kg) per owner cultivator, 1 maund (37.32 kg) per land owner renting out land and 0.5 maund (18.66 kg) per tenant in the case of the Tarai; and 6 mana (1.83 kg of paddy and 2.55 kg of maize), 4 mana (1.22 kg of paddy and 1.70 kg of maize), and 2 mana (0.61 kg of paddy and 0.85 kg of maize), respectively, in the hills.

12.2.1 Ownership and Distribution

In Nepal, more than two-thirds of the total holdings have less than one hectare of land, and they own only 30 percent of the total farm area. On the other hand, 1.5 percent of the holdings in the more than 5 hectares holding class possess 14 percent of the total farm area (Table 12).

A regional analysis of land distribution indicates that the proportion of landless holdings is higher in the Tarai as compared to the hills and mountains. Three-fifths of the holdings in the hills and mountains own less than half of the total land whereas 41 percent of the holdings in the Tarai own little more than half of the total land (Table 13).

Interventions to facilitate access to land is one of the options available to address the equity issue. Indeed, land redistribution and regulation of tenancy contracts are favoured both on equity and efficiency grounds. Analysis of the 1991 Sample Census of Agriculture data reveals that cropping intensity, a proxy for agricultural productivity, decreases with increase in the size of holding per household (Chapagain 1999). Thus redistribution of land has the potential to increase output and equity, hence the case for more equal distribution of land.

Table 12: Land Distribution by Farm Size in Nepal, 1991

Size of Holdings	Holdings		Total Area	
	Number	%	Hectares	%
No Land	32,109	1.2	1,571	0.1
Holdings with Land	2,703,941	98.8	2,597,400	99.9
Below 1 Ha	1,877,702	68.6	791,883	30.5
1-2 Ha	529,467	19.4	716,533	27.6
2-3 Ha	168,449	6.2	400,227	15.4
3-5 Ha	88,165	3.2	328,089	12.6
5 Ha and Above	40,158	1.5	360,669	13.9

Source: National Sample Census of Agriculture, 1991 (CBS 1994).

Table 13: Percent Distribution of Farm Holdings and Area by Ecological Region, 1991

Size of Holdings	Ecological Regions					
	Mountains		Hills		Tarai	
	Holdings	Area	Holdings	Area	Holdings	Area
Landless	0.30	-	0.2	0.04	0.9	-
Below 1 ha	7.80	3.5	37.8	17.00	23.0	10.0
1-2 ha	1.30	1.8	8.6	12.20	9.4	13.5
2-3 ha	0.20	0.6	1.9	4.80	4.0	10.0
3-5 ha	0.10	0.4	0.8	3.10	2.3	9.1
5 ha and above	0.05	0.5	0.3	3.10	1.2	10.3
TOTAL	9.75	6.8	49.6	40.24	40.8	52.9

Number of total holdings: 2,736,056
Total area of holdings (hectares): 2,598,971

Source: National Sample Census of Agriculture, 1991 (CBS 1994).

12.2.2 Tenancy

Table 14 presents information regarding land tenancy situation in Nepal. Details are provided for three holding categories: (a) holdings of cultivated rented land only; (b) holdings engaged in more than one tenure arrangement (mixed tenure); and (c) rented area as percentage of total area of holding. About two percent of the total farm holdings are pure tenants who do not have their own land. The proportion of such holdings varies across the ecological belts. It is 1.1 and 1.2 percent, respectively, in the mountains and hills, while 2.7 percent of the holdings in the Tarai is of such type.

The bulk of the holdings operate under mixed tenurial arrangements supplementing their own holdings with land obtained through tenancy arrangements (Table 14). About 15 percent of the total holdings are under the mixed tenancy form. Again, the incidence is much higher in the Tarai where almost one-fifth of the total land holders are mixed tenants. In terms of area, land under tenancy (both pure and mixed) constitutes about 10 percent of the total farmland in Nepal. Across the ecological belts, 13 percent of the land in the Tarai, and about 5 percent of it in the hills and mountains, is under tenancy.

However, the actual incidence of tenancy is widely believed to be much higher due to the presence of informal and nonregistered tenants. Because of the slackness in the implementation of the existing legal provisions, landowners have managed to continue engaging tenants on an informal basis in order to maintain their full claim on the land owned by them. The situation is made more complex with the easy access of cultivators from across the country's southern border. Since land can not be legally owned nor rented by noncitizens, landowners, particularly in the Tarai Region, find it more convenient to engage the easily available and Indian wage labourers and cultivators.

Table 14: Structure of Tenancy, 1991

Regions	Pure Tenants as % of Total Holdings	Mixed Tenants as % of Total Holdings	Area Rented as % of Total Land
Nepal	1.9	14.9	9.3
Mountains	1.1	12.0	5.8
Hills	1.2	11.8	4.6
Tarai	2.7	18.8	12.9

Source: National Sample Census of Agriculture, 1991.

12.2.3 Fragmentation

Land fragmentation is considered one of the structural problems inhibiting agricultural modernisation. Because of the scattered nature of farm parcels, and in many instances, due to their economically nonviable size, farmers are hindered from adopting productivity enhancing technologies that are otherwise readily available for them to benefit from. The case of shallow tubewells is one example. If a farmer has a piece of land just enough for irrigation with a shallow tubewell, he will be attracted to install such a tubewell. However, if that land is fragmented into four parcels and situated in four different places, that attraction will not hold anymore. This is exactly the situation at present. Land fragmentation has its roots in the traditional Hindu law

of succession whereby all the male offsprings are entitled to the parental property, including land.

Information on the extent of fragmentation by ecological region is presented in Table 15. It is interesting to note that the average number of parcels into which a hectare of land is divided is the highest in the mountains, followed by the hills. In the mountains, it is more than twice (6.8) in the mountains and significantly higher (5.1) in the hills as compared to the Tarai (3.1).

Table 15: Land Fragmentation, 1991

Regions	Average Parcels per Farm	Number of Parcels per Hectare
Nepal	3.96	4.2
Mountains	4.63	6.8
Hills	3.92	5.1
Tarai	3.85	3.1

Source: National Sample Census of Agriculture, 1991.

The combination of the existing legal provisions concerning inheritance and the present land ceilings would imply an increasing fragmentation and sub-division of land holdings as the society moves from one generation to the other.

In the year 1995, the government formed a "High Level Land Reform Commission" in order to study thoroughly the land issues and suggest corrective measures to the government. However, no follow up actions were initiated by the successive governments.

12.3 LANDLESSNESS AND FOREST ENCROACHMENT

There is an ongoing argument between the Departments of Agriculture and Forestry regarding what constitutes forest and agricultural areas. Encroachment of forests for crop production was in fact encouraged in the past with a view to raising land revenue. This encouraged the land scarce-hill dwellers to migrate to the Tarai and settle there by clearing patches of forest land. Thus the Tarai forest acted as a new frontier for the hill people. However, this frontier closed somewhere around the 1970's, but the problem of the landless encroaching on the forest continues to this day, albeit on a reduced scale. The policy related to illegal encroachment is not strong. Quite often, the squatters are moved and driven away by the government authorities. But some other time, they are encouraged by the politicians of that particular area to break the law and stay in the forest area. They are also promised land ownership rights. This has long lasting socio-economic and political implications. Such illegal settlements encourage other local residents to illegally occupy such land and get registered later. If these families are provided some assistance from the government on humanitarian grounds, the neighbourhood gets dissatisfied with the government, as they would also claim for all unmet demands. There may be inter-ethnic/community conflict and clash. Even politicians were found to be motivated to lure such settlers and enhance deforestation. This has been found true, particularly during election periods. Needless to say, such practices have serious environmental consequences.

XIII MACROECONOMIC POLICY

Nepal embarked on a variety of actions since the inception of the economic stabilization programme in 1985/86. Measures attributable to the liberalisation process include: exchange rate manipulations leading to full convertibility of the rupee for current account purposes; attempts to strike a balance between the government's revenue and expenditure; broadening and rationalisation of the revenue base; and liberalization of trade and investment policies, particularly policy adjustments to attract foreign direct investments.

Examples of the changes which could at best be partially attributed to the liberalization process include: initiatives to approve the APP and the ensuing policies and priorities; enactment of a variety of new laws, rules, regulations and administrative procedures; constant transfer of project and programme managers; and organizational restructuring of the institutions whose activities have potentially a direct impact on the performance of the agricultural sector and hence on poverty.

Two important factors external to the liberalization process which might have contributed even more significantly to the process than the initiatives designed for the process itself are the radical political change of 1990 and the ensuing polity within the country and India's embarkation on the liberalization process. A third exogenous factor which led to a number of interim adjustments, although for a relatively short period, is the impasse between Nepal and India in sorting out the bilateral trade and transit arrangements observed in the 1988-90 period.

Thus the observations related to Nepal's performance on the poverty front presented earlier is not just a result of the liberalization process *per se.* As a matter of fact, the present state of the Nepalese economy is the result of a confluence of a variety of measures introduced over a long period and that of a number of endogenous and exogenous variables. Given this situation, the complexity of the task involved in relating the liberalization process with poverty can be well understood. Notwithstanding this complexity, the analysis presented in this paper attempted to trace such relationships on an *a priori* basis.

The findings indicate that the agriculture sector in general and the subsectors relating to trade could not benefit from liberalisation. On the contrary, available evidences suggest that these measures might have contributed to further hurting and strangulating the sector. The various instruments that were introduced over the last one decade or so as part of the structural stabilization process and later in the name of liberalization were designed for those countries with well monetized economies with commensurately advanced physical, institutional and other infrastructural base.

The difficulties of the Nepalese economy on the other hand are not just related to the macro-economic imbalances *per se.* They are also of structural nature. This is not to say that the traditionally recommended instruments should not be used. They should be, but with prudence. Even more important in the long run interest of the country in is the need to address the structural issues. In this context creation and improvement of rural infrastructure, and institutional mechanisms to efficiently generate and disseminate agricultural production and processing technologies appear as the

prerequisites. Hence the relevance of the recommendation of the APP. The APP recommendations also serve as the blue print for poverty reduction.

Considering the observations in Section IV above which contradict the common *a priori* expectations, it is recommended that a thorough review of the various instruments' applicability and efficiency in the specific context of Nepal is necessary.

XIV ENVIRONMENTAL INSTITUTIONS

In accordance with the spirit of the constitution and in recognition of the growing concern for addressing environmental issues for sustainable development, a number of institutions have been created to address the multifaceted issues related to the overall national environmental health and environmental consequences of sectoral development efforts.

Several ministries, departments and parastatals are now equipped with environmental cells to specifically incorporate preventive and mitigatory measures in their respective development programmes and projects. Analytical and implementation capacity is also growing in the nongovernmental and private sectors.

The following institutions are directly related to policy formulation, planning and programme implementation related to the environment.

14.1 PARLIAMENTARY COMMITTEE ON NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION (PCNREP)

In keeping with the directive principles of the Constitution of Nepal, the PCNREP has been constituted with several legislators as members. This Committee, under the chairmanship of a parliamentarian, oversees the actions of the government in initiating measures for conservation of the country's natural resources and environmental protection.

14.2 ENVIRONMENT PROTECTION COUNCIL (EPC)

This is a high-level body created in 1992 to provide guidance regarding the formulation of policies, preparation of working procedures, and implementation of policies in pursuit of the following objectives:

- Effectively manage the natural and physical resources.
- Achieve sustainability in the capacity of all the Nepalese by maintaining balance and coordination between development efforts and environmental protection.
- In consideration of the social, economic and cultural needs and opportunities of the present and future generations of the human community, support efforts for sustainable development through the use, management, development and protection of physical resources and heritage.
- Timely identification of likely adverse environmental impacts from population growth, haphazard settlement and development projects, and prevention and mitigation of such impacts.

- Develop a national system for environmental planning, environmental impact assessment and evaluation, pollution control and protection of national heritage.
- Utilisation, development, management and protection of the capacity to regenerate and recycle physical resources without inflicting adverse impacts on the environment.
- According to the importance of rare and endangered national wildlife, plant species, biological diversity, genetic pool, natural and cultural beauty and sites, environmentally threatened areas, etc., take measures for their special protection and promotion.
- Prepare and improve the environment-related legal framework.
- Develop and coordinate the activities of governmental and non-governmental agencies for effective implementation of environment-related laws and policies.
- Establish and operate an environment protection fund.
- Disseminate information, and improve education and public awareness related to the environment.
- Develop human resources in the area of the environment.

The Ministry of Population and Environment (MOPE) serves as the secretariat of the Environment Protection Council. Besides, MOPE is mandated to carry out the directives given by the EPC.

14.3 NATIONAL PLANNING COMMISSION (NPC)

The National Planning Commission is an autonomous body of the government responsible for formulating policies for overall national and sectoral development. Headed by the Prime Minister, the Commission includes a vice-chairman and five members nominated on individual basis, and a few ex-officio representatives. It is primarily an advisory body with limited executive authority.

The Commission prepares the periodic (five-year) development plan of the country which comprehensively outlines the national development goals, objectives and strategies; presents detailed sectoral, sub-sectoral and cross-sectoral development strategies and programmes; and provides estimates of financial resource allocation to the programmes included in the plan. The NPC scrutinises and approves the annual programme budgets of all the ministries and parastatals and regularly monitors the progress being achieved. All development programmes and projects undertaken in the public sector are subject to endorsement by the NPC before they are implemented.

As part of the NPC's regular mandate, all national and sector-related environmental policies, programmes and projects are subject to review and approval by the NPC before these are put into effect.

There is an Environment Protection Division within the NPC which is responsible for overseeing and coordinating intersectoral activities related to planning, programme budgeting and monitoring of environment-related actions. This division used to be the only national level bureaucratic entity responsible for carrying out the directives of the EPC prior to the creation of the MOPE.

14.4 MINISTRY OF POPULATION AND ENVIRONMENT (MOPE)

This is a newly created Ministry with an overall mandate to initiate policies and implement programmes and projects in the cross-cutting areas of population and environment. Primary functions of the ministry include: (i) formulation and implementation of population and environment-related policies, plans and programmes; (ii) dissemination of information; (iii) coordination among various ministries; and (iv) training for effective implementation of the programmes on population and environment. The range of activity areas embraced by these functions include environmental protection, pollution control, enforcement of environmental standards and monitoring, and environmental impact assessment.

In addition to the above primary functions, the ministry envisages to undertake a number of supportive actions in collaboration with other sectoral ministries.

14.5 SECTORAL MINISTRIES

The sectoral ministries and agencies under them are directly responsible to take adequate measures to prevent and minimise adverse environmental consequences in their respective areas of development. For instance, the Ministry of Industry is responsible for the preparation and enforcement of adequate environmental standards for the industries, and the Ministry of Water Resources serves as the key agency in the water resources sector.

XV MAIN ISSUES

15.1 INSTITUTIONAL CAPACITY

One of the major obstacles to effectively carrying out actions directed at sustainable development is the weak institutional capacity prevalent in the country. Indeed, over the past decades, a number of agencies have been created both in the public and private sectors as well as in the NGO sector. Yet, in view of the enormity of the problem vis-à-vis the extent of coverage and capacity of these agencies, wide gaps still exist. The problem is quite acute in the public sector since this sector has to play a critical role in providing the necessary support and in facilitating the enhanced participation of the private sector.

15.2 COORDINATION

Clear operational mechanisms are weak at the national level to coordinate the actions of the various related agencies engaged in different environmental and development areas. As a result, duplication of efforts, and lack of knowledge about what other agencies are doing and what their experience has been are common.

15.3 LEGISLATION

The need to adequately address environmental issues and incorporate these as integral components of development projects is realised, but there is yet no mandatory requirement to do so. Adoption of necessary mitigatory and preventive measures, and

compliance with the agreed policies and EIA guidelines is thus purely left to voluntary action which makes it unlikely for most agencies and enterprises to take it seriously. No single agency is specifically entrusted with the responsibility of enforcing the existing legal and regulatory provisions and keeping surveillance on compliance.

15.4 LOCAL-LEVEL CAPACITY

The Local Self-Governance Act envisages the local elected bodied to assume a much greater role in all aspects of development. These bodies seriously lack resources and institutional capacity to formulate and implement development programmes that would be locally desirable and feasible and at the same time sustainable. Strong national commitment and much enhanced efforts are thus necessary to provide better access to resources for these bodies and to enhance their institutional capacity.

15.5 PRIVATE AND NGO SECTORS

The private sector is increasingly becoming aware of the environmental consequences of developmental activities and the need for preventing and mitigating the problems that arise from such activities. Since most environmental problems are societal in nature, meaning that the costs or benefits accruing to the environmental impacts of the actions of an individual or group—whether in utilising natural resources such as forests and water, or in production-related activities such as processing and manufacturing, or utilisation of various inputs and processes, or in consumption-related activities such as waste disposal and vehicular emission, or in the development of area-specific settlements and establishments such as growing urban sprawl and construction of development infrastructures such as dams, powerhouses, irrigation canals and roads—spill over the entire community, physical territory or ecological system. It is oftentimes very difficult, if not impossible, for an individual private entity engaging in such actions to fully account for such spill-over effects known as externalities, or it has no incentive to do so since the expected private gains seldom exceed the costs associated with such full accounting.

In order to fulfil the immediate need for a national level agency to play a lead role on the environmental front, the task of the Ministry of Population and Environment becomes quite challenging.

15.6 LEGISLATION, REGULATION AND ENFORCEMENT

A wide range of human actions, individual and collective, are environmentally quite sensitive and several areas of such actions need to be regulated through appropriate legal and regulatory means. Whenever the impacts of individual human actions spill over the larger collective domain, it becomes imperative for the public sector to take positive measures for the benefit of the society as a whole. Legal and regulatory provisions act as an important instrument toward fulfilling this obligation. Equally important is the willingness and ability of the concerned bodies to enforce such provisions. Without a firm commitment and the requisite preparedness to respond quickly and effectively, laws and regulations would only remain on paper and people would begin to lose faith in the entire governance system.

As pointed out in the NEPAP, environmental legislation in Nepal has to date been piecemeal, and many loopholes mitigate against prosecuting those who damage the environment. Many areas of environmental concern are covered by insufficient legislation. For instance, the existing legislations are inadequate or unclear about the ownership and use entitlements of resources such as water, and penalties for damages caused on the environment by industries and other economic agents. Even in areas for which there are legislations, these have not been applicable or effective due to the absence of necessary regulations or appropriate institutional capability.

Besides the absence of proper legislation and/or regulation in many areas, there are several instances of conflict and overlap in some other areas. This situation has led to the realisation of the need for an umbrella legislation which would effectively integrate the main environmental issues and provide a comprehensive and coherent legal framework for dealing with the complex environmental problems. A bill to this effect has recently been approved by the national legislature.

Legislative measures are required which single out a central agency with adequate power and resources to effectively implement the environment-related legislative and regulatory provisions. The present thinking is to hold individual sectoral ministries responsible for enforcement of these acts and regulations. Since most environmental problems would be cross-sectoral in nature, it is unclear as to how sectoral agencies would be able to address those problems. This clearly leaves room for no single agency taking concrete actions as is happening at present.

An additional area of concern has been the country's ability to fulfill a number of international conventions related to the environment which Nepal has signed.

MOPE has now been identified as the custodian of environmental concerns for the entire country. It is critically important that this nationally recognized agency be given enough authority to prevail upon sectoral agencies in enforcing environmental laws and regulations, and take punitive action against the violators. It needs to be supported with adequate budgetary and manpower resources for carrying out the complex tasks of formulating, updating and enforcing environmental legislations, and in closely monitoring the actions of public and private sector agencies and entrepreneurs.

15.7 TRAINING AND EDUCATION

With a national average literacy rate of 40 percent, the general mass awareness about environmental problems and their causes, and measures to prevent and mitigate such problems is quite low. The problem is more acute when one recognizes that female literacy is much lower than the average for both sexes, while it is women who are mainly responsible for household activities, including the fetching of water and fuelwood, selecting and preparing food, cooking with fuelwood with its antecedent problem of indoor air pollution, tending of children and livestock, and cleaning and maintaining the dwellings. Women's awareness regarding nutrition and household sanitation thus becomes crucial in improving the environment at the household level.

Education is important in raising the general quality of life and in preparing a conscious and informed citizenry. Only when the mass itself becomes capable of

understanding basic environmental problems and means of their solution can a national policy and programmes to improve environmental health succeed.

Elimination of illiteracy and raising of people's awareness level through formal education is a long term process. Thus while the policy to eliminate illiteracy through formal education needs to be pursued vigorously, it should be supplemented by other programmes for awareness raising. Such programmes include nonformal education and training. NEPAP has broadly outlined how this can be achieved.

15.8 DATABASE AND MONITORING

The absence of a permanent system to generate and maintain on a regular basis basic data on various aspects related to the environment is a serious problem in Nepal. A unified system does not exist to continually generate relevant data on principal natural resources such as land, water, forests and biodiversity, and changes occurring in their use over time. Similarly, data systems do not exist for the extent of toxic effluents being discharged untreated into the natural system and how these are affecting the ecosystems and human health. Emissions from industrial establishments and vehicles are increasingly becoming a serious problem, particularly in the fast-growing urban centres. Except for a "project approach" to measuring some of these environmentally damaging consequences (viz., vehicular emission in the Kathmandu Valley), there is no regular mechanism to record the changes occurring in water and air pollution, and the shares of different contributing factors to such pollution.

15.9 CONCLUSIONS AND MAIN ISSUES

There is a need to critically review the current development policies and programmes and resource allocation patterns to ascertain whether these properly address the real problems affecting the sector. Evidences suggest that there is little or no correspondence between the policies and programmes on one hand the actual problems faced by the millions of farmers and agro-entrepreneurs. In many instances, the adopted policies are detrimental to promoting the desired sectoral growth on a sustainable basis. There is definitely a strong case for enhancing national capacity to articulate and analyse major development issues and negotiate with the donors.

Bureaucratic destabilisation resulting from excessive political interference has surfaced as a major constraint in building institutional capacity and in effectively promoting sustainable development agenda in the larger social interest. Strong actions and not just empty rhetoric are required and the policy makers need to give it top priority.

The country could not ever depend on external assistance to the extent it has been thus far. It is about time serious thoughts were given to rapidly increasing national self reliance for resource mobilisation, even if that means serious belt tightening for some time. Heavy dependence on donors makes the country more vulnerable to accepting their own agenda even if these are not in the country’s best interest. Economic liberalisation and privatisation that have resulted into withdrawal of subsidies on essential inputs for instance had drastically eroded the Nepalese farmers’ competitive edge in the Indian market, while India is often taken as the principal market for the surplus agricultural output in the country.

Ownership and access to land and land based resources is still a principal determinant of the survival and economic status of the vast majority of the people of Nepal. Their livelihood is inextricably linked to whether they own land, how much of it, and of what quality. Given the largely subsistence based production system, and the skewed land distribution, the imperative is that access to this basic resource be made more equitable.

Mere access to land would not of course ensure that land productivity would increase and poverty would be reduced. As stipulated in the Agriculture Perspective Plan, a dynamic, commercially-oriented agriculture has the potential to significantly increase farm incomes and reduce poverty, while at the same time contributing positively to sustainable natural resource management.

Government policy with regard to land reform has been lukewarm, if not outright inimical. For instance, the Eighth Plan (1992-97) argued that a land reform programme can not be self-contained in itself, and that experience across the globe makes it doubtful whether imposition of a land ceiling through land reform and the automatic guarantee of tenancy rights to the tillers will support the deprived sections (NPC 1992, p. 255). The current Ninth Plan (1997-2002) essentially reiterates this view (NPC 1998, Chapter 9, Section 9.2.2), while putting more emphasis on the elimination of dual ownership of land. All periodic plans since the Seventh Plan (1985-90) have emphasised on increased production and productivity through discouraging the tendency of absentee land holding and diverting investment to the non-agricultural sectors.

It has been well demonstrated by experience from other countries that land reform with the objective of providing access to land, the most important productive resource, for the majority of the poor households (landless, near landless and small holders), and improvement in tenure relationships can act as an engine of growth in the initial stages of economic transformation. Due to the predominance of feudalistic influence in the governance system, Nepal has been unable to initiate genuine steps in this direction for a long time, even after it did away with the autocratic regime of the Ranas in 19951, and on up to now after nearly a decade of restoration of multi-party democracy. True, measures started with the Lands Act of 1964 bore promises for a genuine reform, but those promises were thwarted almost immediately by the ruling power elite. It is ironical that democratic governments that came to power after the people's movement of 1990 have also tended to embrace the status quo and avoid any serious action on this front.

The Constitution of the Kingdom of Nepal 1990 clearly enshrines conditions of a welfare state and seeks to "transform the national economy into an independent and self-reliant system by preventing the available resources and means of the country from being concentrated within a limited section of society..."; and it advocates equitable distribution of economic gains on the basis of social justice (Part 4, Clause 25). It specifically prescribes institution of land reform. All major political parties have also supported land reform measures in their respective manifestos. Yet, ironically, these considerations are not reflected in the two periodic development plans since the political change of 1990, nor have the successive governments taken this issue seriously. On the other hand, it can be concluded that favourable conditions

exist to carry out a carefully designed land reform in the country with the objective of realising a widespread and equitable economic growth.

Available indications are that redistribution of land could enhance agricultural productivity, although this issue needs to be further investigated. We know that smaller farms are more productive in terms of cropping intensity, but these are not necessarily so in terms of yields. The latter situation may be due to the lack of access of the smaller farms to productivity raising inputs and technology. But it is an empirical issue that needs to be evaluated. We know as much that smaller farms are endowed with poorer quality of land, and they are constrained by lack of capital and credit to adopt better yielding purchased inputs.

Tenure-related issues are very important and these need to be analysed and implications of various options clearly understood. The tendency thus far has been to avoid the issue altogether. This has only contributed to perpetuating the uncertainty, discouraging investment on land and hampering adoption of productivity raising measures on a wide scale. The donors can play a role here by promoting further analytical work and healthy debate. The main issues related to land ownership and tenancy are ceilings on land holdings, dual ownership of land, fragmentation of holdings, and landlessness among the rural households.

A review of this nature must first be cast in the politico-economic, socio-cultural and physical environment that directly influenced the development process over the years. While a more detailed analysis of these factors is beyond the scope of the present exercise, a cursory narration is provided here with a view to setting the context of the study. Reference is particularly made to the principal constraints to development that contributed to shaping the current state and options available for future course of action.

Annex Table 1: Main Characteristics of the Physiographic Regions of Nepal

Features	Physiographic Regions				
	Tarai	**Siwaliks**	**Middle Mountain**	**High Mountain**	**High Himal**
Geology	Quaternary	Tertiary sandstone, siltstone, shale and conglomerates	Phyllite, quartzite limestone and islands of granites	Gneiss, quartzite and mica schists	Gneiss, schist, limestone and tethys sediments
Elevation	60-330 m	200 - 1,000 m	800-2,400 m. Relief 1,500 m with isolated peaks to 2,700 m	1,000-4,000 m. High relief 3,000 m from valley floor to ridges	2,000 to 5,000 m
Climate	Tropical	Tropical, subtropical	Subtropical, warm temperate (but tropical in lower river valleys; cool temperate on high ridges)	Warm to cool temperate, alpine	Alpine to arctic (snow 6-12 months)
Moisture regime	Sub-humid in FW+MWDR: humid in W+C and EDR	Sub-humid in most of the area: humid in N-aspect of W+C+EDR and Dun Valleys	Humid: per humid above 2000 m	Sub-humid to per humid	Semi arid behind himal
Rainfall intensity	High	High	Medium	Low	Low
Vegetation	Sal + mixed hardwoods	Sal + mixed hard woods + pine forest	Pine forest + mixed hardwood and oak forest	Fir, pine, birch and rhododendron	Open meadows + tundra vegetation
Soils	Ustochrepts, Haplustolls, Hapiaquepts, Haplustalfs, Ustifluvents and Ustorthents	Ustochrepts, Haplustolls, Rbodustalfs, Ustothents, Dystrochrepts, Haplaquepts and Ustifluvents	Ustochrepts, Haplustalf, Rbodustalfs, Haplumbrepts, Ustorthents and Ustifluvents	Eutrochrepts, Dystrochrepts, Cryumbrepts, Cryorthents and Ustorthents	Cryumbrepts, Cryorthents and Rock
Crops	Rice, maize, wheat, mustard, sugarcane	Rice, maize, wheat, millet, radish, potato, ginger	Rice, maize, wheat, millet barley, pulses, sugarcane, radish, potato, ginger, cardamom	Oat, barley, wheat, potato, buckwheat, yams, amaranths, medicinal herbs	Grazing (June-September)

Annex Table 1 (…contd.)

Features	Physiographic Regions				
	Tarai	**Siwaliks**	**Middle Mountain**	**High Mountain**	**High Himal**
Horticulture	Mango, litchi, pineapple, jackfruit, potato, tomato	Mango, papaya, banana, potato	Mango, papaya, banana, orange, lime, lemon, peach, plum, potato, cauliflower	Chestnut, walnut, apple, peach, plum, apricot, potato	Apple, walnut, vegetable seed, potato
People	Tharus, Brahmins	Tharus (Dun Valley), presently all hill tribes displaced/ immigrated from Middle Mountains	Gurung, Magars, Tamangs, Newars, Brahmins, Chhetris, Damais, Sarkis, Sunars, Kumals, Rais, Limbus	Khas Chhetris, Tibetan related groups Thakalis, Bhotiyas, Sherpas, Tamangs, Ghales	Temporary herders, Sherpas and Bhotiyas
Industry	Match factory, jute factory, cigarettes factory, sugar factory, katha factory, saw-mills, rice and flour mills, soaps, condiment and food processing furniture, industrial estates	Sawmills, rice, flour and oil mills. Industrial estates, cotton factory, cement factory, wildlife camps	rice, flour and oil mills, cement factory, industrial estates. Cottage industry handicraft, curios, hosiery, metallurgy, furniture, plastics, hotels and lodges.	Cottage industry, carpets, blankets, hand woven cloth, trekking	Mountaineering and trekking
Transport	Good road linkages	Good road linkages within dun valleys	Road linkages around major centres	Very few road linkages	No road linkages

Source: Sharma (1995).

Annex Table 2: Main Characteristics of Land Systems and Land Units

Physiographic Regions	Land Systems	Land Form	Land Unit	
Tarai	1	Active alluvial plain (depositional)	1a. 1b. 1c. 1d.	Present river channel Sand and gravel bars Low terrace Higher terrace
	2	Recent alluvial plain "lower piedmont" (depositional and erosional)	2a. 2b. 2c. 2d.	Depressional Itermediate position, level Intermediate position, undulating High position
	3	Alluvial fan, apron complex "upper piedmont" (erosional)	3a. 3b. 3c. 3d.	Very gentle slopes Gentle slopes Undulating Highly dissected
Siwaliks	4	Active and recent alluvial plains	4a. 4b. 4c.	Sand and gravel bars Low terrace Higher terrace, undulating
	5	Fans, aprons, and ancient river terraces	5a. 5b. 5c. 5d.	Very gentle slopes Gentle slopes Undulating topography Rolling topography
	6	Depositional basins (Duns)	6a. 6b. 6c. 6d.	Depressional Non-dissected high position Gently rolling topography Highly dissected
	7	Moderately to steeply sloping hilly and mountainous terrain	7	-
	8	Steeply to very steeply sloping hilly and mountainous terrain	8	-
Middle Mountains	9	Alluvial plains and fans (depositional)	9a. 9b. 9c.	River channel Alluvial plains Alluvial fans
	10	Ancient lakes and river terraces (*tars*) (erosional)	10a. 10b.	Non-dissected Dissected
	11	Moderately to steeply sloping mountainous terrain	11.	-
	12	Steeply to very steeply sloping mountainous terrain	12.	-
High Mountains	13	Alluvial plains and fans	13a. 13b. 13c. 13d.	Active alluvial plain Recent alluvial plain Fans Ancient alluvial terraces
	14	Past glaciated mountainous terrain below upper altitudinal limit of arable agriculture	14a. 14b.	Moderate to steep slopes Steep to very steep slopes
	15	Past glaciated mountainous terrain above upper altitudinal limit of arable agriculture	15a. 15b.	Moderate to steep slopes Steep to very steep slopes

High Himal	16	Alluvial, colluvial and morainal depositional surfaces	16a.	Glacio-alluvial plains
			16b.	Morainal deposits
			16c.	Alluvial colluvial fans
			16d.	Colluvial slopes (talus)
	17	Steeply to very steeply sloping mountainous terrain	17a.	Shallow till or colluvium over bedrock
			17b.	Rock headwalls

Source: Sharma (1995).

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