

# An Impact Assessment Of Fiscal Measures On The Environmental Sector Of Nepal

Arjun Dhakal \*

## INTRODUCTION

'Rich bur Poor', these two words give hole picture of Nepal. In view of environmental resources, bio-diversity, cultural heritages, water, forest, and land, Nepal has a range of variation in humidity, altitude, soil and forest types. But economically, it lies in tail side of the list. Poverty and wrong economic activities are the major causes of the low rank of poorest country of the world which is famous for flora and fauna but now has unique environmental degradation.

Nepal is struggling to achieve the basic necessities of life, environmental issues are often ignored during project implementation and policy design (Tiwari 1998). Land, water, noise and air problems are not mutually exclusive, and in fact combine to intensify their overall negative impact on the environment and quality of life in the valley. High rate of population growth, inappropriate land use practice, uneven distribution of wealth, imperfect markets, unbalance execution of development activities are the reasons of environmental degradation in Nepal.

The economic policy reform in Nepal was initiated after the introduction of structural adjustment Programme (SAP) in 1985. The one thing of particular note is that SAP has not paid attention for protection of environment in tis early phase. Therefore, has not a positive effect but distoreted incentive and could not be regarded as environmental friendly (Tiwari 1998). In present practices, it can be called "Free Rider" policy.

## EXISTING ENVIRONMENT OF THE COUNTRY

Natural resources play a critical role in Nepal's economy. Tarai is covered by tropicl forest as a well as hill area's mountain is covered by different types of forests. It is rich in agro and wild bio-diversity, potential hydro resource, and fertile land. The direct contribution of renewable and exhaustive resource to economic development of Nepal can be approximated by the share of primary producing sectors-agriculture, forestry, tourism, in total value-added, exports, and employment, etc.

Environment pressures are closely linked to the key development challenges that are faced by the the nation. Nepal, at US\$ 200 per capital

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\* Mr. Dhakal is Alumnus of the Centreal Department of Economics, Currently Associated with Nepal Forum of Environmental Journalist.

income, with ten millions people still remaining below the poverty line, 81 percent population are based on traditional service system, poverty alleviation, regional inequality, employment generation are major development challenges of Nepal. Poverty alleviation is the underling objective of Ninth plan as the sizable portion of the population live under the poverty line.

Both from global and national point, deforestation, extinction of endangered species deforestation, soil degradation, decrease in soil productivity, water and air pollution, are the important environmental problems of Nepal.

#### *Land*

Land is a principal resource, constituting about 97 percent of Nepal's total area. Over three-fourths of total area made up of mountains and hills, only 20 percent land of southern part is plain area.

There is a general argument that substantially further increases in the cultivable land area are not feasible in the hills and mountain regions of country and limited land of tarai has high pressure of current population growth. With escalation of new land and increase in some crops' productivity, overall productivity is constant.

Agricultural land is being expanded but at the same time the most fertile lands have been turned into non-agricultural uses, such as conservation areas, urban area, industries, road construction. Major cities have been expanded encroaching upon prime agricultural land like in Kathmandu Valley.

#### *Forest And Bio-diversity*

Forests are the largest in terms of area coverage. A majority of people uses the products of forest resource for firewood, fodder, timber and medicine. About 80 percent of the total population are dependent on forest for fuel wood. The total natural forest area of Nepal was 6.1 million ha. in 1965/65 which reduced 5.4 million in 1985. The present situation is worse than. (Tiwari 1998). Annually deforestation rate is estimated by MFSC in 1999 is 1.7 percent.

A total of 118 forest ecosystems, with 75 vegetation types and 35 forest types have been identified in different physiographic zones in their realms. Out of these, 38 types of ecosystems are represented in the protected areas (MOPE 2000). The forest area has declined due to continued extraction of non-timber forest products. It is estimated that there is a potential of 1876,300 ha. forest and of 1,585,800 ha. non-fores land which can be developed as community forests. Similarly, 2,313,100 ha. of Nepal's current national forest can also be marked as potential community forest. As per of March 2000, HMG has handed over a total of 0.650 million ha. of state- managed forest to over 9,000 community forestry user groups. (MOPE 2000)

According to the MOPE, Nepal falls in the 25<sup>th</sup> and 11<sup>th</sup> position in terms of species richness at the global and continental level respectively. Though, it constitutes only about 0.03 percent of the total land mass of the world and 0.3 percent of Asia, yet it harbours about 2 percent of flowering plants, 3 percent of pteridophytes and 6 percent of bryophytes of the world flora.

Not only in forestry, Nepal has domesticated a wide variety of plants and animals. Over 400 species of agrohorticultural crops and about 200 species of vegetables have been reported. More than 100 varieties of 15 fruits, 200 varieties 50 vegetables and 10 varieties of potatoes are under commercial cultivation.

### *Energy*

Energy demand is met from a combination of traditional and commercial sources such as fuel wood, agricultural residues, animal waste, solar power and hydro-power. Hydro-resources represent a large fraction of the total theoretical energy potential, 83,333 MW, and economically potential of 42,000 MW. The production of electricity is 353 MW approximately which is only 0.4 of its potential 83,000 MW. Nepal is fully dependent on imports of petroleum products with its limited resource, demand of petroleum oil and lubricant (POL) products is continuously rising. In Fiscal Year 1998 from 709,724 kiloliter in Fiscal Year 1999 it creased to 775,863 kiloliters, a 9.3 percent. POL products was Rs. 10,324.1 million in 1998, Rs. 17,232.5 million, 66.9 percent increased in 1999, (Economic Survey 1999-2000), which is the major source of urban emission.

Lacking proper development of hydro-electricity and alternative energy source majority of the people continue to depend on traditional energy source like wood, cowdung cake, etc. This continues to cause forest depletion, soil erosion, flooding and landslides.

Observation of energy consumption pattern by dividing energy into traditional and commercial sources show that share of the latter is insignificant. Of the total energy consumed in FY 1999, share of traditional energy was 87.9 percent and that of commercial source was 12.1 percent . In the same year share of fuel wood was 70.5 percent, share of agriculture and cattle residue 3.5 and 5.9 percent respectively commercial sources energy shares of petroleum, coal and electricity were 8.6 percent, 2.4 percent 1.1 percent respectively, in total fuel wood, cattle residual petroleum and coal take 98.9 percent of energy sources, which are major causes of environmental degradation and pollution.

### *Transportation/Industrial*

Air pollution has emerged as the most visible component of environmental degradation in urban areas. Because of its adverse impacts on human health, environment and ecosystem, air pollution is a serious concern to residents and visitors. A case study of World Bank, Kathmandu

is facing increased health costs as a result of environmental degradation caused by industrial pollution and atmosphere emission which is estimated to be NRs. 50 millions annually. Air pollution in Kathmandu valley is also continuously causing damage to many historical buildings that represent the famous 'cultural sites'. Deterioration of public health, especially due to increase in the respiratory and gastro-intestinal diseases, has already become a concern in Kathmandu Valley. (World Bank 1993).

#### *Agriculture*

Over the 80 percent of the total population still depend on agriculture for subsistence living. Nearly 21 percent land of Nepal is used for cultivation and 39 percent of GDP is covered by agriculture sector. Growing rate of using chemical fertilizer with unproportionately, soil erosion, land degradation and low productivity are major problems of agriculture. The input-output ratio in agriculture is regularly increasing which is a serious concern. Similarly, quantity with quality agriculture production and food security are important issues of Nepal's agriculture.

#### *Water*

People are habitual to drink filtered, boiled or chemically treated water in urban areas. Surface water in the urban area is severely polluted by industrial effluence, waste dumping and by the discharge of untreated sewage from residential areas. Ground water in most urban areas is contaminated due to seepage from septic tank and with the lack of regulatory the level of ground water is rapidly going down.

#### *Urban Waste/Noise*

Along with increasing population, industrial and commercial activities, there is an increasing amount of domestic and industrial solid wastes. Samples estimated in Kathmandu Valley indicate waste generation rate in the range of 0.25 to 0.45 kg/person/day (MOPE 2000). By causes of mismanagement and wrong political decisions, domestic waste is also disposed on the riverbanks in the Kathmandu Valley.

Noise pollution does not direct damage environment, however, like other sources of pollution, it can affect human health physically and psychologically either by causing permanent hearing damage or reducing efficiency. Vehicle emission is the major cause for the deteriorating air quality in the urban areas where vehicular is much aggravated by substandard or adulterated fuel, narrow and poorly maintained streets. (MOPE 2000). Solid waste composition and generation is an outcomes of economic activities of the household. In Nepal, organic waste is traditionally re-used for agriculture production in rural area. Some NGOs and CBOs have started to operate small scale compost plants and recycle industries in urban areas.

Although waste generation, accumulation and disposal problem is a common phenomenon in Nepal's industrial and urban areas, there is an increasing trend to import or export the non-biodegradable wastes such as scraps, plastics, glasses, and so on. Trans boundary issue of waste is not considered at present., however, it will likely encourage to operate industries which uses scraps as raw materials.

#### ECONOMIC TOOLS AND INSTRUMENTS USED TO MITIGATION ENVIRONMENTAL PROBLEMS

Economic instruments attempt to influence the behavior of polluters by offering economic incentives and punishments to achieve environmental protection. They can be highly effective if properly designed and implemented.

Taxes on environmental externalities have been recognized as legitimate intervention by government. Tax increases or rebates can be revised to encourage clean production technologies. According to the World Bank case study in Mexico and Indonesia, taxes on dirty fuels are the least cost instruments to reduce pollution efficiently, (World Bank 1993).

Economists have for long agreed that the market-based incentive approach is more effective than one based on command and control. The economic instruments seek to modify human behavior through the price mechanism.

Here are some economic instruments and tools to manage the environment.

##### *Taxes And Charges*

- Pollution Charges are based on 'polluter pays' principle, which was first adopted by the OECD in 1972, now this is accepted by many governments. Pollution charge can help to correct market distortions, by internalizing the externalities into the cost of production. Industry may save on pollution charges through process of optimization material substitution, waste minimization, adoption of cleaner technologies, or on site treatment. Their charges are based on the volume and nature of the waste. A Pollution charge not only cuts emission but generates public revenue as well (World Bank 2000).
- User Charges are direct payment and fees levied by government to industries and consumers for the cost of environmental management services, for example, collection, transportation, disposal, and treatment of waste. World Bank also recommended promoting user charge as a cornerstone of infrastructure programme in developing countries.
- Road Pricing involves charging a fee to motorists for inducing some change in individual behavior and driving pattern. Implementation of road pricing may lead to increased use of public transportation, ride

sharing and driving on off peak hours (Adhikari 1998). A well designed system can both generate municipal revenue and help reduce the production of waste by the residents.

- **Liabilities And Deposit Refund System** means holding concerned industries, firms and institutions liable for the cost of air pollution and garbage reduce. Liabilities can serve as a deterrence, assigning liabilities for the cost of damage by pollution and wastage. This deposit instrument is applicable on relatively durable and re-usable items. It diverts waste from traditional disposal paths into alternatives such as re-use, recycling and environmentally safe disposal.
- **Tradable/Marketable Permits** means the state where tradable permit limits the total amount of pollution in given geographical area. Each industry is given a permit for a prescribed amount of pollution, which can be freely traded in the market. If industry produces less pollution than what is allowed to, it can sell the remainder of the permit. Similarly, industry may buy permits for right to pollute from the market, making the use of pollution reducing technologies in their own interest. Tradable permits, is a system the allows industry to facing trade any unused portion of emission credit that has been assigned to it by regulatory agencies.

### *Subsidies*

A subsidy is defined as a government policy that alters markets risks, rewards and costs in ways that favor certain activities or groups. The most visible subsidies are direct government payments that help hold down prices for consumers or prop than up for productions. Subsidies can be devised to encourage people to choose transportation over cars. They can also be initially devised to encourage people to use cleaner fuels and energy (Adhikari 1998). But subsidies impose a budgetary burden to the authorities.

### *Public Expenditure*

Direct government investment could play a major role in both current and prospective environmental programme. The types of activities financed by the government could be grouped under the following categories : damage prevention activities (e.g. municipal treatment project), regeneration activities (e.g. reforestation, slum clearance), research (e.g. pollution level measurement and control techniques, agriculture production techniques to minimize environmental degradation). The rational for public investment are: first 'many environmental services (clean air) are 'pure public goods" so that a market-based provision is unfeasible and second, an efficient scale of operation of pollution control facilities may require investment levels that much exceed any single polluter's needs. (Ahmed 1991).

## HMG'S FISCAL MEASURES AND THEIR TIMPACT ON ENVIRONMENT

The fact that Nepal is unable to feed its current generation, its coefficient of concern for future generation is low. Other economic affairs are more important than environment to policy maker. Similarly, national environmental are more important than global problems. The livelihood of majority of population of Nepal are directly dependent on natural resource. Poors', which are more dependent in natural resource then rich, livelihood will be seriously impacted after the degradation of resources.

Governments of develponig countries usually intervene in the market by fixing a minimum support price of producers and giving subsidies for maintaining a minimum level of profit for the domestic producers and maintaining the supply of goods and services at reasonable prices for consumers.

A fiscal policy has two sorts of problem: political and technical. The political problem can rise from three sources; general opposition from tax payers to tax increases, opposition from the pollution, whose costs would normally be increased; opposition when the charge is perceived to be inequitable distribution; if low income households pay proportionally more. Technical problem can rise as market based instruments are more effective than command and control, taxes are more effective than subsidies. Combination of policy is like to be more effective, taxes with control, critically dependent on the administrative capacity to implement policies.

The lack of conclusive evidence on the direct effect of fiscal measures, instruments and tools, on polluter behavior needs to be interpreted cautiously. First, data to test the impact of fiscal measures on the environment are generally scare. Second, most fiscal measures have not been large enough to induce dramatic changes in firm behavior. And third, fiscal measures have generally been designed to promote environmental quality through the redistribution of funds to these activities. The indirect effect of fiscal measures on environmental quality has been significant.

### *Agriculture And Land Sector*

Government has adopted minimum price policy, agriculture input subsidies, highly subsidized provision of irrigation water and low tariff on the exports and imports of agriculture commodities.

According to the VAT Act 2052, agricultural and non timber forest products are VAT free commodities. Similarly, government has been providing tariff free pesticides. Toxic ingredients, inappropriate or exercise use of pesticides can be hazardous to human or environment. *Bhate Chalan*, rice culture, has encouraged to farmer to cultivate paddy in stripe area which is the main cause of soil erosion. Similarly, subsidised food supply has encouraged to divert other crops and new food basket system.

Tariff rate to import and export agriculture commodities is helping to create black market and effect on local product. Flow of subsidized Indian rice in Nepali market, Nepali rice price in terai is less than production cost. Matrix 1 shows the impact of fiscal measures on agriculture sector.

Matrix 1

Particular	Instrument	Situation	Indicators
Pesticides, Insecticides, herbicide	Tariff and VAT free	After the liberalization of import increased.	Over use of pesticides, Loss of bio diversity, Health impact, Misuse of green fertilizer
Chemical fertilizer	Removed subsidies since November 1999 with liberalization policy	Price high, Rationale use, Price competition	Reducing use of chemical along with the use of compost
Food transportation	Subsides on transportation cost	Changed the food basket of rural and remote people	Misallocation of resource, loss of agro bio-diversity and indigenous food knowledge
Irrigation	Subsidies on irrigation in decreasing rate, free/low charge	High cost of project, Dependency	Misuse of water resource, Loss of traditional community based irrigation system

The environmental problem is to prevent topsoil from becoming a degradable resource through appropriate soil conservation measures.

If the land rights are not well defined land tends to become a free access resource, there will be inefficient and unsustainable use, and no intensive care to maintain land productivity. The poverty of the farmer is a major source of land degradation in developing countries like Nepal. Nepal also faces the problem of lacking of well established land market.

Land revenue is rapidly reducing, but land and house registration is growing speedily. In 1974/75 land revenue was 90.9 million and house and land registration fee was 36.0 Million. In 1998/99 its share was 103.2 and 41.0 million NRs respectively. Farmer will not be encouraged without special economic advantage for adopting the land management measures and changes in farming system. Matrix 2 shows the impact of fiscal measures on land sector.



Matrix 2

Sector	Instrument	Situation	Indicators
Settlement	N/A	Settlement increasing in agriculture and fertile land	Reducing fertile agriculture land
Opened land	N/A	left to do agriculture practice	Desertification and soil erosion
Land revenue	Low tax rate in unfertile land	Misuse or under use of degraded land and soil erosion	Encouraging to use low quantity land

*Corrective Measures*

- Government price is always lower than market price hence, marginal profit is more than the price of commodities. It is necessary to remove environmental unfriendly subsidies to prevail true price of product, and to improve resource use efficiency.
- Provide low cost farm technology for upland farmers and infrastructure for agriculture market promotion.
- Transfer property rights for handing over of users' rights and management responsibilities to the users themselves. These provisions are effective and encourage users to manage the resources efficiently.
- Introduce economic incentives to improve terrace, gully and watershed erosion control.
- Remove subsidies, adjust land tax, reform land revenue system, tariff on pesticides and subsidies on organic farming, integrated plant nutrient, and pest management system.
- Promote well functioning land market and remove barriers to land use.
- Pursue that the allocation of public land for private land use is based on prices that reflect market values.

*Forest Sector*

In forestry sector, there are two types of charges: royalty and reforestation charges price. Government prices of timber is less than twenty percent of market price. Timber market is on control price mechanism specially monopoly of TCN. Timber price in tarai is 30 percent lower than border price. Total revenue collected from forest charges increased from NRs. 112.7 millions in 1989/90 to NRs 374.6 millions in 1998/99. (IUCN 1998) The practice of basing timber royalty on processed wood encourages under-reporting of the level of logging and provides

little incentive to improve mill efficiency. This has resulted to have deforestation rate 1.1 by percent annually.

In community managed forest, lack of manpower and the large area under concessions has limited the exercise of control and lack of adequate information on silviculture systems. Government removed subsidy in plantation programme still some NGOs and INGOs are supplying subsidies, This has raised the question of right investment in right place. In forest management case, the externalities and efficient issues are linked to property rights and the market structure.

There is no clear policy about how much park entry fee should be, but, government has a policy to spend 30-50 percent of park income in buffer zone and local communities, though, heavy subsidy is going for park management and administration.

Not all of government subsidies have negative impact on environment, bio-gas plant subsidy is helping to protect forest resources and decreasing pressure in forest area. Similarly, in the case of lease-hold forest, special provision not tax to the people under the poverty line has positive impact. Recently, government decided to change 'yarsa gumba' from 'restricted species' to 'trade with permit' species. Matrix 3 shows the impact of fiscal measures on forest-sector.

Matrix-3

Particular	Instrument	Situation	Indicators
Community forestry	Right to collect revenue and expend there self decision	More than 10000 thousand forest areas managed by communities	Improved forest condition and overall impact
Timber price	Constant and lower (around 25% only) than market price.	Misuse, smuggling and pressure in forest timber	Loss of valuable and endangered forest
Park income	30-50 %revenue spend at buffer zone and local community development	Reducing park and people conflict, low cost to protection	Easy to protect
Private forest	Land tax free	Cultivation practice in unfertile land	Increasing plantation on private land
Grazing in forest or pasture land	Grazing tax	Over-grazing is the main cause of forest degradation and soil erosion	Control on over grazing in Himalayan rnage

*Corrective Measures*

- There is need to increase the value of the product by the government. This is necessary not only to raise revenue, but even more importantly, to reduce excessive exploitation of forest resources.
- In reforestation programme, concessionaires should be given technical support for proper species selection and appropriate site selection.
- Remove market barriers by improving pricing mechanism and environmental unfriendly subsidies, allow to prevail true price of product, improve resource use efficiency.
- Transfer property rights for handling over of users' rights and management responsibilities to the users themselves These provision are effective and encourage to users to manage the resources efficiently.
- Provide subsidies for community forestry area to protect bio-diversity.
- Increase park entry fees specially tourism promoted parks as to cover administrative cost.

*Water Sector*

Many government consider water as a 'merit' goods and therefore, provide water free of charge or at a heavily subsidized price. This leads to inefficient and unsustainable consumption. In Kathmandu, the price of drinking water is very low which covered only 40 percent of total cost, in rural area drinking water is totally free except some labor contribution. Lack of safe drinking water, thousand of people are dying in rural area, while the government is providing subsidized drinking water (Tiwari 1998) in urban areas.

There is no charging system to water polluter like industries, hospital and residential areas. Likewise, irrigation charge is virtually free or very low. Revenue collection from irrigation sector was ignoreable in the past, but investment was markable. For both surface and ground water management, appropriate pricing/tax policy is needed to ensure efficient and sustainable consumption. Free water policy has created some problems like lack of maintenance, misuse, irresponsible for pollution. Matrix 4 shows the impact of fiscal measures on water sector.

**Matrix 4**

Particular	Instrument	Situation	Indicators
Ground water	Free	Over-consumption, reduce water level	In Kathmandu valley heritage water tape are dry, health impact, dry surface
Water charge	Low rate	Misuse, seepage, over-consumption	Lack of water

### *Corrective Measures*

- Levy the volume based charge for irrigation water.
- Study the consumers' need and willingness to pay for reasonable price.
- In residual consumption of water, charge high rates for higher consumption volumes and induce ground water use in Kathmandu valley.
- For unsustainable ground water extraction for domestic or commercial use, charge more who can pay for water.
- Transfer property rights for handing over of user's rights and management responsibilities to the users themselves. These provision are effective and encourage to users to manage the resources efficiently.
- Introduce waste water charges as user fees and taxes for excessive use of ground water.

### *Energy Sector*

In Nepal, energy consumption per capita was 28 kgtoe, cost was \$ 0.14 toe, and oil import was 75.4 percent of total energy consumption in 1996. Still now, situation is not different and subsidies on kerosene is NRs 9.75 per liter and in LPG NRs. 100 per cylinder. But subsidies on bio-gas, solar, small hydro-power are markable. Government decided tax subsidies for small hydro-power plant (les than 1 MW) in income tax, and has started heavy subsidy on other alternative energy sectors. But, the subsidies on bio-gas and solar energy syphoned to richer person only.

The price of kerosene is kept below the actual price with subsidized. So, kerosene is mixing in diesel which has created adverse impact on vehicles and air quality. The price difference between diesel, kerosene and gasoline is high because of import and local/municipality duties. The price difference between diesel and kerosene as well as petroleum and kerosene has led to adulterations, fuel substitutions in vehicles and industries with adverse impacts on environment.

If connection costs are excluded from the calculation, the Long Run Marginal Cost (LRMC) tariff rate is found to be 99-399 percent higher than the actual tariffs for different level of users. This pricing policy and provision may have both positive and negative impacts on the environment and the balance of payment.

Subsidy in the construction of bio-gas plants in rural areas has provided economic incentives for the use of bio-gas rather than fuel wood. Subsidized electricity price could have a substitution for the dirty fuel and firewood. Similarly, improved stove produces less smoke and fuel wood and help to improve indoor environment. The matrix 5 shows the impact of fiscal measures on energy sector.

Matrix 5

Particular	Instrument	Situation	Indicators
Kerosene/ LPG	Subsidies in selling prices	Over consumption,	Generate emission,
Price gap	Price different between diesel and Kerosene	Reporting that mixing kerosene in diesel which reduce burning capacity	Air pollution, waste of unburned fuel
Electricity price	Flat rate	Same rate in wet and dry, peak and off hour	Discourage to use in off hours
Subsidies on small hydro	Subsidies in income tax	Potential energy source in rural supply small Investors are encouraging	Rapidly growing investment in small hydro
Subsidies on solar	Subsidies on investment	Potential alternative energy source for rural areas	Rapidly growing the number of solar system
VAT	VAT free for alternative energy	Alternative energy sector is in growing phase	Increasing rate
Subsidies on bio-gas	Subsidy on investment	Potential alternative energy source for rural farmer, use of cow duck and waste, positive impact in family health	Rapidly growing the number of bio gas plants after subsidy

*Corrective Measures*

- Remove environmental unfriendly subsidies and allow to prevail true price of product, improve resource use efficiency.
- There is a need to establish true economic prices for diesel and gasoline. It may be unpopular in short term but in long term it helps to promote environmental friendly energy consumption and positive impacts on balance of payment. This will automatically result in a more environmentally-sound pattern of energy production and consumption.
- Levy emission charges or taxes. Such charges are usually determined at the level where marginal damage costs and marginal pollution abatement costs become equal. Not only in direct charges, fiscal policy can also focus on indirect means-through taxation of inputs and outputs in polluting sectors.
- Remove the price gap of kerosene and diesel.
- Lower electricity tariff. It can discourage use of imported dirty fuels and promote the use of clean energy in household cooking and lighting, promoting cottage and rural industries and irrigation water use.

*Transportation Sector*

Pollution depends upon vehicles conditions, fuel quality and road congestion. These activities can control through the level of users charges and taxes. There is a close relation between road taxes and air pollution. But in, road maintenance cost and revenue from road, vehicles taxes, road permit, registration fees, ratio is very high even in urban areas. 64 percent of road maintenance cost is subsidized by government in Nepal. One after one vehicles purchased has increased the number of vehicles and in per capita pollution.

But, after the public pressure government has decided some markable decision in the sector of vehicle emission. In this context 25 percent tariff rate for large than 15 seats vehicles but 130 percent for smaller than it and no permission to import second hand vehicle, and, 10-20 percent less tariff for India-made vehicle have been provisioned.

Since 1999, the different tariff rate on unleaded petrol and lead petrols have been introduced which run, NRs. 10,750/kl for unleaded petrol and NRs. 11750/kl of leaded respectively. Government has adopted some specially tariff rate for environmentally like zero tariff for trolley bus, 1 percent tariff for electric vehicle. Similarly, tariff rate for pick up vehicle is 80 percent, motorcycle 40 percent, 1 percent for gas tempo, 50 percent less for two vehicles for tourism sector. And new provision for pollution control and management pollution tax has been produced which in petrol/diesel is 50 paisa per litter.

Matrix 6

Particular	Instrument	Situation	Indicators
Annual renew charge	Annual charge for world and new vehicles is same	Lot of old vehicles are using, which is the cause of air pollution	Growing emission, traffic jam
Diesel and kerosene price	Price different between diesel and kerosene	Reporting that mixing kerosene in diesel which reduce burning capacity	Air pollution, waste of unburned fuel, damage vehicles engine
Gas tempo	Subsidies in tariff rate and gas	Produce emission in lower rate, but it is not environment friendly, loss of revenue	Rapidly growing gas tempos, scarcity of cooking gas which enforce to use kerosene
Cable car	VAT on cable car	Cable car could be a potential service in hill area as a environmental friendly transportation	Only one cabal service is working
Road use tax	Not introduce except in Kathmandu Mugling	Government spending huge amount of revenue to make and maintenance of road	Over-road use, loss of maintenance costs, increased emission with small size vehicles number
Electric vehicles	Subsidy on electric vehicles import, low rate of electricity for charging station	Major cause of urban air pollution is fossils fueled vehicles	Increasing number of electric (environmental friendly) vehicles,
Petrol	High tariff rate on leaded petrol import	Seriousness of air pollution, less fuel burning	Increasing use of leaded petrol in vehicle
Indian Vehicles	Less 10-20 percent taiff	Low standard India vehicles are the major cause of pollution	Increasing market of Indian vehicle
Subsidies for owner to import new vehicle	Subsidy on tariff rate of microbus to Bikram Tempo owner	Imported vehicles were not environmental friendly and revenue loss	Increasing in petrol fueled micro bus

*Corrective Measures*

- Levy emission charges or taxes. Such charges are usually determined at the level where marginal damage costs and marginal pollution abatement costs become equal.
- Allow market permits. Market permits to combine a quantitative limit on the pollution with the price signal. Within a geographical area it is fixed and polluters are free to buy or sell emission discharge quota according to their own choices within that limit.
- Differentiate VAT on public transportation, on car and gasoline.

- Introduce emission control fees and use these funds for promoting the use of abatement equipment. The subsidies could be provided in the form outright grants or as subsidized loans. If the effective user taxes induced, it create two side effects, revenue for maintenance and reduce fuel consumption.
- Increase vehicles purchased charge and registration fees to change user behaviors and tax incentive to use catalytic converters and maintaining emission levels within the standards.
- Introduce differentiations in manufacturing electric/gas vehicle.
- Introduce road use tax for urban area which help to build road in remote.
- Maintain gap in registration fee public and private vehicle.
- Reduce subsidies on and diesel, and unleaded petrol.
- Increase car or private vehicle parking fees and remove subsidy provision compensation for owner of Bikram tempo which reduces revenue and increases the number of vehicles.
- To control traffic densities, levy special duty, urban congestion pricing, in peak hours.

#### *Industry And Urban Sector*

In the Kathmandu valley, local bricks and cement factories emit the higher level of TSP, SO<sub>2</sub>, and CO which was estimated at 668 tons and 673 tons for 1992/93. The absence of competition market and land use regulation has led to the concentration of major pollution industries such as cement, brick leather and carpet in Kathmandu Valley which have major cause of adverse impacts both on the environment and human health. Since 2000 AD government has decided to take permission tax with brick factory NRs. 1,00,000/- year in urban area. It will be less 10 percent in rural Kathmandu, 25 percent in rural areas and 20 percent and 25 percent in mid west and far west respectively. Similarly, since 1999 government has introduced 1 percent tariff rate in order to import pollution control equipments recycle in industries and 50 percent reduction in taxable income for industry who invest for pullution control or environmental friendly equipment. And since FY 2000/01, government has decided to take tax in every types of polythine bags less than 20 micron quality, NRs 25/kg and for other NRs 5/kg. Similarly, 80 percent tariff clue for recycling raw materials. The land system particularly in and around major urban areas is affected by solid waste disposals, production of municipal wastes has increased from 0.114 million tons in 1984 to 0.330 millions tons in 1997. Matrix 7 shows the impact of fiscal measure on industry and urban sector.



Matrix 7

Particular	Instrument	Situation	Indicators
Environment friendly subsidies	Subsidies on tariff rate to import environmental friendly equipment	Industries are the major cause of urban, air, water pollution	Increasing the use of that types equipment
Charge in brick factory	Recently increased in renew rate of brick factories	Lots of brick factories are established in urban areas	Factories smoke is the major source of air pollution
Vehicle import	Euro-1 standard, tax subsidy for large sized vehicles	Vehicles are the main sources of emission, road are covered by small sized vehicles	Increasing in import new and large sized vehicle
Kabadi tax	Tax on export of waste	Huge amount of selected solid export from urban area for recycling	Discouraging to collect waste and recycle industries
Polythene bag	Recently induced more sell tax on thin types polythine	Major role in urban pollution, blocks drainage and canal	May help to reduce using
Waste disposal tax	N/A	"Free rider"	Quantity of waste is rising day-by-day and disposal cost also rising same ratio

*Corrective Measures*

- Levy disposal tax to establish quantity based tax on of solid waste which helps to reduce waste and increase revenue for waste and environment management necessary to introduce in urban area.
- Allow market permits. Market permits to combine a quantitative limit on the pollution with the price signal. Within a geographical area it is fixed and polluters are free to buy or sell emission discharge quota according to their own choices within that limit.
- Introduce emission charges or taxes. Such charges are usually determined at the level where marginal damage costs and marginal pollution abatement costs become equal.
- Review the present tax exemption provision for attracting FDI and direct taxes on hazardous ozone depleting substances.

- Introduce tax credits for increasing investments in the development or renewable energy resources.

## CONCLUSION

There is general indication that the government fiscal policy is failure to control environment and natural resources degradation. The result is poor operation and maintenance of the services in various sectors and consequently its impact is negative in environmental impacts. Subsidies are mostly provided without a preceding analysis of the who are beneficiaries. Water subsidies, pesticides subsidies have tended to suport inefficient use of these inputs in agriculture production.

In the past, policies have supported inefficient use of resources and have caused additional generation of waste and emissions. Under-valuation of forest resources has resulted a very low level of royalty and tax levy on their use. Whatever may be the cause of deforestation either fuel or food demand, correct incentives always have their place in alleviation of the problem. Market based instruments are more cost effective, so encourage to polluter to control pollution and use of clean technologies. Direct controls need effective enforcement and administration but its cost is high. To reduce same level of pollution, market-based instruments are less costly.

In designing pollution control policy in dual economic system like Nepal, combination of taxes and controls are likely to work best. This is especially relevant to a situation where the initial environmental degradation is severe, requiring urgent attention.

Successful implementation of an environmental management strategy that balances regulatory and fiscal instruments will require strong political support and stronger institutions, improved and simple tax collection system, and availability of information on environmental problems.

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