

International Cooperation for a Hazardless World

by Masayuki WATANABE

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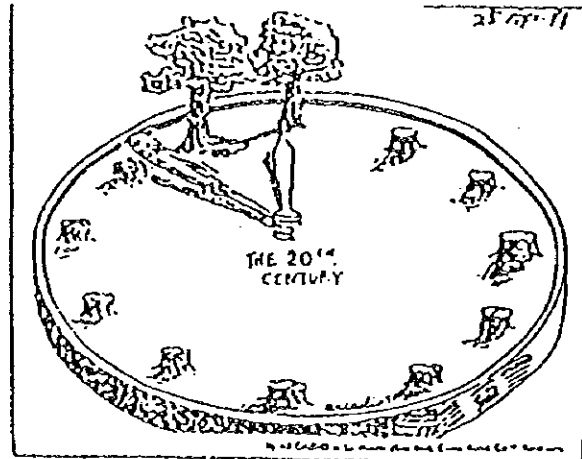
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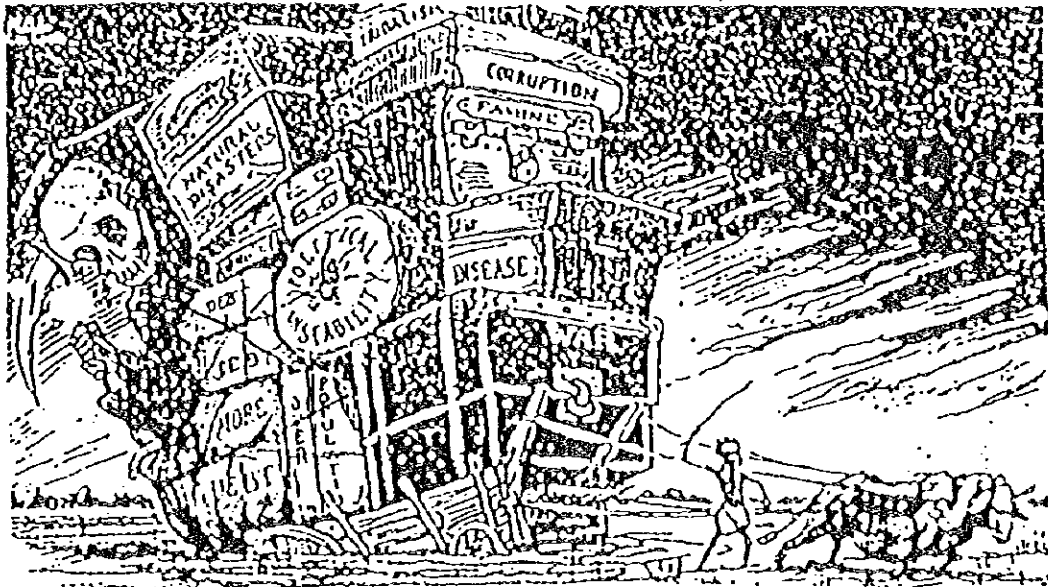
Prologue



A majority of so-called "developing countries" are situated in areas with tropical climates. Life in such areas used to be free from want in food, clothing and shelter and perpetually adapted to the ecological system.

People were humble enough to ask the forest "May I have just one of your trees?" They would only cut it down after the forest replied, "Yes, it's all right."

"The walking stick that a traveler stuck in the ground before he lay down to rest sprouted and bore fruit during the night. In the morning, he woke up and ate the fruit before traveling on." - Such tales from tropical Asia eloquently prove that the people's lives and the cultures in those areas may well have been the closest thing to our conception of life in Paradise.



Countries with weak industrial sectors and few employment opportunities are characterized by explosive increases in population, dreadful gaps in living standards (bare feet and Mercedes Benzes) concentration of population into urban areas, worsening environmental conditions typified by commercial cutting, mass casualties due to frequent disasters, endless disputes and wars between tribes and massacres... What has made the countries that used to be closest to Paradise suffer from so many hardships?

Is it really possible to reverse these hardships and difficulties, raise living standards and reduce disasters? What can we do to achieve this?

pt. There has been more give-and-take in collaborative activities with industrialized countries, and thus closer relations are being established. However, cooperation with developing countries involves many issues: setting objectives, planning, implementation, and assessment of the effects of assistance projects.

For what purposes are the developmental assistance and cooperation being offered?

How properly do we understand the thinking of the recipients?

What type of methods are appropriate?

The objectives, targets, methodology, and effects of assistance and cooperation are examined here through the prism of disaster prevention projects.

1. Japan Once Received Assistance

Post-war Japan needed tremendous funds to recover from her loss in World War II. Since it was totally impossible to raise such funds through domestic savings, Japan compensated for the shortage by accepting loans (totaling 870 million yen). The loans were appropriated for the construction of the Sakuma Dam, the Tokyo-Nagoya Highway and other projects to build up Japan's infrastructure as well as for capital expenditures at Toyota Motor. It was not until July 1991 that all repayments were completed.

2. What Does "Development" Mean?

131 countries (74%) out of the 178 UN members are developing countries. These countries make up 73% of the world's population but have only 16.5% of the world's GNP. The per capita GNP in an average developing country is only \$350, compared with \$19,600 in industrialized countries.

In order to raise living standards, first, much more production is needed than that required to maintain the present level. Next, the goods must be distributed among those who need them with maximum fairness.

To do this, resources and production technology as well as a framework for fair and efficient distribution must be developed.

A safer environment, funds, an educated and trained labor force, and technology are required.

The world's population is 5 billion at present. Will there be sufficient resources in order to support the 10 billion predicted in the year 2025 and to further improve living standards?

Even at present, in order to support the current population of 5 billion people, the impact of environmental pollution and destruction is already devastating. Does the earth really have enough resources to sustain such a tremendous population in the future?

The industrialized nations, which have less than 15 percent of world population established their present living standards through a history of environmental destruction in their own lands and the areas they colonized with mistreatment or genocide of indigenous peoples.

Merely lamenting or criticizing the environmental destruction occurring through people's efforts to survive in developing nations cannot possibly solve the problem. In what ways is the environment in the developing countries deteriorating?

Why does the population increase so explosively in developing countries?

3. The Need for Assistance Necessary and the Situation in Developing Countries

Needs for assistance cannot be adequately defined analytically, in the way one would explain the function of a catalyst in a chemical reaction. It would be better to look at international aid in the light of the logic of the "fellowship" and "mutual assistance" between people in a community. If "aid" is imposed

without regard for forming such connections, how can one realistically expect it to be accepted by the local community?

In any case, it is essential to know about one's counterparts in order to achieve closer relationships that result in maximum effectiveness. The following are some characteristics of societies in developing countries:

- 3-1. Absolute shortage of national wealth, impoverished people
- 3-2. Monopolization of agricultural land by an elite, rural population growth
- 3-3. Urbanization and environmental destruction as two sides of the same coin
- 3-4. Undemocratic politics
- 3-5. Wide gaps in living standards between regions
- 3-6. Feudalistic societies, sense of human rights
- 3-7. Prolonged military domination and its justification
- 3-8. Tax and financial systems
- 3-9. The catastrophe of colonization
- 3-10. The legacy of colonial rule

4. Stages of Social Development and Means for Cooperation

"Living standards" advance through a number of stages. Figures 1 and 2 consider living standards from different viewpoints. Both figures indicate that the best types of inputs and the

priorities they should be given differ depending on the developmental stage of a society.

Figure 1 shows that investment in disaster prevention has little meaning unless a satisfactory supply of food is first achieved. The history of development in many nations clearly proves that the will to participate in cultural events and decision-making processes and the desire for liberty emerge only after people have a sufficient supply of food, clothing and housing (only after they have work). While participation in decision-making processes is the fundamental premise of democratic regimes, what other indices are involved in democratization? I believe that integration of the following four principles into the social system is essential:

- (1) Equal opportunity
- (2) Fair competition
- (3) Proper rewards
- (4) Mutual support

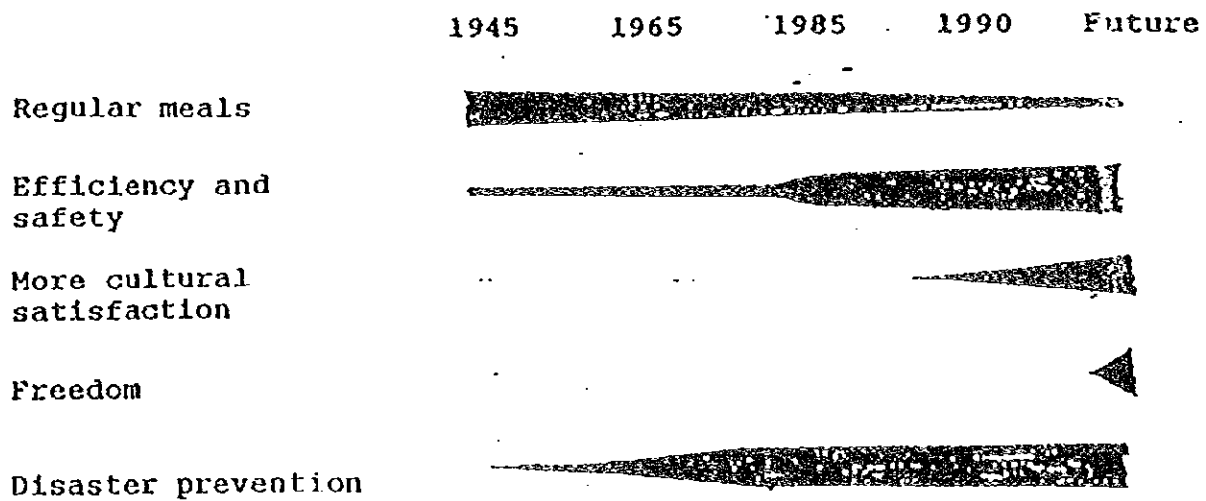
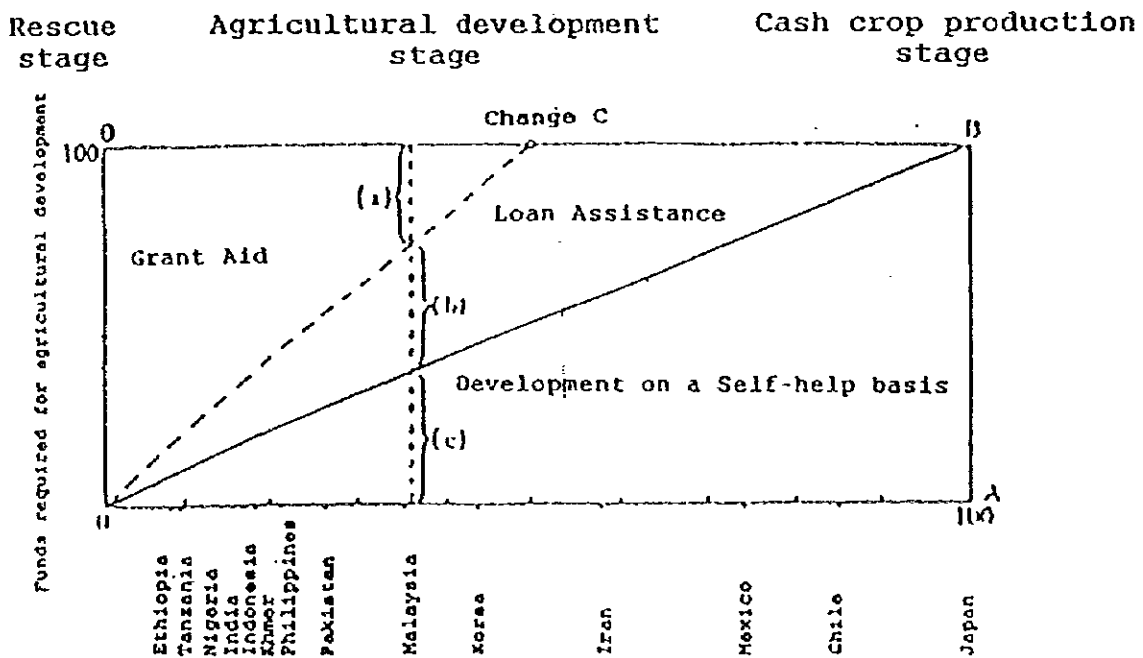


Fig. 1 Progression of Priorities in Japanese Society



(Indices in comparison with Japan's labor productivity as 100)

Fig. 2 Classification of Social Development Stages by Labor Productivity

5. The Case for Disaster Prevention - Six Reasons Why Disaster Prevention Knows No Borders

We have discussed how opportune offers of assistance must be made in the required quality and in sufficient quantity. However, any type of developmental effort will be in vain when it is negated by disaster. Since disasters nullify development efforts, disaster prevention must be a major premise of development initiatives. In this section, let us examine the logic of cooperation and assistance by specifically examining disaster prevention projects.

Ayako Miura depicted the Tokachi mudflow disaster of May, 1926 in her novel "The Mudflow District." The hero lost not only his fields, which he had nurtured over 30 years of desperate effort, but also the grandparents who raised him and his sisters. He cried "I've lost my faith in living with honesty," and grieved, "Why do God and Buddha punish me without cause?" "To live with honesty" is the basic ethic for any society, and God and Buddha are the objects viewed as the absolute origins of salvation for man to live by, the source for overcoming the absurdity, oppression and hardships of life. When someone who has worked with all sincerity finds himself on the verge of death, without salvation by God or Buddha, he is left with nothing but despair.

When people striving to climb out of the mud of desperation, determined to believe in a brighter future, are wiped out; when hopes and efforts to live more humanly come to naught; when their spiritual basis for life - belief in God or Buddha - is destroyed; this leads to the collapse of society. A disaster is an anti-human phenomenon.

Disasters are mostly caused by the impact of natural phenomena. It is only natural that as a result of such impacts changes will arise in our living environment with various frequencies and magnitudes, including topographical transformations.

The vital question is whether the impact of such natural changes in the environment will be amplified or attenuated within society.

When the magnitude of an impact exceeds the capacity limit of a society, the society will perish. The flood that ruined the Indus civilization and the earthquake that reduced Mycenae to ashes are examples. As a human act, the impact of deforestation is of crucial importance. Ancient Ethiopian and Greek civilizations gradually declined as the elimination of forests progressed.

However, a society with a larger capacity to cope can survive even against a natural impact of the same extent. Drought and food shortages do not occur in Africa alone, so why do so many people have to die in Africa?

We must not overlook the social mechanisms that may amplify a small impact, causing large sacrifices and making the society more inhumane. These social mechanisms cannot be rectified by mere technological plans.

By considering the matter in this way, one may find that the problem of disaster should be regarded as an issue of basic human rights before it is studied as a technical problem. Disaster prevention projects are the most fundamental security program. The spirit of disaster prevention is to treat the sufferings of others as one's own, and to try to overcome disasters by collective effort as a society. In this sense, disaster prevention projects may be an index that indicates the degree to which a society has matured. This is one reason why there can be no national borders in initiatives for disaster prevention.

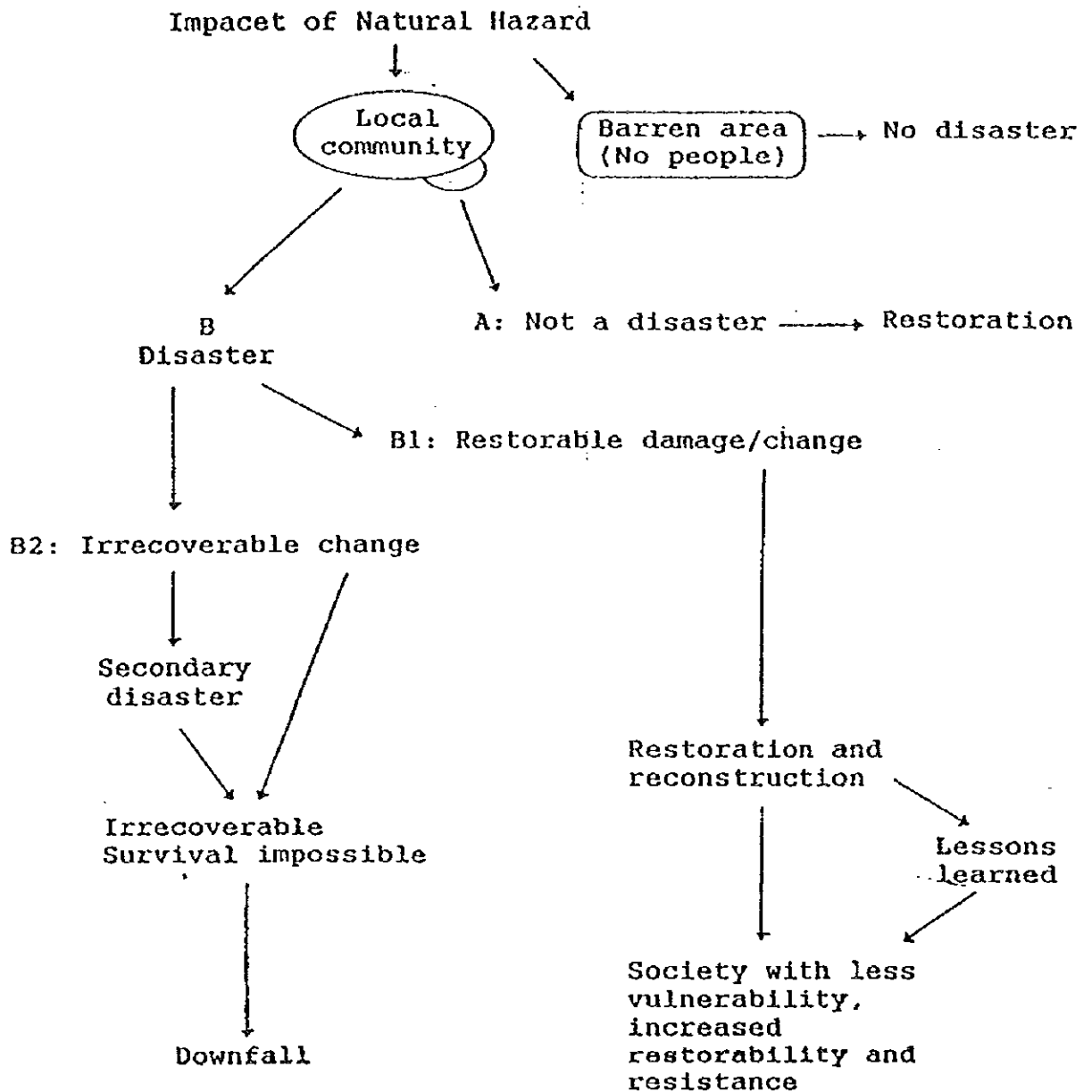


Fig. 3 Reaction of Societies to Impact of Natural Hazards

Next, rarely does a disaster prevention project produce new wealth for society as a whole. In almost all cases, disaster prevention projects do not result in new capital goods.

The objective of disaster prevention or recovery projects is to minimize the effects of hazardous natural phenomena that can destroy the utility of existing production facilities or to give them higher resistance in order to recover their functions

more quickly. Such projects naturally involve added expense. The only source of funds to cover such expenses is an economic surplus in other sectors. Not that many societies can produce such an economic surplus. And there are for fewer societies with the huge capacity needed to reproduce damaged or destroyed facilities on a broad scale. This is the second reason why there can be no national borders in initiatives for disaster prevention.

As we accumulate experience with and make progress in scientific understanding natural phenomena, we find that the sources of damage-producing phenomena can often be traced to the other parts of the earth. That is, the safety of a place to live cannot be readily secured merely by eliminating the weaknesses in its surroundings (in a particular area or country) or by reinforcing them. (Nor can one ensure safety by waiting until assets are accumulated and then implementing disaster prevention measures based on experience. Disasters may occur at any time.) This is the third reason why there are no national borders in initiatives for disaster prevention.

Many developing countries afflicted by disasters were colonies of Europe, the U.S.A., or Japan before they gained independence. The imperialist powers drained their colonies' human and natural resources and in many cases constructed only the facilities required to carry out this deprivation. This has significantly hindered developing countries from gaining economic independence. However, accusations of historical responsibility will do nothing to eliminate their ever-growing vulnerability today. Considering the present and future bonds between us alone and the situation in international society, it simply makes sense that we should invest some of our economic surplus there. Collaboration in disaster prevention also simply makes good sense. This is the fourth reason for borderless efforts in disaster prevention.

Disasters have not always brought about an overall minus. For example, the big fires in Edo era Japan resulted in

reconstruction booms. Earthquakes and fires may have side effects of promoting improvement in building codes, urban planning, and in fire fighting, police, disaster-prevention and insurance institutions. Floods have engendered solidarity in local communities. Disasters may lead to development of science and funding of and cooperation in research. However, in order to turn such misfortunes into blessings, the culture of a society must nurture scientific thinking, cooperative efforts, and a sense of responsibility. (It is a further prerequisite that there be resources or an economic surplus available for promoting disaster prevention projects.) Very few societies can satisfy all these prerequisites for ensuring the success of disaster prevention projects. This is the fifth reason why international cooperation is required.

Cooperation generally has the aim of making up for a shortage of capacity on the part of institutions not yet adapted to rapid changes in a society. The institutions in each society and its capacity to operate have developed individually with different historical, social, economic and cultural backgrounds. Institutions or operating methods from other societies with different backgrounds and in different stages of development do not properly function if they are simply shifted or "parachuted" into place. This is why the idea that "as soon as aid input stops, everything stops functioning" does not make sense.

The form, method, amount and timing of required inputs must be determined after reviewing the characteristics and development stage of a society, with special regard to its ways of thinking and national, regional and community contexts. Such determination involves a trial-and-error process, even if everything is thoroughly considered at first. It is essential to exchange information and experiences among people who share the same aim. This is the sixth reason for the need for international cooperation.

6. What the sites of disasters teach us

Disaster sites show clear signs of the close relationship between social factors (poverty and environmental deterioration) and disasters as natural phenomena. Moreover, these phenomena form a vicious cycle (see Fig. 4). Disaster prevention is impossible unless we interrupt this vicious cycle. Disaster sites also illustrate the stark reality that there are very few of the resources required to break this vicious cycle at the sites themselves. The problem is how to utilize disaster prevention technologies in the specific environment and how to formulate viable projects. Stated differently, the key issue is to ask what sort of society we intend to construct and what type of disaster prevention projects can be launched in the environmental conditions of a specific region. The fundamental problems cannot be solved by blindly applying the belief that disaster prevention consists solely of applying technologies and funds from without.

Recent history shows that a wealthy industrial country like Japan may be barely able to turn the misfortune of disaster into a blessing for society. In developing nations, disasters function as setbacks that turn the clock back on their development efforts.

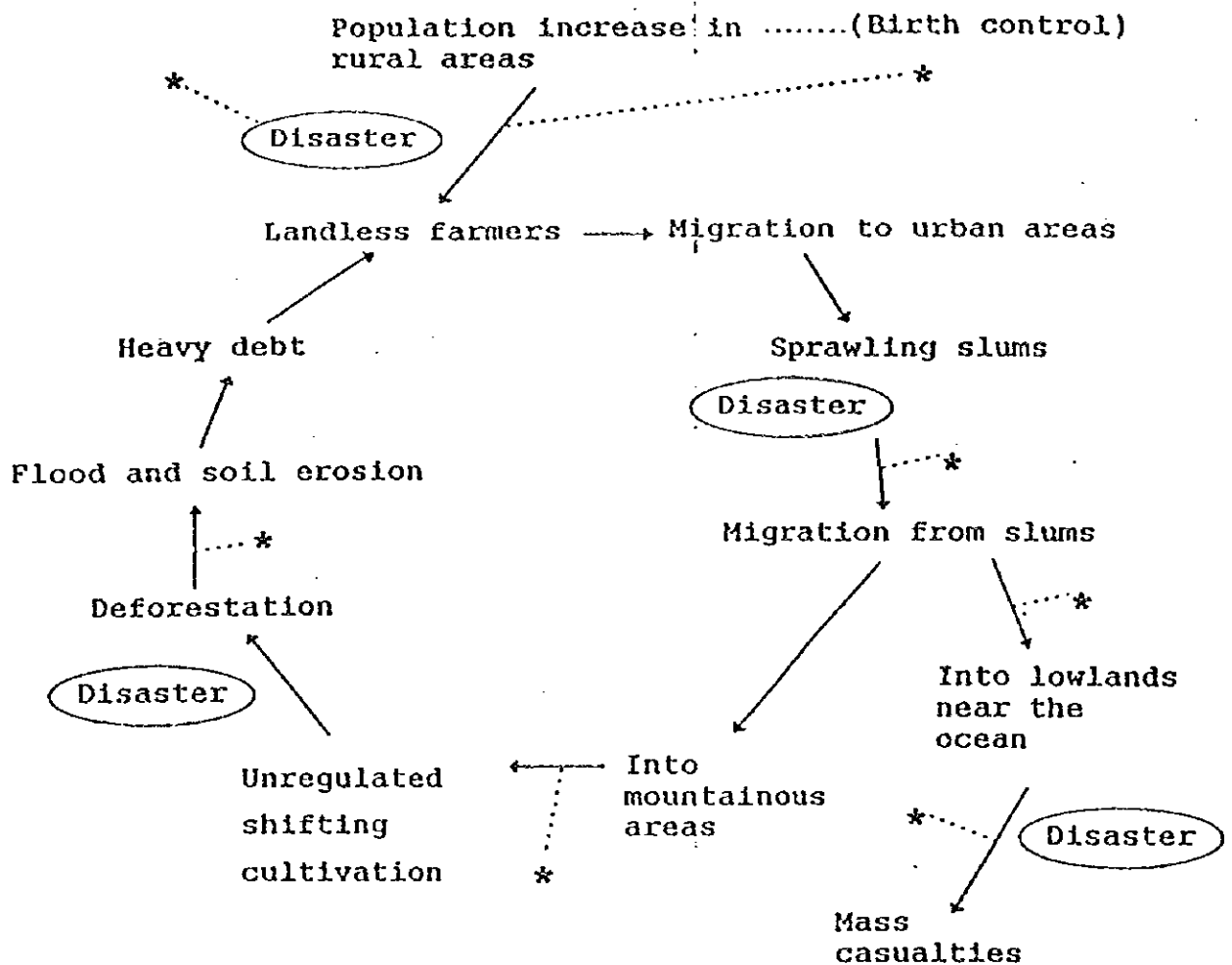


Fig. 4 Vicious Cycle of Poverty and Disaster

It is development efforts that are eventually supposed to produce the economic surplus to fund disaster prevention. However, since these efforts can be nullified by disaster, development efforts will not bear fruit unless assistance is also directed toward disaster prevention.

The economy of a developing country with little surplus has few resources to devote to disaster prevention. Even if local disaster prevention projects are planned, their priority is always low. Wars also accelerates this vicious cycle and makes disaster prevention impracticable. Japan's history is no exception to this reality. Japan does have some successful

case histories, though, of emergency relief projects in rural areas. Disaster prevention projects for river construction, sediment control, and forest conservation make up the core of these.

7. Can Economic Assistance Projects Make a Society Ready for Disaster?

Disaster prevention is in the end an issue of basic human rights. The administrative will to implement disaster prevention depends on the willingness of the people to make collective efforts to share other's pain.

The lessons learned from past experience with similar damage-inflicting phenomena are analyzed and converted into technologies. In this sense, its disaster prevention efforts can be viewed as a scale to gauge a society's maturity.

In order to plan and implement a disaster prevention project, the mechanism of a natural hazard's impact on the society must first be analyzed. Then, the resources that can be set aside by the society are defined and countermeasures are determined. In this process, the following types of qualitative and quantitative information and knowledge are required:

- (1) The natural hazards (triggering phenomena)
- (2) The process(es) whereby they inflict damage
- (3) The mechanism(s) by which disasters are generated (focusing on social weak points)
- (4) The available mechanism to mobilize resources and manpower for emergency relief and rehabilitation
- (5) The existence of means within the society to transform misfortunes (setbacks) into blessings (advances)

7-1. Impact of Natural Hazards

Developing countries afflicted with disasters are from the outset situated in areas where damage-inflicting types of natural phenomena are ubiquitous. But while one can say that disasters prevent developing countries from achieving economic development, when we examine the historical facts we find that areas where ancient civilizations prospered coincide with high-risk areas today. The principal cause for their vulnerability can be attributed to the cycle of deforestation and environmental degradation engendered by continual warring in pre-modern eras and to the plundering of nature and society that accompanied colonization in recent times.

7-2. Damage-Inflicting Phenomena and Their Amplification

The physical mechanisms by which the impact of natural phenomenon generate damage are not specific to any particular locality. However, amplifying effects whereby a minor impact inflicts grave losses can be clearly observed in developing countries. The principal cause are population pressure, clean cutting of forests, and immoderate land utilization resulting from over grazing, monoculture agriculture, and land monopolies.

7-3. Mechanism of Disaster Generation

The key to disaster prevention is to learn lessons from past case histories and to be prepared for similar situations that may take place in the future. In a society with considerable vulnerability to damage-inflicting phenomena, a minor natural phenomenon may bring about a serious disaster. What sort of index can be used to represent vulnerability?

The societies and economies of developing countries in regions with a high risk of disaster are often overwhelmed by a great influx of immigrants with no experience of past disasters. This amplifies the impact of disasters and makes disaster prevention activities more difficult to execute. Moreover,

frequent disputes between ethnic groups and regional conflicts further magnify this difficulty.

7-4. Resource and Manpower Mobilization Mechanisms for Emergency Relief and Rehabilitation

To initiate disaster prevention activities, the spirit to face up to the damage-inflicting phenomena is the first requirement. Community-specific solidarity among the inhabitants as well as the technical and financial assistance available from higher authorities can be regarded as cultural and social indices of this spirit. Disaster-prevention technology is unlikely to evolve in a culture where disasters are interpreted as a manifestation of divine will. Disaster prevention facilities have no functions as production facility. Facilities, of course, do not have an intrinsic value like gems; it is their functions that are valuable. But the functions of facilities are subject to the influence of the environment in which they are installed. Facilities will lose their functionality unless they are managed and operated in such a manner that conforms to changes in their environment. They not only become useless, obstructive objects, but their very presence can be dangerous. Since facilities in developing countries are often poorly monitored and maintained, many fall into a condition of disrepair before the one is even impacted by a hazardous phenomenon. But why are they poorly maintained?

Defining needs, conducting surveys, drafting plans, and executing construction are of course prerequisites for disaster prevention, but the fundamental prerequisite is a society that values the sense of responsibility and effort needed to support the feedback cycle of monitoring functions, maintenance and management, and modification of plans.

7-5. The Framework for Turning Adversity into A Blessing

The vulnerability of a society to disaster and the mechanisms of disaster generation involve not only physical elements, but

also political, social, economic and cultural factors - national and regional characteristics. The methods appropriate for Japan, in which the disaster with a death toll of five thousand due to a typhoon happened long ago and no one is in danger of dying at present, are not necessarily the best methods for other countries. Offering cooperation and assistance through implementing an erosion control project and supplying mudflow warning systems alone will not necessarily prevent a mudflow disaster. Not only must training courses be offered, the imparted knowledge must be properly disseminated and utilized.

In order to succeed, we must have the patience to study the social circumstances and values of our partners in cooperation and make continuous cooperative efforts for disaster prevention, naturally including technical assistance.

7-6. Conditions for Social and Economic Development

The objective of assistance and cooperation is to support the process by which introduced technologies and invested funds will produce a return and the resulting profit will be reinvested to produce a further return. The process must steadily repeat itself so as to accumulate assets and capital, and in due course, foster people with ability and establish a framework for development.

The reality of developing countries is that they must overcome a number of hardships such as a variety of ethnic groups, multiple religions, the legacies of colonial institutions, insufficient educational systems, insufficient revenues, population increases, a lack of people with skills, social anxiety, and a treacherous natural environment.

What are the conditions that will make such a difficult undertaking possible?

a) Conditions at the individual level

Here, there is needed the ideal, spirit and will to build up one's own country.

Next, comes the confidence that "we can make it" and the trust in one's country as "worth it." Thus, one role of education must be to provide the fundamentals for maintaining the morale of individuals.

b) Conditions at the national level

On the other hand, what conditions must be fulfilled at the national level to achieve success in this undertaking?

First, one needs a framework for convincing the people of the potential to succeed and for providing them with equal opportunities to challenge themselves.

Secondly, one needs to ensure that fair competition is allowed among those challenging these opportunities.

Thirdly, one needs to institute a system that offers pertinent appraised results and rewards.

(In parallel with establishing institutions that satisfy these conditions, another framework for the punishment of adverse acts should likewise be established.)

c) Role of leaders

In an environment filled with adversity, the presence of leaders with outstanding capabilities is indispensable. They make it possible to maintain the nation's solidarity and direct the people's energies in a planned direction to achieve success and mediate interference by other countries. The prosperity of a nation heavily depends on leadership that is available in that country. Countless

nations have fallen because of the lack of good leadership. History shows that many leaders who excelled during a certain period but later fell and lost power, or who became corrupt and ruined their countries. While it is an unimaginably difficult task for a leader to guide a developing country faced with innumerable disadvantageous factors forward, if the country's vital leadership itself is corrupted, it will lead to historical disaster.

7-7. Realities That Nullify the Effects of Cooperation and Assistance - Some Social Facets of Developing Countries

- a) The sense of fulfilling responsibilities and keeping promises

As has been mentioned above, for developing countries to grow as solid nations, the cycle of expanded reproduction, which allows invested resources to generate new resources, must rotate smoothly. "Resources" refers to the all wealth available in terms of personnel, capital and production. In order to ensure that these resources are efficiently combined in order to make the society function, it is vital for individuals to a sense of duty to fulfill his/her responsibilities.

- b) The Morass of corruption

Corruption of leaders is among the most tragic of factors that hinder progress. Corruption proliferates like a fungus in a culture medium. Thus each individual and each organization that plays a role has a significant responsibility. Since subordinates imitate their superiors, the responsibilities of leaders as individuals are grave.

The hidden assets of the late Ferdinand Marcos as gold ingots deposited at Swiss banks alone are said to be worth 350 million dollars. This is equivalent to one-third of

the Philippines' annual budget for public works, and could easily make up for the losses of 250 million dollars incurred through the eruption of Mt. Pinatubo. Regardless of how they form, such hidden assets spoil a nation's efforts for development and demoralize honest taxpayers.

c) Bribery

When the leaders pursue vested interests, the whole governing organization down to the rank and file becomes a monster of bribery. Public officers who do not receive bribes tend to lack diligenee. The infrastructure improvements and maintenance and management that are the absolute requisites for disaster prevention (as well as the monitoring of conditions and transmittal of warnings are neglected. Use of bribery appear to be nothing more than a convenient means to obtaining desired advances to those in the upper classes who can afford it, but it accelerates the misuse of administrative power for private purposes.

d) Monopoly of power and vested interests

When assistance becomes a vested interest and the results of development are monopolized by a particular group, antagonism between groups grows and may cause civil war. A war is nothing but wasted consumption. It not only lays waste to past efforts and results, but also nurses rancor and hinders development.

Large landowners in rural areas typically practice high-interest rate usury. Small farmers and landless farmers burdened by high rents, who have no savings, can only manage to pay for seed, fertilizer, cattle and irrigation water by assuming debts. Unless the climate is stable and the expected yields are obtained, they must seek extra loans to cover their crop losses. Thus, the process of turning small farmers into tenant farmers and tenant

farmers into landless farmers is accelerated in areas where natural phenomena frequently inflict damage, and migrants then drift into disaster-prone areas.

That assistance will never contribute to the improvement of farmers' living standards, but will only favor land owners unless this mechanism is rectified is a frequently-heard criticism. The gathering of jobless migrants in disaster-prone areas, and the inevitable large losses of life and suffering in disasters cannot be prevented through disaster prevention science and perfunctory campaigns alone.

Migrants forced to live in conditions very close to the lower limit of survival, have no money or time to spare to receive an education. In this way, gaps in status become fixed.

e) Aid Fatigue

The human rights of chronically poor, landless farmers who do not receive an education are rarely observed. The majority of sheltering projects to protect people from cyclones are managed by funds from donor countries. The number that can enter such shelters in the event of an emergency is limited. While the principle of first-come, first-served is supposed to be applied, in some cases, the shelters are commonly occupied by the cows possessed by the most influential persons in the area. No room is left for the village farmers. The value of human life depends on how much land one owns. Such realities cause so-called aid-fatigue.

f) Disasters as more than natural phenomena - disasters as indicators of defects in the social framework

The causes of disasters are not directly related only to the magnitude and frequency of the physical impacts of natural phenomenon. The structures and operating

frameworks of the societies in disaster-prone areas are also significantly implicated. Thus begins the vicious cycle of disaster-poverty-environmental aggravation, and its speed grows ever higher. This is the actual reality of disaster-prone areas. How can our disaster prevention projects contribute to the elimination of this vicious cycle?

8. To Create Societies Resistant to Disaster

A society can be said to have "disaster-prevention capacity" if no disaster occurs even if the impact of a natural phenomena takes place, or even should a disaster occur, it is not a serious one and restoration proceeds at a rapid pace. What is "disaster-prevention capacity" made up of and how can it be obtained?

8-1. Indices of Disaster Prevention Capacity

According to Kawata (1994), disaster prevention capacity can be expressed as a function of mean lifetime. It may seem evident that only "affluent" societies can be immune to disasters since the capability to resist the impact of natural hazards originates from an economic surplus in other sectors. However, the capacity to resist disaster can only be effective when social restrictions do not interfere. Thus, "affluence" in this case does not necessarily signify the physical wealth of an industrialized nation.

The traditional building technologies and site selection practices of villages in the southern Pacific and Caribbean were appropriate means of protecting people from cyclones and hurricanes. The source of disaster-prevention capacity is to be found in another type of "affluence," represented by land use that avoids areas at risk, flexible building structures, and social institutions that encourage mutual support. This shows that comprehensive "affluence" over a wide range of

economic, social and cultural factors is what creates a great capacity to prevent disaster.

8-2. Enhancing Disaster-Prevention Capacity

The issue is to find the appropriate methods to remake today's fragile societies that are vulnerable to damage-inflicting phenomena. A report by Akihiko Yoshida (1993) explains:

What is of particular importance in developing countries inhabited by masses of poverty-stricken people is that a sufficient number of opportunities for steady employment be created. However, since the educational institutions and social infrastructure in such countries are poorly founded, it is difficult to develop the secondary industries that would provide enough job opportunities. Accordingly, it is primary industries that must first be encouraged, emphasizing food production. Even so, creation of many job opportunities in agriculture and other primary industries will not be an easy task. Moreover, primary industries typically involve hard labor not well-suited to female workers. Fewer employment opportunities for women prevents them from advancing and raising their social status, resulting in an increase in population. A simultaneous solution to the problems of poverty and population increase must be found.

The Nordeste is a tropic savanna located in inland Brazil. The educational level of the region is low and accordingly the quality of labor is substandard. It is a society where adults can only make a living by drifting into urban areas or the Amazon. After years of hardship, immigrants from Japan made the year-round cultivation of a temperate species of grapes possible, and as a consequence, the birth rate of working women there has decreased to less than half its previous level. This decrease in the number of births has had a marked influence on suppressing drift into urban areas and environmental destruction.

Yoshida regarded the comprehensive agricultural projects as one specific measure that can solve the issues of developing countries. He enumerated the conditions for such projects as follows:

- 1) It must involve reforestation or a similar conservation method.
- 2) It must be labor-intensive.
- 3) It must be suitable for female workers.
- 4) Its products must be competitive in the international marketplace.
- 5) Its products must find an international market.
- 6) It must have a propagative effect on other industries.

Once a number of labor-intensive projects are implemented, the infrastructure for a large number of people to live is then required. Furthermore, high quality human resources will be needed to maintain the projects. To fulfill these conditions, the following must be implemented:

- 1) Development of primary education
- 2) Provision of health and hygiene facilities and hospitals in order to lower infant mortality
- 3) Improvement of water supply and sewage systems
- 4) Improvement of waste disposal facilities
- 5) Establishment of railroads and other transportation networks for transporting products to outside regions
- 6) Improvement of communications networks to avoid international isolation

To support private enterprise and local government, the following are needed:

- 1) Separation of assistance for environmental protection and elimination of poverty from the burden of past debts
- 2) Construction of infrastructure
- 3) Financial support by long-term, low-rate loans to assist private investment
- 4) Purchase of products
- 5) Promotion of technical education

9. Epilogue

A large number of people have gone abroad since we inaugurated assistance and cooperation programs for developing countries. As a result, a great variety of things have been both given and received.

One of the founding principles of Indonesia is "unity in diversity." In both a good sense and a bad sense, "diversity" is a key characteristic common to many developing countries. Diversity, or regional and national styles, may also be possible in the measures taken to resist the impact of natural phenomena. Our aim is to create technology - appropriate technology - taking into account this diversity, and to allow it to be suitably adapted to each country.

For a technology to develop, it is a prime requisite that people will be able to "make a living" by using the technology. That is, we need to establish societies in which people can make a living while utilizing disaster prevention-technology. However, as discussed above, the priority given to disaster prevention is extremely low in a society where the supply of food for tomorrow is in doubt or a society preparing for war. This is because disaster prevention is provision for future crises. On the other hand; taking into account today's rapid

increase in population, stopping the vicious cycle of disaster and poverty has become a race against time.

The history of Japan's disaster prevention projects indicates that disaster prevention made a firm foothold as "projects to feed farmers." The majority of farmers in developing countries are landless.

To formulate projects that will be well-adapted to agricultural or other regions, increased participation by local government officials and staff from other sectors in Japan should be considered.

When we consider the future of mankind, we have no spare time left to engage in war. Disaster prevention projects lie at the extreme opposite end of the spectrum of human action, as they are endeavors to secure the human rights and safety of people. More efforts must be directed to such assistance and cooperation.

FIELD REPORT ON THE 1993 NATURAL DISASTER IN NEPAL

BY DR. AKIHIKO YOSHIDA

PART I

Natural hazards are natural phenomena. It is humanly impossible to control their occurrence. However, if we employ our wisdom, it is possible to mitigate some of the damage caused by them. We may be able to completely avoid the problems associated with their occurrence. The extent of natural disasters is decided by all kinds of vulnerability which may be divided into three categories, these are: physical, social and economic vulnerabilities. Needless to say, these three factors are closely interrelated with each other.

The extent of natural disaster that hit Nepal in 1993 was enormously severe. The natural disaster was a record rainfall. The average annual rainfall in Nepal is over 2000 mm. Eighty (80) % of the precipitation occurs between the months of May and September. The country has many mountainous areas with steep slopes. This creates an ideal condition for localized torrential downpour to occur. Statistically, the 1993 rainfall of 540 mm was not unusually high. It was only a third more than is expected every year. We may conclude that Nepal is vulnerable to natural hazards triggered by heavy rainfall and that it has always been confronting the factors that can make disasters severer. If you want to diminish the damage caused by these hazards, you must make strenuous efforts to mitigate these vulnerabilities one by one.

Past disasters in Nepal were caused by earth washouts, exposure of rocks and sand as land collapsed in mountainous regions, soil erosion or landslides, and flooding on the plains. The basic causes of all those disasters were attributable to physical vulnerabilities in mountainous regions. These physical vulnerabilities are divided into two groups; those caused by nature and those caused by humans. Nepal requires immediate and considerable improvement to its physical vulnerabilities.

Human factors contributing to physical vulnerabilities include deforestation, deterioration of croplands, excessive grazing and road construction. For the moment, there seems to be no sign that deforestation may stop. Continuing population growth requires further development of arable lands and consumes forests as fuelwoods. On the other hand, young workers have been moving to the cities. This results in fewer human resources to manage the agricultural lands, creating conditions that cause washouts of the soil. These factors are further aggravated by extensive overgrazing. Road construction or widening of existing roads is necessary to improve the living conditions of the people, however, these "improvements" will often degrade the land and frequently cause washouts and result in landslides.

As you can see from the above examples, conditions which aggravate physical vulnerabilities are closely related to social and economic vulnerabilities. Population growth and poverty are among the most crucial issues. Both factors are interactive, but finding the solution to the population problem should be placed first. Nepal has a very limited supply of arable lands, Without solving the problem of an increasing population, the problem of poverty can never be solved.

The most important social problem facing Nepal is the issue of over population. However, it will take a long time to solve this issue. More immediate task should be raising the people's educational level. The Nepalese learned a bitter lesson from the 1993 disaster. Before this lesson is forgotten, the country should provide its people the knowledge to cope with such disasters so that tragedies are not repeated in future disasters. The 1993 disaster was noted for a large death toll. If people had knowledge about possible disasters or how to evacuate, many of the deaths could have been avoided. It is important that people have this knowledge to avoid death in future natural disasters and the task of imparting this knowledge should be undertaken immediately. It is easier to educate people while the memory of the disaster is still fresh. This knowledge will bring peace of mind to people and will enhance the effects of future rescue operations. If government administrations emphatically promote the education of women, they can promote birth control education to control population growth as well.

To be protected from economic vulnerabilities requires a solution to poverty and a significant improvement in per capita income. To that purpose, it is necessary to improve agricultural productivity; Nepal's basic industry. Many unfavorable conditions exist in the current agricultural climate, such as steep slopes or small amount of land per farmer. No significant improvement can be expected even if the measures are taken along with the status quo.

If you could create a new industry, this could contribute to an increase in per capita income and also create new job opportunities. The new industry would have to be closely related to agriculture. For example, the sericultural industry looks promising. The silk industry is divided into two areas: mulberry and non-mulberry (*Bombyx-mori*). Mulberry silk worms eat only the leaves of mulberry bush, while non-mulberry silk worms are more environmentally flexible and eat a variety of plants. Eri silk worms (*Pricini*) are the most representative non-mulberry silk worms. They eat the leaves of the castor bean tree, the Chinese tallow tree and the cassava.

Considerable technology is involved in the development of the mulberry silk industry. Japan has the technology and is in a position to provide technical cooperation. The non-mulberry silk industry may be introduced rather easily by the addition of simple improvements to the existing methods used neighboring countries. Both types of the silk industry have a common feature. As they grow, they both promote afforestation activities which will improve physical vulnerabilities to natural disasters. In addition, the roots and nuts of the plants used in the silk industry will create other marketable products, such as wax and castor oil. The roots of the cassava plant are edible and can also feed livestock.

Silk production generates a number of industries. It ranges from raising cocoons and spinning them to silk-reeling and weaving of fabrics. Further into the future, it is also possible to develop secondary industries such as the silk processing industry. A main characteristic of this clusters of silk-related industries is that they create jobs for women. The growth in job opportunities for women will lead to remarkable improvement in their social status and a subsequent decrease in the number of children. Therefore, the aforementioned industries will be effective in controlling population growth.

The cocoon industry produces masses of pupae, which are considered protein sources for humans, pigs and poultry. They can also be used for fish food. By creating dams for water reserves and landslide prevention, fish farms may also be created for eel, carp, crucial carp and trout. These farms can be a protein source for local residents and may be marketed to urban areas.

Because it is very difficult to improve economic vulnerabilities, it is imperative that developed countries like Japan provide technological aids, cooperate positively to foster the industries and buy the products.

PART II

Now that we understood that the extent of natural disaster is more dependent on human rather than natural factors, we must have the local people recognize the various factors that mitigate such disasters. People will then take steps to eliminate their vulnerabilities to such disasters. The difficulty comes from the fact that the scope of the disasters are caused by the life-styles of the population and it is not easy to change or eliminate these habits. Mutual cooperation among the local populations are very important. Without local cooperation and a united effort, no prevention or mitigation of disasters is possible. This unification of effort is the most important factor.

For a local community, the worst possible disasters are those causing a high mortality rate. The most positive countermeasure in coping with this type of disaster is to displace the population to areas that are safe from the hazard. Each community should identify these safe areas and construct refugee shelter facilities. In Japan, elementary school buildings are identified as refugee shelters in the event of a natural disaster. It is very important that these facilities where many children gather be constructed in a fashion that is strong enough to withstand severe disasters.

The Japanese experience of the Kobe earthquake taught us many lessons. Each refugee facility should contain an independent energy source, foods, medicines, beddings (including blankets), bathroom goods, electric lights, radio or other means of obtaining information. The facilities in Kobe did not function properly, as they failed to contain an independent power source. Through this experience, we learned that the facilities must be self-sufficient and function during a power failure and information breakdown. In the area of emergency electric power supply, solar-generated power plants have proved to function well. Most gas stations were not affected by the earthquake, so that fuel for rescue vehicles was readily available. It was proven that stocking a supply of gasoline or light oil at each refugee facility was indispensable.

It is very important that all residents are informed of safe evacuation routes to refugee facilities. Each family needs to plan for evacuation of the elderly and small children to the facilities. Prior planning is of the utmost importance and classes for community people should be held at refugee facilities such as the elementary schools, and emergency drills should be conducted before the beginning of the rainy season.

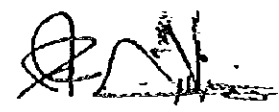
The decision of whether or not to evacuate should be based on the amount of precipitation falling within a specific period of time. Therefore, it is necessary to obtain a measuring device and have trained personnel available to monitor the device during the rainy season. It should be decided ahead of time who the responsible is and this individual should be compensated for his / her efforts.

When a dangerous level of precipitation is measured, the local population should be notified. It is not easy to notify a scattered population in a mountainous region, where there is little means of communication. I recommend that you adopt the methods employed by Japanese farmers located in remote mountainous regions. They warn people by the use of sirens or bells and sometimes use a cable broadcasting system with loudspeakers. These systems do not require a large capital outlay for their implementation.

"Turn a misfortune into a blessing" is an old Japanese saying. I wish this saying could be true in Nepal which suffered from the great 1993 disaster. To that end many improvements must be made. The major cause of the 1993 disaster was the overcutting of fuelwoods from the mountain area. Replacement fuel may be obtained without cutting trees. Methane gas may be obtained from waste products, such as leftover rice, raw sewage and dry grasses. The facilities to produce methane gas are easily built. This will have the added benefit of reducing the work load on women and a reduction of the devastation of the forests.

Water that is collected in a debris dam can be used as tap water. By fixing a filter in it, the water will become drinkable. This lowers infant mortality rate. Testing the stools of infants is an effective method of improving the health care of infants. This method has been used effectively in Japan for long. Soliciting cooperation from Japanese Organization for International Cooperation in Family Planning, Inc. (JOICFP) in this respect is a good idea.

There are many improvements that the community must make. However you should begin with the easiest and most effective ones first. The basics of improving living conditions should be improving educational level of the population, with an emphasis on the educational level of women. At the same time, it is necessary to spread knowledge among people about improving living conditions.



**INTRODUCTION OF PARTICIPATORY DISTRICT DEVELOPMENT PROGRAMME
NPC/MLD/UNDP/NEP/95/008**

By Kalyan Pandey
Programme Advisor, UNDP

1.1 BACKGROUND

Participatory District Development Programme (PDDP) is a follow-up to Supporting Decentralization in Nepal (NEP/92/027), a NPC/UNDP project which worked primarily at the district level to promote decentralized participatory development and strengthen local governance in Nepal.

PDDP builds on the achievement of NEP/92/027 and consolidates, improves and institutionalizes participatory planning and management of development activities from the community to higher levels to promote sustainable human development.

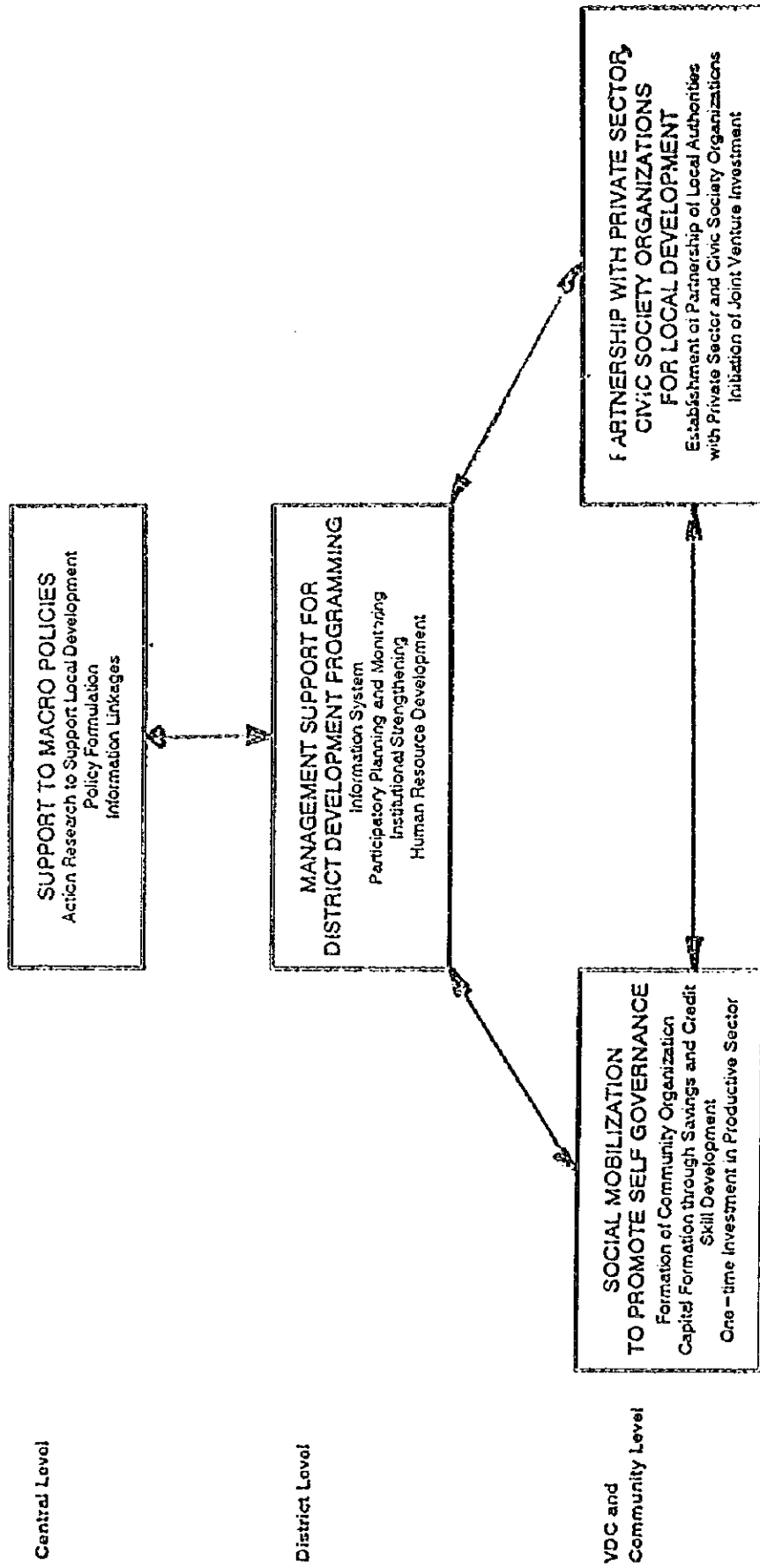
Primary emphasis in PDDP will be given to promote decentralized, participatory development in Nepal by mobilizing civic society organizations (including the private sector, women's organizations, NGOs and community organizations), local authorities with support from NPC and MLD.

1.2 OBJECTIVE

PDDP seeks to empower people to take increasingly greater control over their own development and to enhance their capacities to mobilize and channel the resources required to poverty alleviation. To achieve this development objective, PDDP has the following two inter-related immediate objectives;

1. To support the capabilities and capacities of the District and Village Development Committees in 20 districts to manage local participatory development efforts and to establish working linkages amongst district-level organizations in the private sector, women organization, community organizations, NGOs and line agencies.
2. To support the National Planning Commission (NPC) and Ministry of Local Development (MLD) in their mission to assist the local authorities in pursuing sustainable and decentralized development.

PARTICIPATORY DISTRICT DEVELOPMENT PROGRAMME
AN OVERVIEW

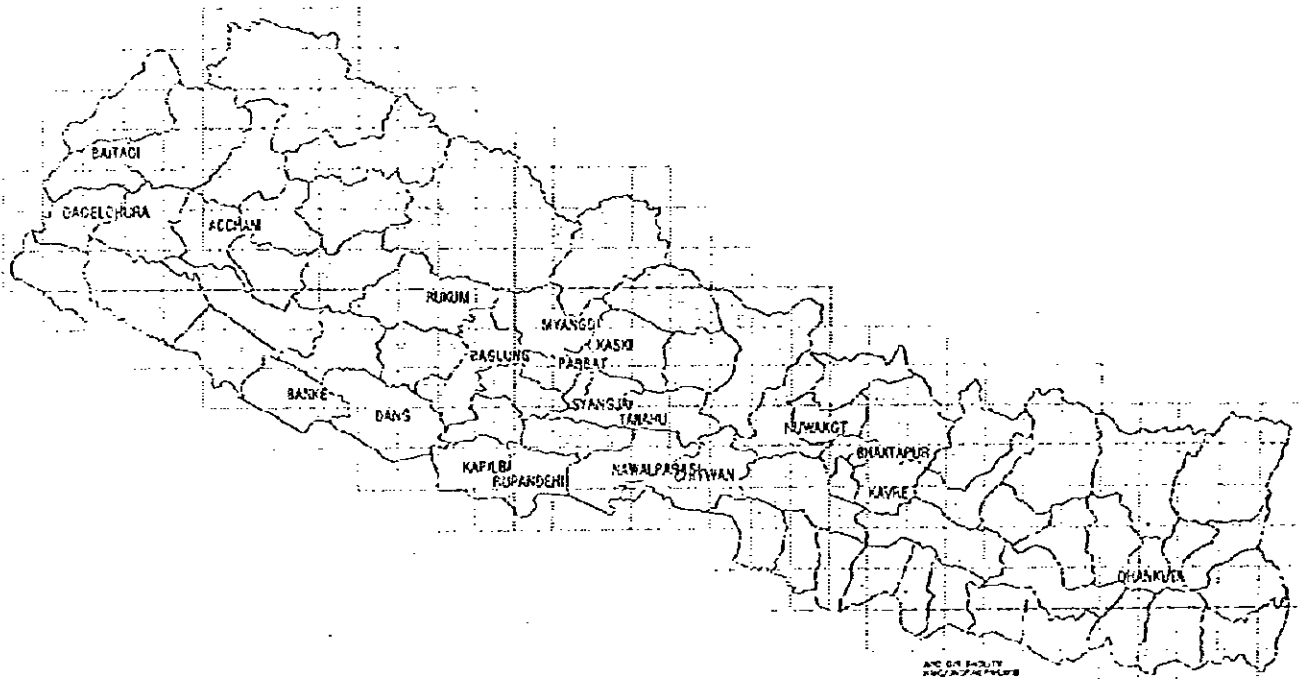


1.3 PDDP DISTRICTS AND BENEFICIARIES

PDDP is implemented in Achham, Baglung, Baitadi, Banke, Bhaktapur, Chitwan, Dadeldhura, Dang, Dhankuta, Kapilbastu, Kaski, Kavre, Myagdi, Nawalparasi, Nuwakot, Parbat, Rukum, Rupandehi, Syangja and Tanahun districts.

The people, local authorities (DDC and VDCs), community organizations, line agencies and NGOs of 20 districts along with the Rural Development and Decentralization Division of NPC and Policy, Planning and Programme Division of MLD are the beneficiaries of the programme.

NEPAL MAP SHOWING PDDP DISTRICTS



1.4 PDDP OUTPUT AND ACTIVITIES

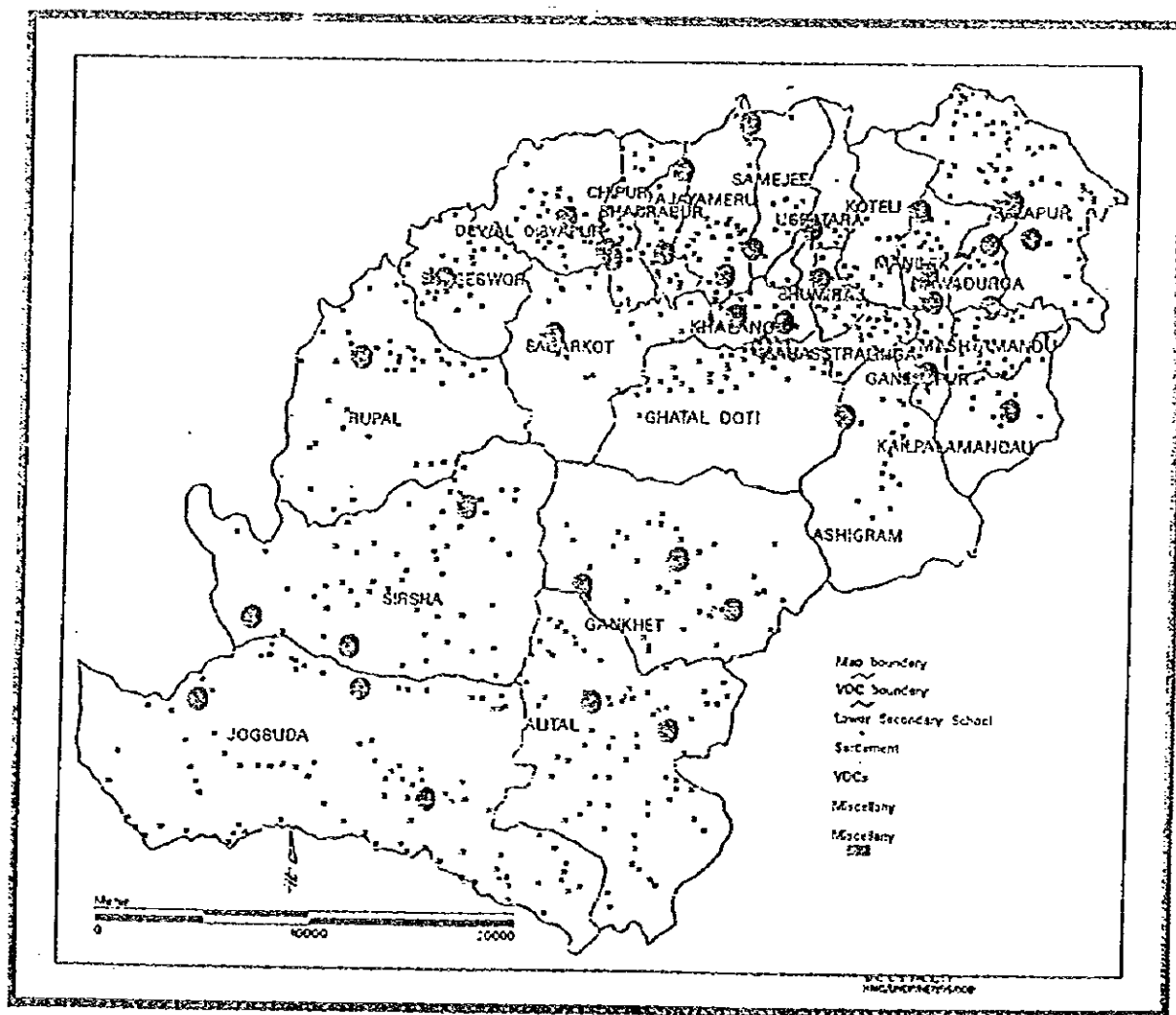
In order to achieve the above mentioned objectives, the programme focuses on the following activities:

1. Information System and GIS

PDDP assists in creating a "trickle-up" information system where data collected at individual settlements is aggregated to higher levels at the VDCs and DDCs. The comprehensive database and digitized Geographical Information System (GIS) maps provide accurate information and assists in the formulation of development programs that are more responsive to people's needs.

The programme helps to enhance the flow of information among institutions working for local development and supports a coordinated effort to tackle issues of common interest.

DADELDHURA DISTRICT
Location of Lower Secondary Schools



**PARTICIPATORY DISTRICT DEVELOPMENT DATABASE, DADELDIHURA
(AJAYAMERU VIC)**

Variable Description	Data Element	Indicators	Variable Description	Data Element	Indicators
Table 1: Total Pop	Total Pop	4697	Table 15: Land use by type	Total land	4697
Table 2: Population by Sex & Age Groups	Total Pop	4697		Agriculture area	200%
	Female	2426		Khal land	22.61%
	Male	2171		Pakho land	11.27%
Table 3: House-hold heads by Religion - type	Total House-holds	669		Forest area	17.58%
	Hindu	NA		Semi-plant forest	4.65%
	Buddhist	NA		Coast forest	0.96%
	Others	NA		Degraded land	NA
Table 4: House-hold heads by Age Group	Average House-holds size	233		Private forest	NA
	Area in Sq.Km.	NA		Lease forest	NA
	Pop Density/Sq.Km.	NA		Other forest	NA
Table 5: House-hold heads by Major Occupational type	Area in Sq.Km.	NA		Sediment area	NA
	Population (No.)	NA		Rock area	NA
	Occupation type	NA		Mines/Riverside	NA
	Agriculture	NA		Clearing area	NA
	GO/NGO Service	NA		Facid land	NA
	Own Business	NA		Private land	NA
	Labour	NA		Others	NA
	Others	NA			
Table 6: Total & Average Agri. Production	Production (NRs)	2605375		Table 16: Services & pop ratio per service	Total Population
	Suka (NRs)	1400			4697
	Babane (NRs)	2581375			Ratio
Table 7: House-hold heads by Major Caste type	Obherin	NA			Medicine shop
	Brahmin	NA			Ten shop
	Others	NA			Thence shop
Table 8: Literate & Educated Pop by Class level	Total Literate	170			Hotel/Resto
	Education: Up to Class 5	147			Cold store
	Education: Class 6-SLC	13			Cooperative org.
	Education: Above SLC	10			Club shop
Table 9: Students by level	Primary Class	232			Agri Serv Centre
	Secondary Class	39			Appliance shop
	College level	6			Watch/Radio shop
Table 10: School going pop, Students by Sex	Primary school going pop (6-10Yrs)	317			Electric Goods shop
	Secondary school going pop (11-15 Yrs)	250			Petrol Pump
	Primary Students (Class 1-5)	232			Newspaper
	Secondary Students (Class 6-10)	39			Printer/Shop
	Primary Schools	5			Shoe/Leather shop
	Secondary Schools	2			Gold/Silver shops
Table 11: Population by Occupational type	Industry	0			Agri & Industry shop
	Business shop	3			Furniture
	Hotel/Lodge/Tea Shop	0			Maintenance shop
	Masonry	0			Tyre
	Carpentry	0			Vehicle
	Cobbler	0			Motor Cycle
	Goldsmith	1			Cycle Rickshaw
	Blacksmith	17			Watch/Radio
	Tailor	7			TV/Tape Recor.
	Medicines (Watch/Radio)	0			Others
	Medicines (Others)	0			
	Health Worker (Modern)	0			
	Health Worker (Trad.)	0			
	Guest Service	12			
	NGO Service	0			
	Agriculture	1091			
	Peace Army	21			
	Other Foreign Job	0			
	Others	3			
Table 12: Economically active Pop vs Unemployed Pop	Economically active pop (10+ age)	1941			
	Total unemployed pop in various occupation	1155			
Table 13: No. of House by ownership type & physical type	Total House	688			
	House Ownership type: Own	688			
	Rented	0			
	Others	0			
	House type: Modern	0			
	Traditional	688			
	Kuadd	0			
	Others	0			
Table 14: Total Land by Ownership type	Total land	5673			
	Land Ownership type: Own	5673			
	To others	1			
	From Others	0			
Table 17: Bank service & Pop ratio per Bank	Agri Dev Bank	NA			
	Rakyat Bank	NA			
	Nept Bank	NA			
	Small Farmer Project	NA			
	Rural Bank	NA			
Table 18: Communication type & pop ratio per service	Post office	1			
	AKAS Bank	NA			
	Domestic Bank-call	NA			
	International Bank-call	NA			
	Fax	NA			
	Telex	NA			
	Express Delivery	NA			
	Others	NA			
Table 19: Health service & Pop ratio per service type	Hospital	1			
	Health Centre	NA			
	Health Post	NA			
	Sub-health Post	NA			
	Private Clinic	NA			
	Asyurific Hospital	NA			
	Specialized Hospital	NA			
Table 20: Education service & Pop ratio per service type	Primary School	5			
	Lower Seco School	1			
	Secondary School	1			
	Higher Seco School	1			
	Compu	NA			
	Others	NA			
Table 21: Infrastructure facilities	Non settlement having transport facility	0			
	Water supply benefited pop	675			
	Irrigation (ha.)	303			
	No. of Industries	0			
	Large scale	0			
	Medium scale	0			
	Small scale	0			
	College	0			
	Others	0			
	Non settlement having electricity	0			
	Electricity benefited pop	0			
Table 22: Migration records	Families	13			
	Pop	81			
Table 23: Hst Disaster & Calamities Information	Location of the Hst	0			
	Hst Day	0			
	Disaster Date	0			
	Disaster type	0			
	Disaster affected family	0			
	Disaster affected pop	0			
	Disaster affected land (Rupoo)	0			
	Disaster Severity type	0			

Note: This sheet is developed so as to show the information available in each VIC. Therefore, it is not the final published data tables. Please refer Statistical Data Tables with respect for detail information.

Continued...

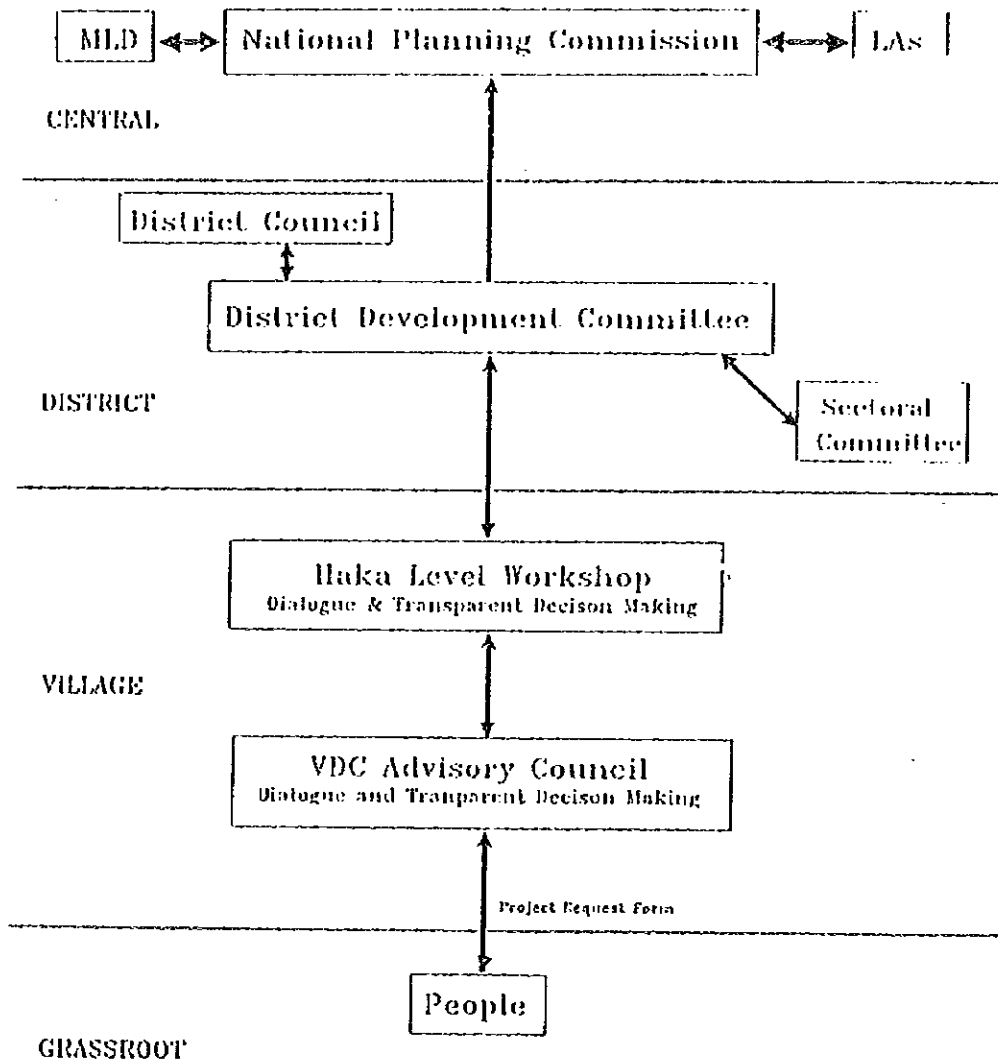
End.

2. Planning and Monitoring System

PDDP institutionalises a people oriented planning and monitoring system based on the principles of participation, transparent decision making and coordination between political bodies, technical agencies, NGOs and the community.

This system documents people's development needs as well available resources so that local institutions can base their programmes and projects on their prioritized needs.

PARTICIPATORY DEVELOPMENT PLANNING

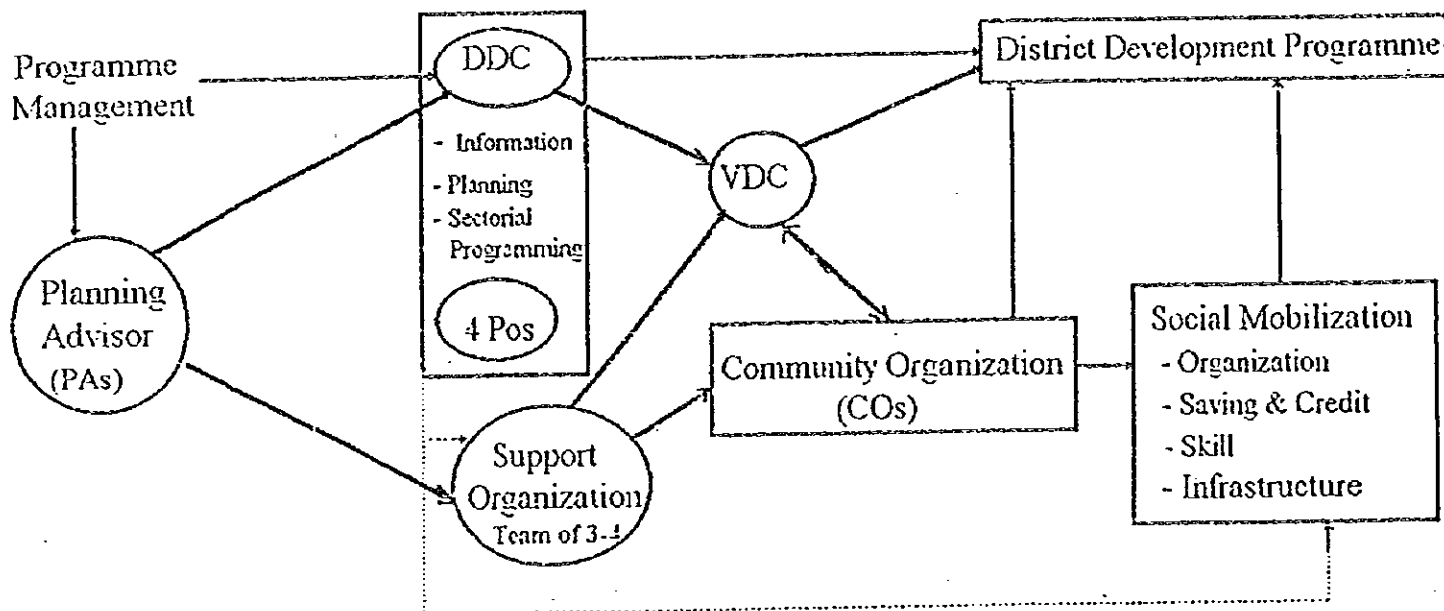


3. Social Mobilisation

PDDP encourages self-governance in local communities by empowering them to undertake self-reliant development activities. Communities are supported to form their own development institutions through capital-generating activities like saving/credit schemes and skill development.

As an incentive, catalytic "seed grant" are provided selectively to community organisations for improving infrastructure, increasing productivity as well as enhancing the organisations resource management capacities.

PDDP SOCIAL MOBILIZATION MANAGEMENT SYSTEM



4. Partnership Building

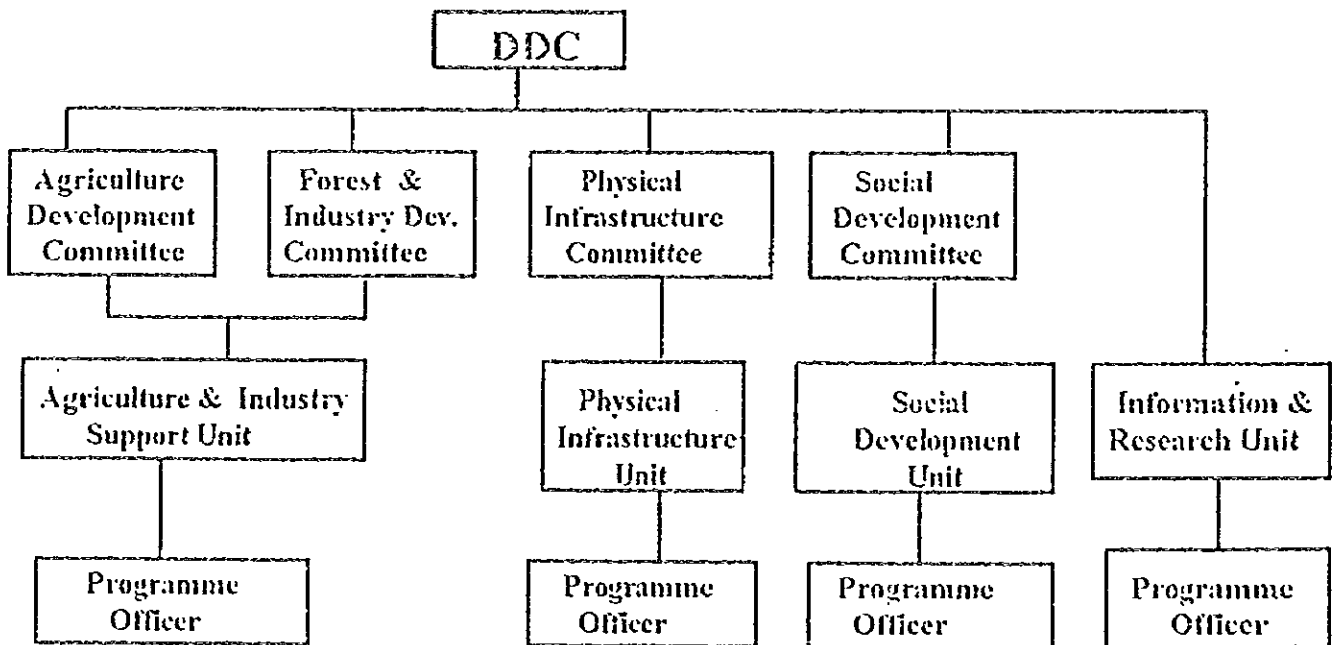
PDDP experiments the promotion of partnership building among DDCs, VDCs, private organisations NGOs, and community-based organisations like Ama Tolis (women groups) to link community needs to public resources.

The program helps to explore the potentials of the district-level organisations of the private sector to promote local industrial and commercial development and to enhance local-urban linkages.

5. Management Support

To make the DDCs more functional and professionally oriented for planning, managing and coordinating district-level development, PDDP assists in restructuring DDCs into support units related to four sectorial committees.

The DDC's financial and accounting management capabilities will be made more transparent through the installation of account management packages.



6. Human Resource Development

PDDP helps to develop and implement training packages in Sustainable and Participatory Development at the national and district levels to orient professionals, programme staff, DDC, VDCs government agencies, political parties and private sector organisations.

7. SHD Action Research

PDDP supports action research on innovative initiatives in Sustainable Human Development-poverty alleviation, women's development, environment management and employment generation and helps NPC and MLD to formulate a series of policy guidelines for sustainable district development.

1.5 EXECUTING AND IMPLEMENTING AGENCIES OF PDDP

The National Planning Commission Secretariat (NPCS) is the Executing Agency of the programme. The executing agency is supported by Ministry of Local Development and UN OPS as cooperating agencies. Execution by the NPCs is through its Rural Development and Decentralization Division and support by the MLD is through its Policy, Planning and Programme Division.

The Executive Committee with the representatives from NPC, MLD, UNDP and the DDCs is responsible for policy decisions related to programme implementation.

The Programme Management Committee with a National Programme Director from NPCs, a National Programme Coordinator from MLD and a Programme Advisor from UN OPS is responsible for implementing the programme activities.

The District Management Committee with the DDC Chairman, LDO from MLD and Planning Advisor from UN OPS manages and coordinates the decentralized operations of the district-level activities in a district.

DAMAGE TO THE PRITHVI HIGHWAY AND THE TRIBHUVAN RAJPATH DURING THE 1993 DISASTER

Presentation to the Seminar on Disaster Prevention and Community Development

DPTC, 13 May 1996

Presentation time: 11:15 to 11:30 (15 minutes only)

Introduction

The storm of 19 to 21 July 1993 affected a number of important road sections:

- Prithvi Highway, Naubise-Mugling section;
- Tribhuvan Rajpath;
- Narayanghat-Hetauda road (mainly river protection works);
- Pathlaiva-Dhalkewar road (Bagmati bridge).

In this presentation, we are considering only the first two of these.

The 1993 storm led to severe problems for the Department of Roads because of the number and scale of roads affected. However, in most years we have to face up to a similar scale of floods causing damage somewhere on our network. To lose bridges and sections of road is, regrettably, nothing new.

Prithvi Highway

The section of the Prithvi Highway affected was the most highly trafficked length of road in Nepal. At the time, the average daily traffic was about 1,500 vehicles per day. This road forms the main link to Kathmandu.

Bridges. The main damage was the destruction of the three bridges, at Mahadev Besi, Belkhu and Malekhu.

These were major bridges, with no alternative crossing points to the rivers. Their loss was the hardest problem to overcome, since they had to be replaced with Bailey bridges under emergency conditions. This was achieved in about 3 weeks.

The cause of loss of the bridges is not clearly known. Witness reports are conflicting. Either the central piers were abraded and collapsed, or the beams were simply pushed off the top of the piers. It may have been a combination of both.

New bridges are under construction. The design of these seeks to avoid both of the possible problems encountered in 1993.

River undercutting. The big floods in the Naubise khola and the Trisuli led to unprecedented surge levels, well above the design limits of the road running down the valleys. As a result, there were numerous cases of undercutting.

Between Naubise and Mugling there was damage along about 4 km of road in total, amounting to 5% of the whole stretch. The location of the road is constrained by the steep, fragile slopes rising abruptly above the valley bottom.

A number of structures appear to have failed because of poor foundations. Sometimes these were not available; sometimes the construction was poorly implemented. Indiscriminate quarrying in the Naubise khola and other river valleys may have led to a faster flood velocity and therefore higher risk of side cutting by the rivers.

The flood damage has now been repaired, with protection works designed to withstand a similar magnitude event.

Slope failures. A number of slope failures were either re-activated or triggered by the heavy rain. The most notable was at Jogimara: this is a limestone rock failure which has been active for some years, but which is gradually being helped towards stability. Other landslides were relatively minor and mostly amounted to debris falling on the road which could be removed quite quickly.

Tribhuvan Rajpath

This is the older road from Hetauda to Kathmandu, built in the 1950s. It crosses two high passes and has a much more winding alignment, and so is most useful now as an alternative to the Prithvi Highway route. In 1993, it had an average daily traffic of about 150 vehicles per day, only one tenth of the Prithvi Highway.

Bridges. Three bridges were completely destroyed and two others partly damaged. Those destroyed were at Bhainse, Mahaveer and Trikhandi.

The most serious was Bhainse, which had been a 61 metre single span steel truss bridge. The river bed rose about 4 metres and the structure was simply washed off its abutments. A temporary Bailey bridge was erected and the bridge has since been replaced.

Slope failures. There were so many of these that they have not been counted accurately. They number hundreds. The biggest frequency was in the section of road between Palung and Daman. The majority of the slope failures took the form of shallow debris flows resulting from liquefaction of weak materials, particularly weathered granites. These coalesced into gullies, which were rapidly enlarged by scouring. Many of the worst problems affecting the road were caused by these gullies, which in places crossed several sections of road. There were some deeper and more complex landslides as well. The Tribhuvan Rajpath was opened after a few weeks and the damage repaired in several phases. The last phase will be completed following the scheduled rehabilitation of the road surface, which is starting shortly. Bio-engineering will be used extensively here.

River undercutting. The road runs alongside the Rapti river from Bhainse to Hetauda, and some erosion was caused here. The worst section was 300 metres of road just downstream from the Bhainse bridge, a location damaged a number of times in the past. This river is prone to short duration floods of high level and velocity, and carries large volumes of big debris. The road is constrained by steep valley side slopes rising straight above the flood plain.

Conclusion

This short presentation has just outlined the damage to two sections of road. Because both of these lead to the capital, the 1993 storm resulted in the biggest single natural disaster which the Department of Roads has had to face. But with a network of roads covering much of the southern Himalayas, rarely a monsoon passes without damage in some location.

Mr. Chairman,
JICA Officials,
Representative of different ministries,
and friends

I on behalf of Makwanpur District Development Committee would like to express warm felicitation to all the participants

I feel it extremely pleased to present the report of activities carried out by Makwanpur District Development Committee. First of all, I would like to thank Mr. Oi and other Japanese friends for their valuable cooperation from the time of 1993 disaster. I have already submitted a paper containing our suggestion and details about the condition of disaster to the JICA team. Below are the activities executed by DDC and other organizations after the submission of the report.

This does not include :

1. The record of books and other materials distributed immediately after the damage of schools.
2. Immediate relief measures taken by District Administration Office, DDC and other donors.
3. Relief done by District Disaster Relief Committee.
4. Relief done by Central Disaster Relief Committee.
5. Kulekhani Project, National Highway and other measures taken to open the road.
6. Rehabilitation and construction works done without the coordination of DDC, works done by VDC with their own resource and also by people.

District Development Committee, Makwanpur, Hetauda.

I. Makwanpur District

(Introduction and Location)

Area : 2,426 sq. Km

Bordering district : East : Kathmandu, Lalitpur, Sindhuli and Kavre
West : Chitawan
North : Dhading, Parsa and Rautahat
South : Bara, Parsa and Rautahat

Latitude and Longitude 27°10' North to 27° 40' North
84°41' East to 85°31' East

Height 166 m to 2,584 m above sea level

Highest Peak Sim Bhanjang (2,584 m)

Lowest Place Rai Gaou VDC Hathi Dhunga (166 m)

Main Rivers Rapti
Source : Chisapani, Bhimpheedi VDC, Makwanpur
Tributaries : Samari, Kara Manahari, Lothar
Affected region : Bhimpheedi, Nibuwatar, Bhaise, Hetauda, Basanadi,
Hadikhola and Manahari
Bagmati
Source : Shivapuri, Bhagdhua, Kathmandu
Tributaries : Panauti (Kulekhani) Kogate, Dharke and Chaura
Affected region : Kulekhani, Sisneri, Ipa, Dhigan, Manthali, Baitini,
Phaperbari, Raigaou (Bhimbodh)

Main Mountain range In north from Phakel to Tistung south face of Chandragiri
In mid north from Dhigane to Kharad Mahabharat mountain range
In south from Raigaou to Pratapur with Hadikhola, Manahari Chure range

Climate and Temperature
Climatically tundra, temperate and tropical rain from north to south.

Average temperature : Maximum 30.3 to minimum 16.06 centigrade

Population

Total : 315,588 (as per 1991 National Population Census)
Male : 160,636
Female : 154,952
Average family size : 5.9
Population Density : 130/sq. Km.
Population increase rate : 2.63 (as per 1991-1998)
V.D.C. : 43, Municipality : 1 Headquarters Hetauda

Landuse	Mid Mountain	Siwalik	Total
Cultivated area (ha.)	16070	24772	40852
Barren area (ha.)	11316	7499	18815
Grazing area (ha.)	2461	675	3136
Forest area (ha.)	64416	103037	167453
Others (ha.)	689	8141	8830
	94952	144124	239076

(Source : Nepal District Profile, National Research Association, 1993)

Transportation (Main Road)

Mahedra Highway : (Chure-Hetauda-Lothar) :	55 km
Tribhuvan Highway (Hetauda-Bhaise-Tistung-Kamerekhola) :	99 km
Kunchal Kulekhani Road :	6 km under construction
Hetauda Chughoda Purkechaur Road :	17 km
Bhaise Bhimphedi Road (District Road : All weather) :	11 km
Manhari Chainpur Road (District Road : Weather) :	1 km under construction
Chaughoda Thigan Road :	42 km
Taukhel Chitlad Road : (District Road : Weather) :	6 km

Service Sectors

Education :	Primary School	: 372
	Lower Secondary School	: 47
	Secondary School	: 26
	Campus	: 3
Drinking Water Project		: 272
Hospital		: 1
Health Post		: 38
Electrification		
	Municipality	: 1
	VDC	: 15
Postal		
	District Post Office	: 1
	Regional and VDC Post Office	: 43
Agriculture Sub Centre		: 9
Livestock Sub Centre		: 14
Cooperative Organization		: 11
Bank		
	Nepal Bank	
	Rastriya Banjaya Bank	
	Agriculture Development Bank	
	Small Farmers Development Project	: 17
Irrigation Cannel		: 48
Police Post		: 13
Telecommunication		: Municipality 1 and VDC 6
Telegram		: Municipality 1 & Bhimphedi 1

2. Details of the damage of 1993 disaster

Following are the summarization of the damaged caused by the disaster of July 1993 due to heavy precipitation and flood & landslide in the rivers.

(Data as per the record of District Development Committee)

Flooded rivers : Rapti, Manahari, Bagmati, Ghartikhola

Affected VDC : Palung, Daman, Namtar, Kalikatar, Manhari, Phaperbari, Bhaise, Nibuwater, Bhimphedi and etc.

Affected family : 17378
People Dead : 257
People Missing : 2

Private House Damaged
Partial : 1104 Complete : 1580

Public Properties Damaged : Partial : 108
Primary School Damaged : 130
Secondary Schools Damaged : 2

Land :
Paddy Cultivation : 47,318 ropani
Maize Cultivation : 40,040 ropani
Total : 87,178 ropani

Drinking water project : 158

Road:
Tribhuvan Highway
Kanti Highway
Bhaise Bhimphedi Road
and all district level weather and foot trail roads

Livestock
Cow and Bull : 500 nos
Male and female Buffalo : 119 nos
Sheep and Goat : 551 nos
and others : 665 nos

Cereals
Rice and Maize : 279 Muri

Irrigation Cannel
Big : 23
Middle and Small : 434

Suspension Bridge : 2 nos

3. Immediate relief work and re-habilitation measures

After the disaster of 1993 with the coordination of DDC following 621 relief and construction works were carried out in different scales to normalize the situation with the participation of various governmental and non governmental orgnaizations.

Maintenance of School building	: 88
Irrigation Cannel (big)	: 70
Protection of land	: 131
Foot trail and horse trail	: 127
Temple and Gumba	: 4
Health Post	: 2
Government Buildings	: 1
Road	: 14
Transmission Building	: 1
Landslide and River Training	: 23
Drinking water	: 147
VDC building	: 5
Police Post	: 1
Post Office	: 1
Wooden bridge	: 4
Bhimphedi Bazaar protection	: 1

Bhimphedi River training

1

In order to execute above projects following amount of cash and materials were received.

Cash

Rs. 3,449,400

Materials

- 150 MT Gabion wire
- 680 MT Food
- 100 Bundle C.G.I Sheet

Apart from this various non governmental organization carried out following School construction work.

From Swiss Disaster Relief Fund

1. Kalika Secondary School, Namtar
2. Mathivara Primary School, Phaparbari
3. Lawati Primary School, Sarikhet
4. Praja Pragati Primary School, Sarikhet
5. Sidhi Devi Primary School, Gogane
6. Gyan Mandir Primary School, Raigaou
7. Prasadha Primary School, Manthali
8. Mahakal Primary School, Agra
9. Chaura Primary School, Phaparbari

From Japanese Friendship Fund

1. Jhamkeswori Primary School, Palung

From Boarding Association

1. Pandrang Primary School, Nibuwater
2. Sayarase Kali Primary School, Namtar

From Rotary Club

1. Ra Primary School, Manhari

From Lam Puch

1. Kali Devi Primary School, Palung

Public Youth Campus

1. Dovan Khola Primary School

Suspension Bridge

From Japanese Friendship Fund

1. Namtar
2. Nibuwater Pandrang (Ministry of Local Development has surveyed)

District Level Road (Constructed by DDC)

1. Hetauda Rai Gaou Road
2. Thigan Road (Kanti Highway)
3. Manahari Chainpur Road
4. Padampokhari Hadikhola
5. Chitlang Chandragiri
6. Churnia Namtar

From Disaster Relief Re-Construction Project

Road

1. Chundada Purkechaur : 12 culvert
2. Daman Dadabas : 4 culvert

Irrigation Cannel (Last year)

1. Raksirang	: 3 nos
2. Sarikhet Palase	: 2 nos
3. Kakada	: 1 no
4. Namtar	: 2 nos
5. Agra	: 3 nos
6. Gogane	: 4 nos
7. Dada Kharka	: 5 nos
8. Makwanpur Gadhi	: <u>1 no</u>
Total	21 nos

Irrigation Cannel (this year)

1. Bajrabarahi	: 1 no
2. Chitlang	: 1 no
3. Namtar	: 1 no
4. Phaperbari	: 1 no
5. Chatiban	: 1 no
6. Daman	: 1 no
7. Palung	: <u>1 no</u>
Total	7 nos

Land 1,830 ha.

Land Improvement 45 ha.

Drinking Water

From Swiss Disaster Relief Fund	: 93 nos
From DDC	: 147 nos maintenance
From District Water Supply Office (last year)	
1. Markhu	
2. Phaparbari	
3. Bhaise Khiseri	
From District Water Supply Office (this year)	
1. Am Bhanjang	
2. Makwanpur Gadi	
3. Bhimphedi Suping	
4. Padam Pokhari	
5. Tarsikot	
6. Namtar	
7. Likche Kalikatar	
8. Daman	
9. Chatiban	

Dozoring

From DDC for the river training works

1. Phaparbari
2. Chatiban (Bhirkot, Bakaiya, Simat)
3. Daman (Ghartikhola)
4. Palung (Phedigaou, Phat bazar, Indreni Chaour)
5. Gurru Birta
6. Bhimphedi
7. Nibuwater
8. Bhaise
9. Am Bhanjang
10. Makwanpur Ghadi

4! Measures to be taken in future

- (1). In order to prevent landslide, soil erosion caused by the rivers and rivulets, check dams should be constructed in the northern belt of this district and also application of bio engineering works.
- (2). In order to prevent the nearby cultivated land from the rivers like Rapti, Manahari, Lothar, Simat, Bakiya, Phaparbari khola, Bagmati and etc. embankment should be constructed and also measures should be taken to control river aggradation from debris and sediments.
- (3). In the Chure range from Rai Gaou to Manahari, many rivulets have caused landslides in many places making desertification so to prevent this measures should be taken.
- (4). Rivers passing though this district like Kalikatar, Rapti, Manahari, Bagmati, Lothar should be utilized for Rural Electrification and Irrigation purposes. With this pressure on the forest and environment can be minimised preventing serious natural disasters.

SOIL CONSERVATION AND EROSION/SEDIMENT CONTROL ENGINEERING
- In Connection with Disaster Prevention/Disaster Rehabilitation

FOREWORD

This is a mere lecture-note or memorandum for myself. It is my great regret that I haven't had enough time to prepare a proper paper and also I have failed in arrangement of discourse items. Now I am here - very diffidently - in face of you, a knowledgeable audience. In fact, it is not an easy task for a foreigner to give you some useful suggestion.

Nevertheless, I have chosen five relevant items as follows:

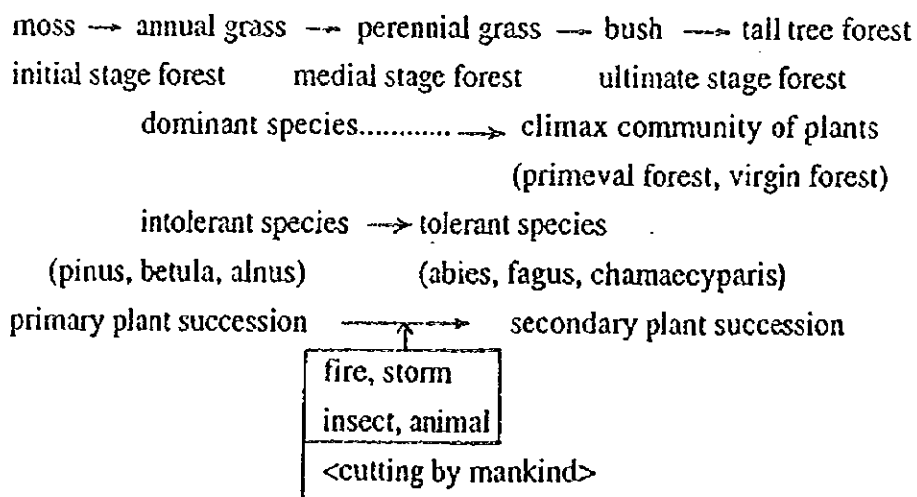
1. Plant succession versus Cycle of Erosion
2. Disaster Prevention and Rehabilitation
3. Erosion and Deposition
4. Regulation of Human Deeds
5. Some Keypoints of Erosion/Sediment Control Engineering

Some parts of the contents, I am afraid, you are aware of and you may not find profound, even of passing-interest. But you will, I hope, tolerate them because they are intended to express my own deep interest in the future of this country and nothing is more important than uniting them in a comprehensive way.

1. "Plant Succession" versus "Cycle of Erosion"

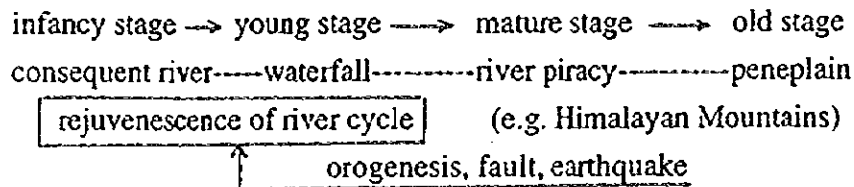
Incessant struggles between plants and erosion agent have been continued since the globe was born.

1.1 Plant succession



There is an opinion that if the mountain slopes are covered with a climax community of forests we shall not suffer from landslides, soil loss, sediment outflows, flood and drought at all. (forest ecologist)

1.2 Cycle of erosion



There are some people claiming that even though the mountain slopes are covered with dense forest, still occur landslides, gully erosion and big flood. We can overcome natural disasters with new technologies scientific knowledge (civil engineer)

1.3 Difficulties in practical solution

Both of the above-mentioned opinions may be theoretically and partially true but be false in reality, especially in the aspects of finance we need.

Afforestation or reforestation actually requires an enormous investment and it is hardly possible to build up such structures enough strong against any magnitude of natural violence, within acceptable construction cost.

We cannot but seek, irrespective of both opposing opinions, for a neutral and compromising way. In the end, however, it will be very difficult for us to overcome financial matters since most of investment must be borne by national treasury.

2. Not so much "Disaster Prevention" as "Disaster Rehabilitation"

The term "Disaster Prevention" here majorly means water-induced natural disasters such as landslides, debris/sediment flows in the upper basins and flooding in the lower basins of a river.

The disaster prevention in a real sense of the meaning, particularly in mechanical way of engineering had not ever been conducted in advance before a severe event of disaster happened to occur in an area. What has been done is the works of disaster rehabilitation or the restoration works of damaged structures and some limited facilities directly concerned with. It is fair to say that it is almost impossible for us to provide some effective preventive facilities in an area where is little suffered from natural disasters such as floods, debris/sediment flows, even in financially rich countries. Even in advanced countries the governments are always chasing the consequences of natural disasters. The same is true with Japan.

Disaster rehabilitation works, in the meantime, are not always confined to the redintegration of old structures but include the restoration of functions or performances of structures which they formerly played, and sometimes they have been involved into improvement of structures, provided governmental authorities could prepare necessary budget.

If those procedures would be systematically impossible, it is quite natural that the matters of disaster prevention or rehabilitation should be induced into the matters of disaster management, or replaced by the idea of some self-reliant preparedness or mitigation efforts against disasters, as a matter of fact. This naturally includes the establishment of information/evacuation system in every locality.

disaster prevention → disaster management

┌ disaster preparedness ─┐ (without mechanical
└ disaster mitigation ─┘ (construction

In connection with those matters mentioned above. I should like to give some remarks herewith.

- Nature disaster will happen suddenly when people forget the antecedents (Dr. Torahiko TERADA)
- Extremely severe event of water-induced disasters will never occur in the same magnitude, in the same area, for a time (ANONYMOUS)

3. Erosion and Deposition

3.1 Simple classification of erosion

S. Di Silvio (Italian Soil-conservationist) has classified the erosion phenomena as below:

- └ geological erosion (by water, wind, ice, gravity)
- └ anthropic erosion (deforestation, over-grazing, construction)

Here, geological erosion by dint of gravity majorly means the mass movement like rock-fall, landslide, land-collapse, slope-failure. And the erosion by ice includes the outburst of glacial natural dam. This may be significant in this country which is shouldered by Himalayan Ranges. While, anthropic erosion here means the accelerated erosion by human activities. (deforestation and deterioration of forest as well as construction of road and other facilities are also included in this category.)

According to S. Di Silvio, anthropic erosion is unlikely to be the major source of sediment yield, but such a geological erosion as represented by mass movement of the earth may occupy a greater part of sediment yield from a long-term point of view. (We find somewhat similar discussions in the paper entitled "Erosion and Sedimentation Processes in the Nepalese Himalaya", ICIMOD, 1985)

Although we never be ignorant of the significance of well-managed forests on the earth, we cannot neglect, at the same time, existing sediment accumulation on the stream bed of torrents and rivers, because the current situations of forests in this country are so crucial that it is unexpected to improve them in short period, even if we make a maximum allowance for some possible successful results of afforestation/reforestation.

3.2 Alternation of erosion and deposition

S. Di Silvio describes that even though it is a stream in a state of long-term equilibrium conditions, a stream will experience alternating phases of erosion and deposition, depending upon the time and space distribution of yearly precipitation. This remark will be noteworthy for us to reconfirm the fact that the soil movement (sediment transportation) is a discontinuous time-depending, space-depending process (depending upon yearly hydrograph in a basin). Note that this is speaking of the situations in ordinary year without extremely severe event. He discriminates abnormal year's situations from ordinary year's ones.

Sediment deposition during extremely severe event will take place in the upper sub-basins of watershed where concentration times are short and will be gradually, discontinuously transported downstream. It is assumable that the amount of sediment

falling into the river must be more than ten times that in ordinary year. The evolution of longitudinal and lateral profiles subsequently continue for several years after the event. Everybody knows such phenomena in natural river-channel. Nevertheless, we are sometimes not reminded of this fact and led up to misleading design by merely looking at the existing situation, just a while at a specific location.

Deposited sediment will be eroded and transported again, necessarily, depending upon hydrograph. This means that deposited sediment also becomes the source of sediment yield. This natural fact is apt to be overlooked. We call this re-production of sediment. In such discussions it is of significance to take in account the material sorting function by dint of running water, although there are a number of sediment control engineers who neglect the phenomena and treat it solely in quantity.

The river is the passage way both for water and sediment to the sea.

3.3 Datum and grade of erosion

Geographical datum of erosion phenomena is put on the surface level of the sea or ocean, and we have some mathematical formulae expressing the form of longitudinal profile of the river where the erosive agent merely prevails. The term expressing an idealized curve along a valley is called "grade" in physiography. I think I need not recite them, but I should like to emphasize its significance in terms of introducing the concept of "grade" into erosion/sediment control engineering, because we must always learn the approach to realize certain equilibrated situations of streams.

Apart from the case in physiography, it is necessary for us to set out a considerable number of "datum" lines in compliance of river-morphology so as to check up the natural tendency of longitudinal development of a river, tributaries (rivulets and torrents). For instance, the confluence of devastated torrents with a calm main river should be a datum.

On the other hand the horizontal development of a river such as meandering, waterfall and narrow pass will exert a big influence on longitudinal development of the river.

Needless to say, anthropic activities such as deforestation, reforestation reservoir construction will affect the longitudinal development of river to a big extent.

4. Regulation in Advance of Disaster Prevention/Rehabilitation Works.

They say that in developing countries it is hardly possible to regulate every kind of unfair deeds of people. Tree-cutting without permission, indulgent digging on riverbed for instance, can be said the cases in point. In fact, we can see other bewildering variety of unregulated deeds. I confess, I am not optimistic on that score.

Allow me to quote an example from my own country. One-hundred twenty years ago Japan was also a small, poor country and experienced unprecedented political revolution (1868) at that time. The situations of land conservation, hence were naturally aggravated. At places, people were seriously suffered from floods and sediment-water. So, to cope with such circumstances, the Government has established three kinds of laws toward the end of 19-century. That is:

- { River Law (established in 1896)
- { Erosion Control Law <Sabo Law> (established in 1897)
- { Forest Law (established in 1897)

These three kinds of laws are collectively called three laws for Flood Control. Although they have been partly revised, they are in force effectively still at present and provide for the reinforcement in implementation as well as operation and maintenance aspects.

Throughout these three of laws, it is remarkable that the laws first aim at regulating the deeds of people by all means. Some particular works are strictly confined to stipulated, inevitable case. Off course, this principle stems from financial circumstances of the Government. I think this principle deserves to be noticed. Forest officials still have the polite right and men of river patrol also had police right formerly.

Notice that mechanical or vegetative way of construction is the secondary or final treatment.

5. Keypoints of Construction in Erosion/Sediment Control Works

Relying on our experience and judgment a few of keypoints for the construction of check-dam or ground sill (low drop-check-dam) can be briefly mentioned in the followings.

- 1) The crown of check-dam (crest of overflow section) should be designed to have the dimension more than 1.5m thick, desirably to be 2.0 - 3.0 m. The more devastated a basin is, the better is thicker crown.
- 2) Plain, rich mix-proportion concrete applied to the crown of check-dam will be best for protecting dam-body from abrasion due to sediment-water flow. The thickness of concrete should be about 1.0 m thick.
- 3) So long as you are obedient to the above-mentioned remarks you will be able to reduce the degree of dam-body construction on the condition that the overflow section height of a check-dam is less than about 10 m high.
- 4) Apart from the remark mentioned in preceding paragraph 3) the structure of non-overflow section, particularly the portion higher than crown elevation which we nominate wing section of check-dam, should be carefully reinforced so as to endure a fierce striking force of debris/sediment flows.
- 5) The most weak point of a check-dam comes from local scouring which usually takes place at the immediate downstream of a check-dam which we call apron-portion. (None of check-dam has been build without suffering from scouring downstream) We have some empiric ways against the scouring (counter-dam, apron, boulder riprap) We cannot dispense them at any rate.

Erosion / sediment control engineering is merely temporary or provisional way but helpful to give foundation support to the purpose of soil/water resources conservation

Five items mentioned above are related to the matters of structural design, but what is much more important is entangled with overall design or master plan. The contents included in the paragraph 1 to 4, I hope, would be referable to the purpose, although they are quite rambling brief observations.

INTRODUCTION OF COMMUNITY BASED DISASTER PREPAREDNESS ACTIVITIES

12 May 1996

Introduction:

Nepal is one of the most disaster prone country due to its fragile topographic features and disasters are becoming more common. They are being induced by a number of human activities such as the development of an infrastructure, deforestation, cultivation of energy. The himalayan mountain range of Nepal has been identified as very young and highly susceptible to ecological hazards.

Major hazard faced by Nepal include earthquake, floods and landslides, fire and occasional drought which strike nearly every year.

Over the years, hundreds of people have lost their lives and thousands have been rendered homeless. While the physical events that can case disasters may not be increasing drastically, there is a steady increase in the vulnerability of people to disaster. Thus disaster are becoming more frequent and more catastrophic. Again the range of factors that cause the disaster-natural and so natural reveal the disasters are becoming more and more complex. These days people have become the agent of many disasters. The decision taken by individual in all sectors and at all levels have an enormous collective influence on the vulnerability of the community.

The reality today is that there is a growing gap between the resources needed to reduce these tragedies - both in terms of tackling disaster vulnerability and improving relief response -and also the available resources nationally and internationally. This has happened because the present system of disaster preparedness has been basically the preparedness in response to disaster with a very little or no emphasis on hazard mitigation and reduction of vulnerability. Relief operation are carried out after the disaster hits the community by distributing urgently required relief materials and in some case post disaster rehabilitation and reconstruction programme. Present day relief operation are basically the certain package of relief materials irrespective of type of disasters season, geography , cultural background etc. as it is planned centrally which necessitate uniform package throughout the country due to logistics considerations. They received what they are provided with rather than risk assessment of victims. This situations reflects need of community awareness and enrolment to cope with the disaster.

Disaster & its management in Nepal:

The topographic condition to a large extent, contribute to increase the vulnerability of communities of disaster of different types. With wide variations in the physical environment in Nepal, the country has always been vulnerable to the whole range of natural hazard. Floods and landslides are the most common of all disaster in Nepal. It is estimated that every year on an average 400 people are killed & 2000 families are rendered homeless by floods and landslide only. Occurance of floods and landslides have increased because of human factors like deforestation and badly planned road constructions.

Nepal experienced a devastating floods/landslides in July 1993, which affected 45 districts killing 1269 lives and 235 injured. More than 15,000 houses were completely destroyed and more than 18,000 houses were partially damaged.

Geographically, Nepal lies in earthquake prone zone. In the past, Nepal has experienced several earthquake causing tremendous loss of lives and properties. The small magnitude earthquake are quite frequent.

Fires are also considered as major disaster in the southern plains as well as in the mid mountains. In 1992, a record of 10,000 families were affected. Every year, on an average more than 2,000 houses are burnt down with a loss of property equivalent to more than 22 million rupees due to fire.

After the implementation of Disaster Relief Act by HMG in 1982 a committee at national level and committees at district level are formed for disaster reliefs with limited activities resources. Though the activities of various concerned governmental departments/agencies are closely related to disaster prevention, it seems that coordination of these activities would contribute more for end result. Beside government efforts only a few NGOs and INGOs are involved as effective actors such as Nepal Red cross Society , Lutheran World Service and others. Warehouses, man power development and distribution of relief supplies of NRCS would become more effective after the implementation of community based preparedness for which Nepal Red cross and Lutheran World Service are jointly working for.

Introduction of Community based Disaster Preparedness Programme:

The new concept of community based disaster preparedness aims to change this. Traditionally in all the Nepalese villages the community supports the disaster victims through donation of foods, clothes and helping them to construct their houses. The CBDP aims to strengthen and institutionalize this tradition which is slowly fading away. The CBDP aims to organize and empower the community with the knowledge and means to carry out the disaster preparedness in Hazard Mitigation. Reduction of vulnerabilities and in response to the disaster immediately using the local resources and go to the service organization and high authority with the specific requirement to the particular incident only if it is immense and can not be tackled by the community.

There are many roles that small groups can fulfill and activities they can undertake, especially in preparedness. At the most basic level, small group can promote public awareness of natural hazards and public action to mitigate or prepare for pending disaster. Second agencies can work together with community groups to develop an organizational framework for meeting people's needs in a disaster and assign responsibilities for certain task to appropriate groups. This step, the development of organizational framework for coping, is the most important action that can be taken at the local level.

Action to reduce losses of disaster at the local level are the "Community Based Disaster Preparedness" activities.

Local capacity building is the main focus of the Disaster Preparedness programme. Disaster preparedness activities are focusing on the local development committee (VDC) level as a

compliment to the HMG/UNDP national programme. Specifically, it had been requested to co-ordinate the local NGOs, Disaster Preparedness coordination and training unit (DPCTU) and to develop preparedness/Response plans/training for its project area. The project aims to support and increase the knowledge about disaster preparedness, response and mitigation that already exists in local communities. By working with the communities on risk mapping and assisting people to develop their own disaster management systems the project will enable the community to more effectively cope with disaster in their area.

Objectives:

To reduce the loses of human lives and properties caused by disaster through Community Based Disaster Preparedness.

Strategies:

- a) To educate , train and advise people about disaster prone locations and discourage them to settle in such areas.
- b) To work in close co-ordination with government agencies, NGOs & INGOs .
- c) To promote people's participation in preventing/controlling disaster.
- d) To initiate community awareness/preparation programme to reduce the impact of the disaster.
- e) To operate efficient rescue and relief for small scale disaster by the community.

Programme:

- a) to conduct vulnerability assessment and to prepare hazard maps.
- b) to incorporate disaster management and mitigation in local planning programmes.
- c) to strengthen capacity of community groups and local NGOs to cope with disaster.
- d) establishment of Disaster Management Information System (DMIS)
- e) coordination of available communication system and support/expansion of traditional communication practices.
- f) to collect statistics and its analysis so that the community could be better prepared to minimize the destruction due to the disaster.

Activities:

- Identification of hazardous areas
- Vulnerability and risk assessment
- Manual preparation
- Basic level training on disaster management and rescue
- Basic training on vulnerability and capacity assessment
- Local institutional development

Coordination:

The best way to set up a co-ordination plan is to involve it as part of disaster-preparedness. In many cases, systematic co-ordination is needed to readily assist local disaster responses where prior preparation usually remained absent. In these circumstances, the integration process can be initiated as below:

Based on experience and knowledge gained from the assessment/mapping of project areas and the training of trainers will expand the exercise to other vulnerable areas. Consequently, assessment will focus on these hazards and the vulnerability of people. Survey team will conduct assessment in close co-operation with local NGOs, government agencies and community groups. enrolment of local groups and agencies in vulnerability assessment is the first step in their participation in community disaster preparedness and response mechanisms.

Education, training and development of self-help organizations in local level is the main focus of the disaster preparedness programme. Therefore, coordination system will be developed among the incorporated NGOs, community groups and INGOs through appropriate framework of efforts. For this, relevant training and mutual learning & supportive activities conducted with various organizations. Such activities will involve several component on the process and procedure of vulnerability, hazard, risk assessment, organization of disaster preparedness plan and response mechanisms, integration of local, national and international components, operation of early warning and communications.

Presently, Nepal Red cross and Lutheran World Service are working very closely . NRCS is preparing a "CBDP Programme Manual" with extensive studies of its applications. The manual is , being prepared with the help of LWS, expected to be a appropriate guidelines to move coordinately. The same inter-agential relationship has been committed in the implementation of CBDP either.

Conclusion:

In order that disaster preparedness proves to be effective at the time of need, the people have to be involved at all level viz., individual, families and communities. This is a field of activity where trickle-down plans will not do. It will have to be integration upwards. Macro level plans at the national or district level can only provide a broad canvas and can plan for assistance by ways of funds, institutional supports, training programmes but the absorption of ideas and crystallization of preparedness activities appropriate to the local needs and acceptable to the community have to be at the community level. In short, disaster preparedness in community level has to be people's programmes with a high sense of :

- * motivation
- * participation
- * willingness and readiness
- * contribution - time and money
- * co-operation and co-ordination
- * updating and innovation

Prepared by

NRCS/CBDP and LWS/DPP
Kathmandu, Nepal

JAPAN INTERNATIONAL COOPERATION AGENCY

The Study
on
The Disaster Prevention Plan
for
Severely Affected Areas by 1993 Disaster
in
The Central Development Region of Nepal

INTRODUCTION

Background

On July 19 to 21, 1993, an unprecedented disaster of floods and landslides occurred and severely affected to the Central Development Region of Nepal, killing about 1,500 lives and damaging the national infrastructures such as Kulekhani Dam and its hydropower stations, Tribhuvan and Prithivi Highways and so on.

Damages to the communities in the area were quite serious. About 500,000 persons suffered from damages to rural infrastructures such as buried farm land and disconnected rural road. Many people have lost their houses and farm land, and works for rehabilitation have been done until now. Moreover, such damaged communities are still dangerous to further disaster since unstable debris remaining along river courses and mountain slopes may easily be collapsed and attack to communities even by small storms.

Under such current conditions of the severely affected areas by the storm of July 1993, HMG/N requested to the Government of Japan for the technical assistance for the Study on the Disaster Prevention Plans for Severely Affected Areas by 1993 Disaster in the Central Development Region of Nepal in October 1994.

Taking into consideration that there are many people still in difficulties in their living, and recognizing that disaster prevention is essential for the national and rural socio-economic development, Government of Japan has decided to cooperate with HMG/N to carry out the Study.

Needs to Disaster Prevention Study

Disasters in Nepal are frequent and severely affect not only the national economy but also the people's lives in rural areas. According to the Ministry of Home, the disaster loss of assets in 1985 amounted to 20 % of that year's GDP (Gross Domestic Product) and the earthquake of 1988 alone caused the total damage equivalent to 7% of the GDP in that year.

In the case of 1993 disaster, the amount of total damage excluding indirect damage is estimated at 3.18 billion Nepalese Rupee, which is equivalent to 1.7% of that year's GDP having an estimated amount of 177 billion Nepalese Rupee of the GDP in 1993/94. The damage amount is also equivalent to about 12% of the annual national budget including

the foreign assistance. According to National Planning Commission (NPC), it is said that the 1993 disaster made the national economic development delayed for 20 years, which is very severe and discouraged to the people in Nepal.

The tragedy remaining in Nepal is that the limited budget has to be spent for rehabilitation activities first, and the remaining to be used for development activities. Such tendency is feared that the people for sustainable development/improvement activities would be discouraged. Disaster management actions are, therefore, important for the sustainable development and the empowerment of the people in the severely affected areas by the 1993 disaster.

The reduction of the vulnerability of the country and regions to further disasters and empowerment of the people should be focused, and this is the most important issue in disaster prevention study in Nepal.

Objectives of the Study

The objectives of the Study are:

- (1) To investigate about 15 areas and to select 5 severely affected areas by the storm of July 1993 to form disaster prevention plans in the upper basins of Bagmati, East Rapti and Trisuli rivers. The following matters should be taken into consideration:
 - a) Disaster prevention plans of the community which are not only to rehabilitate rural infrastructures, but also to encourage people's participation to disaster prevention activities, and to stimulate rural economic activities. Improvement of the women's situation shall be also considered. This is called Community Disaster Prevention Plan, herein after as "CDPP" in the Study.
 - b) Disaster prevention plans for major infrastructures such as Kulekhani hydropower stations, Tribhuvan and Prithivi Highways shall not contain massive structures to prevent huge disaster potential, but appropriate technologies in Nepal aiming at the maximum economic viability with the concept of disaster management and mitigation. This is called Infrastructure Disaster Prevention Plan, herein after as "IDPP" in the study.
- (2) To transfer relevant planning and designing technologies to the Nepali counterpart in the course of the Study.

Study Area

The Study Area is shown in the location map, covering the following five river basins in the Central Development Region of Nepal:

- a) Kulekhani River of Bagmati River systems.
- b) Upper part of East Rapti River basin (upstream from Bhainse village).
- c) Manhari River basin of East Rapti River system.

- d) Upper part of Agra River basin of Trisuli River system; and
- e) Marin River basin of Bagmati River basin.

Study Approach

The Study aims at formulating the integrated disaster prevention plan, taking into consideration reduction of the vulnerability of the country and the regions to disasters and to be empower the people against to further disasters. To attain such aims, the following approaches are to be taken in the course of the Study:

- 1) Assessment of disaster potential in the study area to find out the best solution to prevent, mitigate, or manage disaster potential.
- 2) Integration of community development and disaster prevention to encourage people's participation to disaster prevention activities for CDPP,
- 3) Application of appropriate measures for disaster prevention to major infrastructures for the optimum economic return to reduce the vulnerability of the country or the regions to further disasters,
- 4) Assessment of environmental issues to minimize adverse effects due to implementation of the project.

Flow of the Study

The flowchart of the Study is shown in Figure 1.1. The Study will be carried out from the middle of January 1996 to the middle of February 1997, in two phases: the first phase from the middle of January to the end of July 1996, and the second phase from September 1996 to the middle of February 1997. The outline of the Study is enumerated below.

FIRST PHASE : Overall Basic Study and Selection of Priority Areas (Jan.-Apr. 1996)

- A: Preparatory Works,
- B: Data Collection and Selection of Priority Areas,
- C: Data Analysis and Clarification of the Problems in Study Area,
- D: Seminar of Initial Output of the Study and Discussion.

**SECOND PHASE: Feasibility Study for Disaster Prevention Plan for Priority Areas
(May 1996-Feb. 1997)**

- E: Detailed Field Investigation for Priority Areas,
- F: Feasibility Study and Preparation of Implementation Program,
- G: Seminar for Transfer of Technology based on Draft Final Report,
- H: Preparation of Final Report.

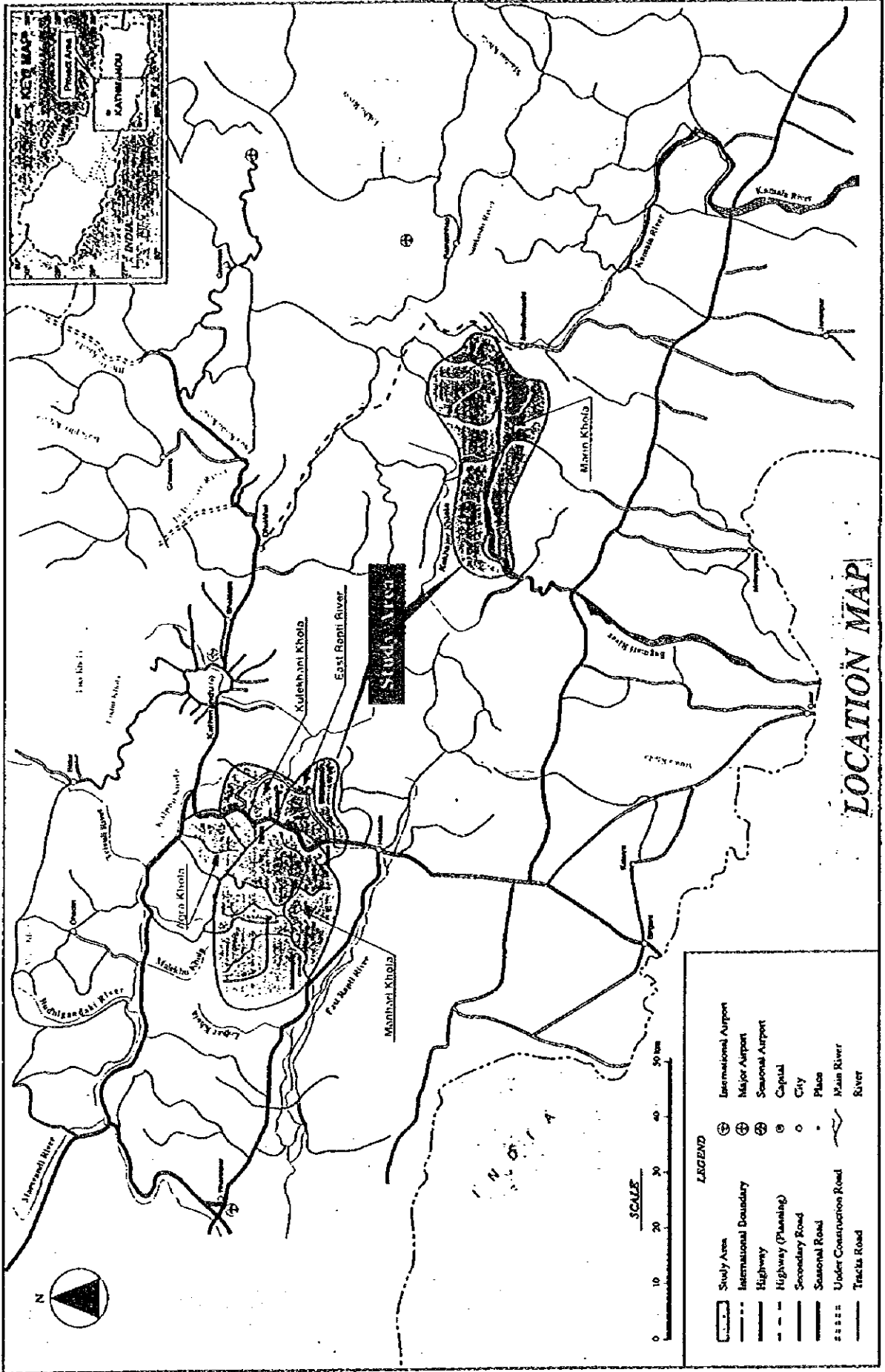
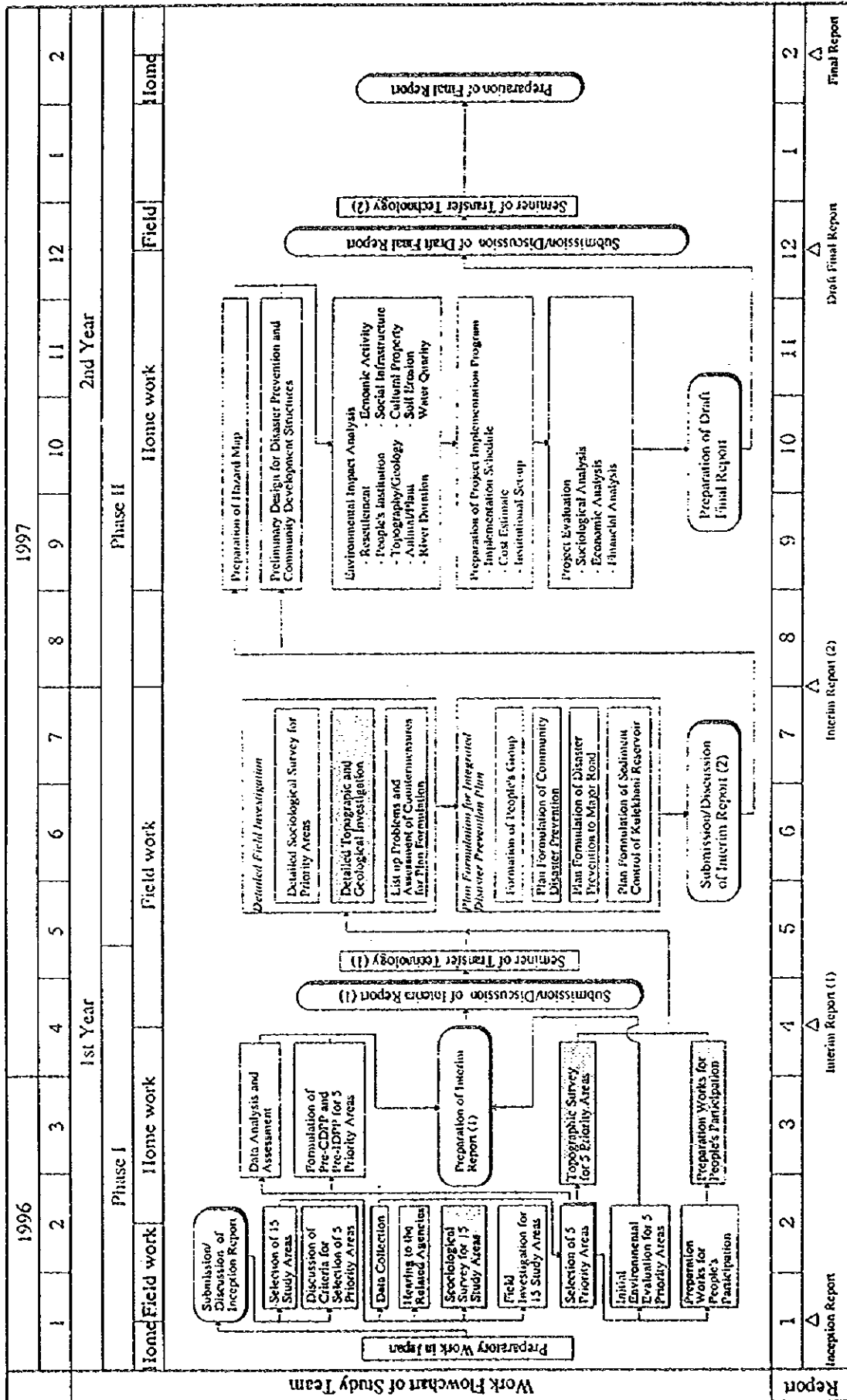


Figure 1.1 Flowchart of the Study



COMMUNITY DEVELOPMENT

1. Disaster Prevention Plans

1) Aspects of Disaster Management

prevention, mitigation, preparedness, response, recovery,
and development.

2) Two Major Approaches

2-1) Direct Measures

Structural Measures/Hardware Approach

Natural Sciences: water, earth, etc.

Civil Engineering (infrastructure)
etc.

2-2) Indirect Measures

Non-structural Measures/Software Approach

Social Sciences: human

Economics
Sociology
Anthropology
etc.

2. IDPP and CDPP

1) Structural Measures

IDPP = Infrastructure Disaster Prevention Plans

2) Non-structural Measures

CDPP = Community Disaster Prevention Plans

3. Community Development and CDPP

1) Objectives of CDPP

Ultimate goal: To improve people's welfare

Objectives: To reduce people's vulnerability to disasters
To achieve sustainable development

2) Definitions (ambiguous)

Community Development:	people's group, small
Rural/Local Development:	poor people in rural areas
Social Development:	all social matters

"The term 'social development programs' refers to the array of programs to improve the quality of life by improving the capacity of citizens to participate fully in social, economic, and political activities at the local or national levels", an excerpt from "Putting People First," edited by M. M. Cemea.

3) Community Development

Community development is the major component used in CDPP, whose academic disciplines are mainly sociology and anthropology.

4) Rapid Rural Appraisal

Structured Direct Observation
Key Informant Interviews
Focus Group Interviews

5) Mixed Approach

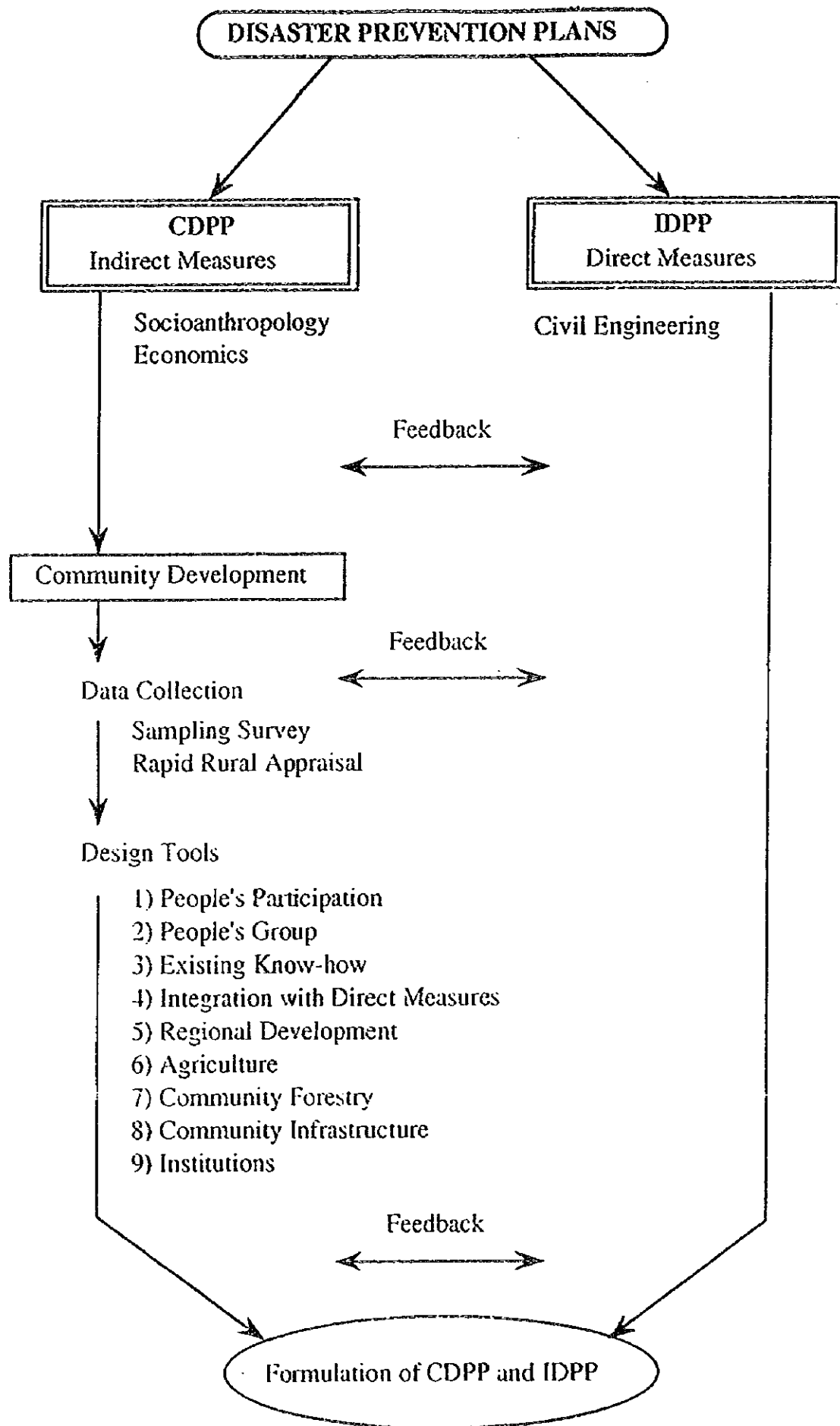
Top-down vs. Bottom-up

6) PCM

Participatory Decision Making
Logical Framework Analysis

4. Components of CDPP

- 1) People's Participation
- 2) People's Group
- 3) Existing Know-how
- 4) Integration with Structural Measures
- 5) Regional Development
- 6) Agricultural Development
- 7) Community Forestry
- 8) Community Infrastructure
- 9) Institutions



**MANUAL FOR MULBERRY TREE PLANTING
(NEPALESE VERSION)**

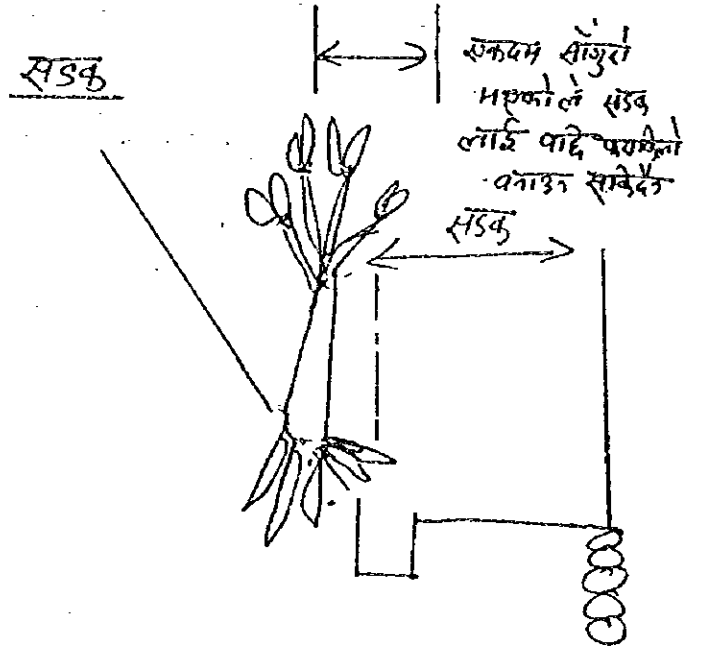
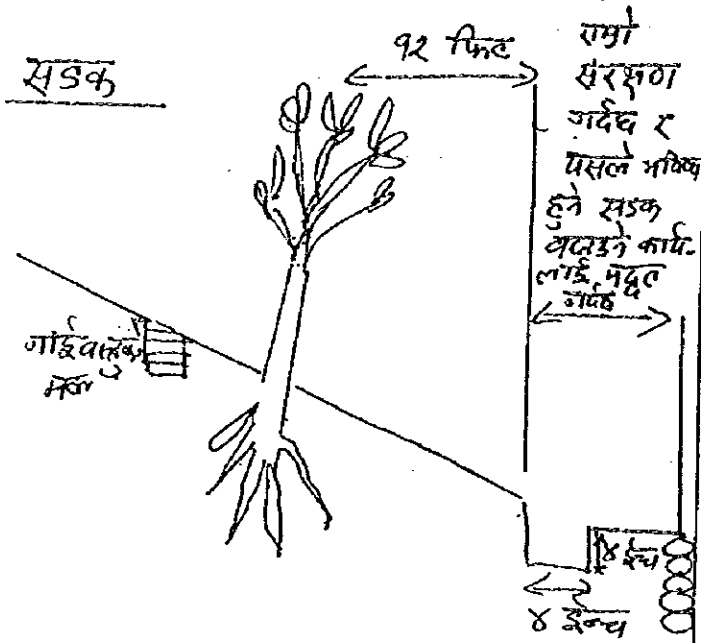
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2022-2023
2024-2025

किम्बू विरूवा लगाउनुको उद्देश्य :

- (१) सडक । वाटो देखि माथि तिरको भिरालो जग्गाको भौगोलिक वनोट अस्थिर (कमजोर) भएको र जग्गा सार्वजनिक भएको कारणले यसलाई सबैले मिलेर (समुदायका सबै) जोगाउनु पर्ने हुन्छ, त्यसैले यहाँ किम्बूको वोट लगाउन लागिएको हो ।
- (२) गाउँको अझ वढि विकास गर्न सडकको संरक्षण गर्नु महत्वपूर्ण हुन आउँछ, त्यसैले :
- क) कृषि जन्य उत्पादनको ढुवानी सुरक्षित संग गर्न
 - ख) मोटरको वाटो संग यसलाई भविष्यमा जोड्न
 - ग) दैवि प्रकोपको बेला सुरक्षित किसिमले ग्रामिण जनतालाई उद्धार गर्न
- (३) समुदायका मानिसहरूले किम्बूको विरूवा लगाउने र यसको उपयुक्त व्यवस्थापन गर्नले :
- (क) माटोको (भू) संरक्षण राम्रो हुन गई हुन सक्ने पहिरोलाई रोकथाम गर्न सकिन्छ ।
 - (ख) दुई वर्ष पछि यसले घांस र दाउराको माग पुरा गर्दछ ।
 - (ग) रेशम खेतीको विकासमा सहयोग पुग्दछ ।
- (४) त्यसकारणले, आफ्नो गाउँ भित्र रूख विरूवा (किम्बूको समेत) लगाउने र भविष्यको लागि गाउँलाई सुरक्षित बनाउन सल्लाह गर्नुहोस् ।

✓ (ठिक तरिका)

× (गलत तरिका)

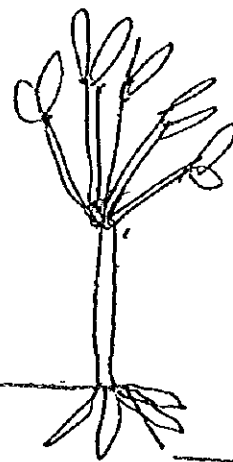
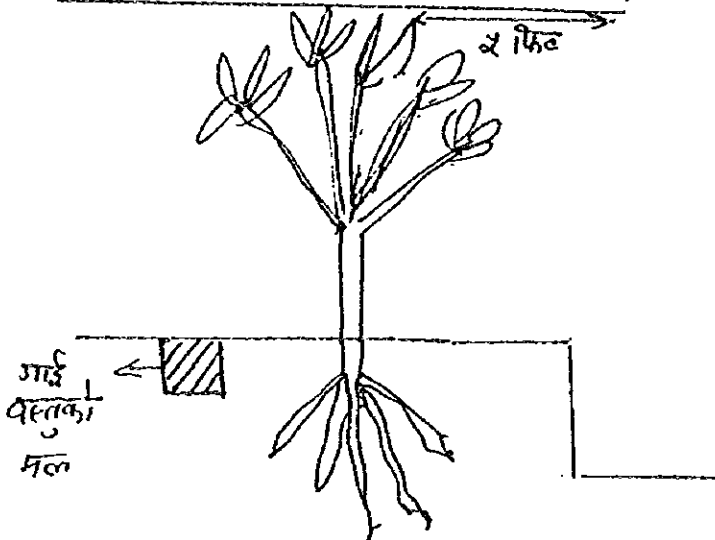


✓ (ठिक तरिका)

× (गलत तरिका)

रवेतीगर्ने जग्गामा लगाउने तरिका

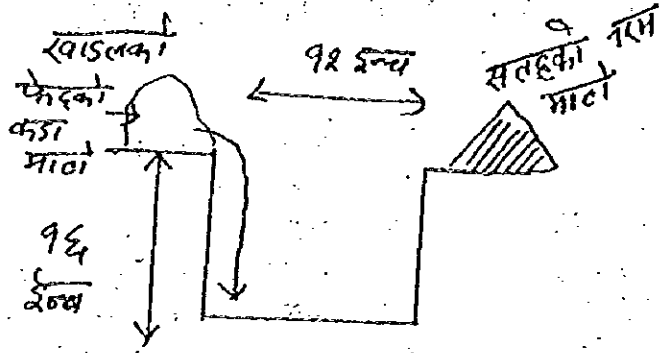
रवेतीगर्ने जग्गामा लगाउने तरिका:



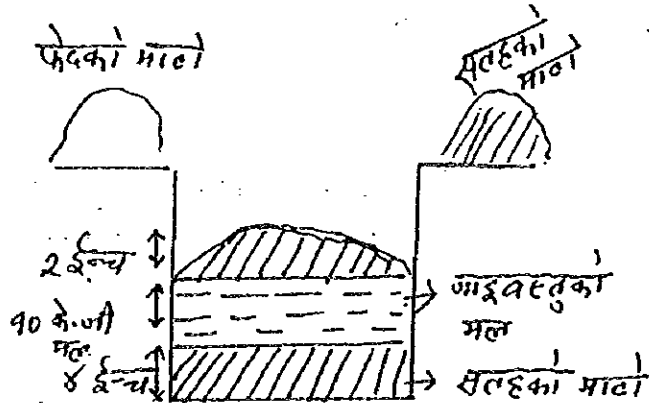
यदि किम्वुलाई रुद्ध विलमा जग्गामा भने ठाम्को संभावना हुन्छ। यसैले पसरी किरासो हुने।

पार्थक्य जस्तो उपयुक्त दूरीमा किरासो लगाउनुले किरासो जराको राम्रो विकास हुनालाई पालोको समेत राम्रो संरक्षण हुन जान्छ।

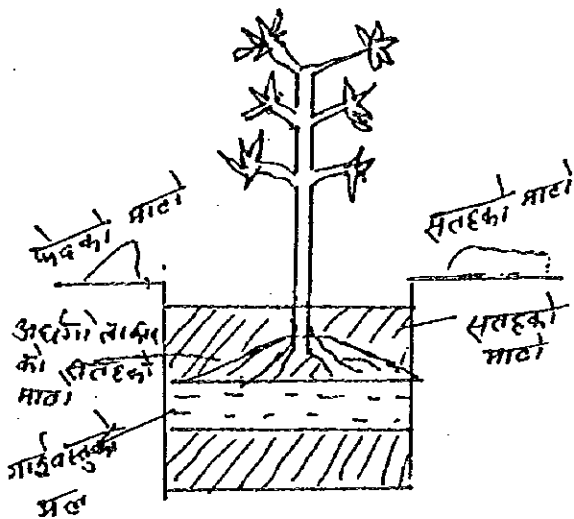
किम्बुको विरूवा रोप्ने तरिका :



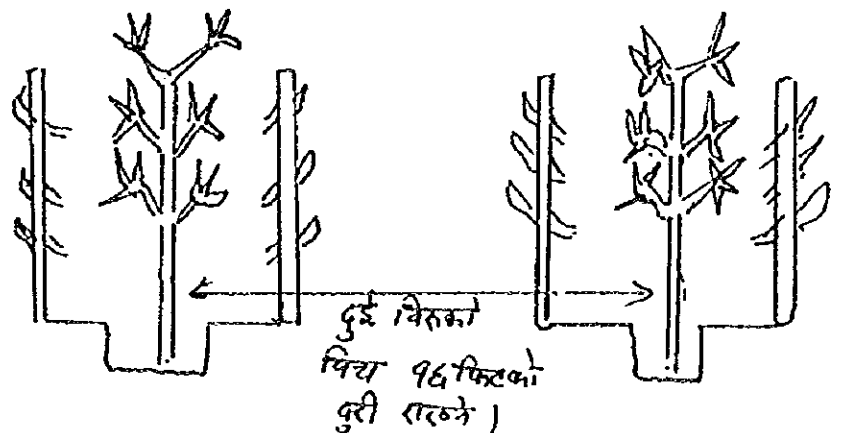
१) करीव १६ इन्च फराकिलो (डायामिटर) खाडल खन्ने । यसरी खनिएको खाडलमा १२ इन्च जति स्पष्ट मुलायम सतहको माटो तथा कडा खाँदिएको माटो हुन जरूरी छ ।



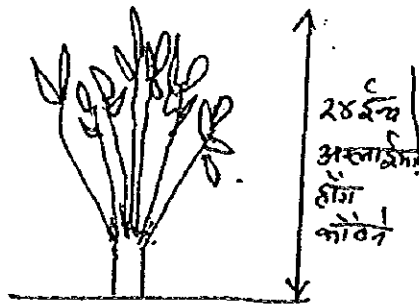
२) मुलायम माटोलाई ४ इन्च जति फेरि खनिएको खाडलमा भर्ने र यस माथि १० के.जी. जति गाईवस्तुको मल राख्ने (मल राख्दा ३ इन्च माथि आउंछ) । त्यसपछि फेरि सतहको नरम माटो राख्ने (दुई इन्च जति) । यति गरि सके पछि चित्रमा जस्तै भरिएको माटो सानो अर्ध गोलाकार जस्तो (Mound) बनाउने ।



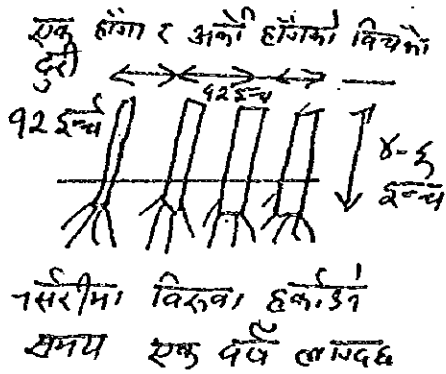
३) यस पछि यसरी भरिएको खाडलको विचमा किम्बुको विरूवा सानो प्वाल बनाएर सार्ने र फेरि सतहको माटोले पुर्ने । यसरी माटो दुई इन्च जति माथि सम्म राख्ने । गाई वस्तुवाट जोगाउन वार (वांसको लगाउने (बनाउने) ।



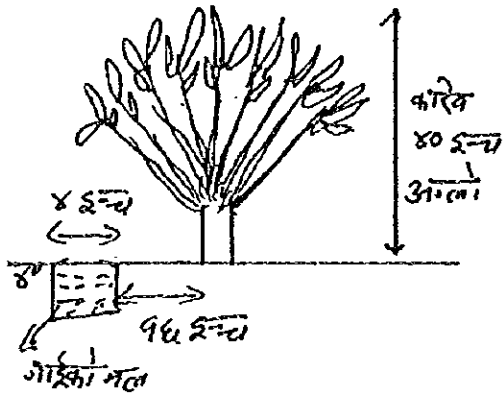
दोश्रो वर्ष (वांसको वार वनाएर विरूवालाई गाई वस्तुवाट जोगाउने)



१) चैत्र । वैशाख (आउंदो) तिर किम्बूको विरूवा एक मिटर (३९ इन्च जति) अग्लो हुन्छ । सवै हांगाहरू २४ (दुइ फिट) अग्लो रहने गरि काट्ने र बढ्न दिने । (यसरी काटिएका हांगालाई सोभै गाई वस्तु, बाखा आदिलाई दिन सकिन्छ) ।



२) काटिएका हांगाहरूलाई नर्सरीमा हुर्काउन सकिन्छ । यस्ता हांगाहरू ४ देखि ६ इन्च लामो बनाई जमिनमा गाड्नु पर्दछ । यसरी जमिनमा गाडिएका दुई हांगाहरूको विचको दुरी करिव ९६ इन्च हुन जरूरी छ । पानी हाल्न जरूरी छ ।

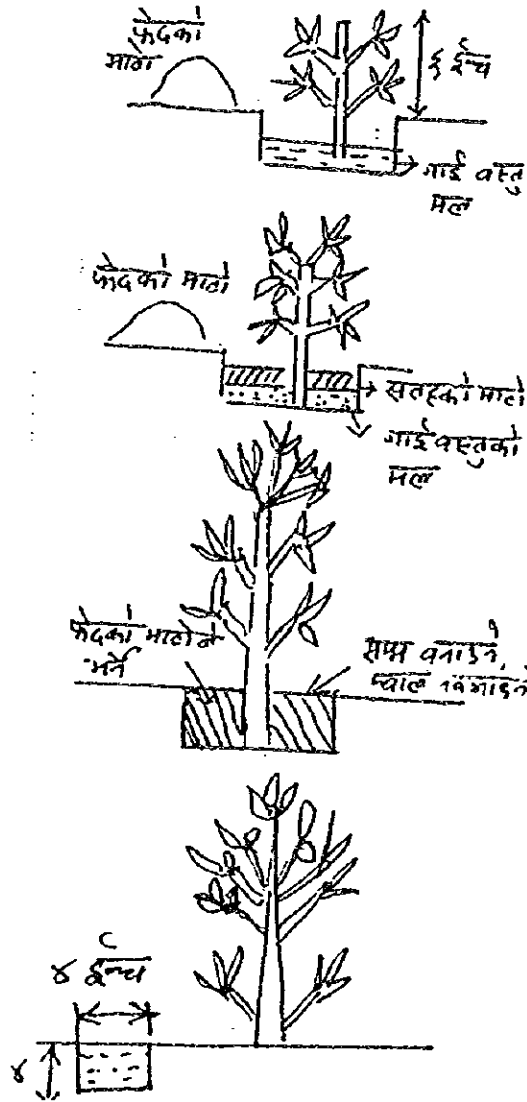


३) दशै तिर किम्बूको वोट करिव ५ फिट जति अग्लो हुन्छ । फेरि रूखका (किम्बू) हांगाहरू लाई ३०-४० इन्च अग्लोमा काट्ने । (काटिएका हांगाहरू गाईवस्तुहरूलाई खुवाउन सकिन्छ) ।

४) काटिएका हांगाहरू नर्सरी वनाउन पनि काम लाग्दछ ।

५) मंसिरको अन्त तिर किम्बूको वोटलाई गाईवस्तुको मल राख्नु पर्दछ । (यो क्रम हरेक वर्ष मंसिरको अन्त तिर गर्नु पर्दछ) ।

पहिलो वर्ष : (वांसको साठाले वार वनाई गाईवस्तुवाट वचाउने)



१) किम्बूको विरूवा सारे पाछि विरूवाको सतह भन्दा ६ इन्च माथि काट्ने (मुन्टो) र अलिकति गाईवस्तुको मल पनि राख्ने ।

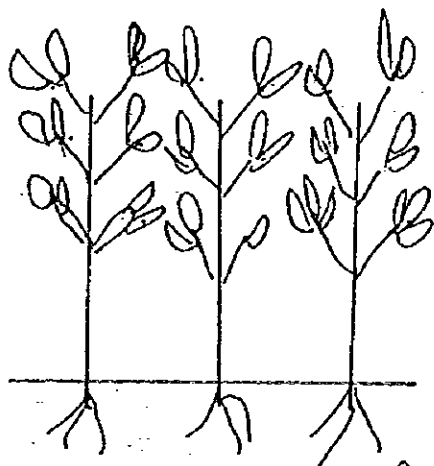
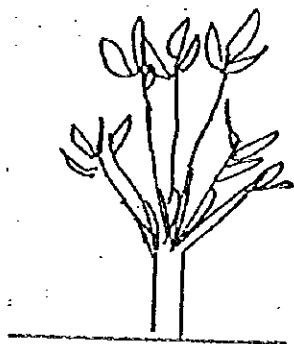
२) काटिएको ठाउँमा हांगा पलाए पाछि फेरि केहि गाईवस्तुको मल थप्ने र सतहको माटोले पुर्ने । यस्तो प्रकृया २-३ पटक दोर्‍याउने ।

३) दशै ताका बाँकी रहेको फेदको कडा माटो राख्ने, यसो गर्दा विरूवाको फेदको सतह सम्म हुन्छ ।

४) मंसिरको अन्त तिर भित्ता तिर करीव ४ इन्च गहिरो र ४ इन्च फराकिलो सानो खाडल खन्ने र यसमा गाईवस्तुको मल भर्ने ।

५) फागुनको अन्त सम्म सबै हांगा पलाउन दिने । विशेष पानी हाल्ने आवश्यकता पर्दैन ।

तेश्रो वर्ष :



एक वर्ष पाठिका नर्सरी

- १) चैत्र । वैशाख तिर किम्बूको बोट करिव ५ फिट अग्लो हुन्छ । दुई तीन हाम्रा हांगाहरू बाहेक अरू सबै हांगाहरू करिव आधा अग्लोई रहने गरि काट्ने (४० इन्च अग्लाइमा) ।
- २) यस बखत तपाइहरूले रेशमको किरा पाल्न सक्नु हुन्छ । यदि यस्तो गर्न इच्छा लागेमा चितलाङको रेशम छेती वा जाईका विशेषज्ञसंग सम्पर्क राख्नुहोस ।
- ३) तपाइहरूले गाईवस्तुको घासको रूपमा पनि किम्बूलाई प्रयोग गर्न सक्नु हुन्छ ।
- ४) यदि तपाइहरूलाई किम्बूको नर्सरी बनाउने इच्छा भएमा हांगा काटेर माथिको जस्तै गरी असार, श्रावणमा नर्सरी बनाउन सक्नु हुन्छ ।

JICA