CHAPTER-6
ENVIRONMENTAL MANAGEMENT AND PLANNING STRATEGIES

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ENVIRONMENTAL MANAGEMENT AND PLANNING STRATEGIES

Comprehensive environmental management and planning is inevitable for overall physio-cultural development of the area. The main objective behind such attempt is to appraise various problem confronted by the land and the people of the area and to suggest ways and means to tackle them with a view to utilizing potential resources at the optimum level. Environmental management thus involves socio-economic development of the society on the one hand and maintenance of environmental quality on the other hand. It is to be noticed here that the term ‘environmental quality’ is a subjective term and is interpreted differently by different group of people. The environmental management and planning strategies of this chapter is based on the assessment and analysis of biophysical and human resource of the study area.

The term utilization and environmental management are linked to each other and sometimes compliments and substitute to each other because utilization is the practical and ideal use of resources which aims at sustainability and environmental management for better future so if we utilize our resources it simply means that we are managing our environment. Environmental management thus, is related to the rational adjustment of man with nature involving judicious exploitation and utilization of natural resources without disturbing the ecological balance and ecosystem equilibrium. In fact if the resources are exploited, some environmental problems are bound to immerge because no gainful exploitation of resources and hence socio-economic development of a region is possible without causing injury to some of the components of the environment.

The area under study is basically an agricultural area. There are no major environmental issues in the district instead some minor environmental problems are present in the region that needs to be solved as early as possible. The strategy
for better resource utilization and improvement of environmental health are being presented here.

6.1. Land Resource Development and Planning Strategies

The land resource management of the study area is proposed as under-

6.1.1. Management of Net Sown Area

Land use in rural area is primarily of agriculture as more than 70% area comes under this land use category. Though the district received an increasing trend of net sown area but at block level Akbarpur, Tanda and Jahangirganj within 2005-2012 recorded decreasing trend. The reduction in net sown area brings out the shortcomings and lack of efficiency in proper planning and negligence towards maintaining net sown area by effective policy implementation. The main cause behind the reduction is the conversion of land into non agricultural purpose to meet the demand of space for increasing population. The block Akbarpur which is the headquarter of the district showed drastic reduction in net sown area. The tendency of occupying net sown area for different purpose should be stopped immediately to meet the food requirement of the increasing population. The other urban areas have also aggravated the problem nearby. The construction of houses needs bricks and the brick kilns are established in agricultural land destroying the most productive layer of the soil. An alternate like ash oriented bricks should be promoted by governments and the productive layer of the soil must be saved at any cost.

6.1.2. Development and Planning Strategies Related to Forest Cover

The district represents only 0.14% of forest cover in 2011-12 coming to very vulnerable forest cover. The area under forests can be increased to 2-3 percent if some part of fallow land, cultivated and uncultivated barren land is brought under this. The vegetation cover can be increased by proper plantation of trees like-

- Plantation along road side
- Plantation along canal boundaries
- Plantation around lakes and ponds
- Plantation nearby settlement around houses

The programmes like Pradhan Mantri Rojagar Yojna and Mahatma Gandhi National Rural Employment Guarantee scheme can also be utilized in the plantation process. In this way the natural environment will be strengthened as well as an employment can be provided to the people of the region.

An initiative can be started to frame an interest towards tree plantation and protection. Some incentives can be given to increase interest in plantation.

6.1.2.1. Social Forestry and Private Forest

The concept of social forestry (private micro forest) can be helpful in the forest area development. This envisages that the private individuals could also grow various varieties of plants. The private forest is different from orchards, as orchards generally comprise fruit bearing plants. The private waste land could also be used for timber, energy plants etc. plants with medical value could also be grown in such lands if people could be informed about their medical and commercial value.

6.1.2.2. Agro Forestry

Agro forestry is an important mode of utilization of land resource providing environmentally sound atmosphere. There are two types of tree plantation in agro forestry. First is of trees like Eucalyptus and Babool are planted on boundaries of cultivated land to protect the crop from wind and animals. This also provides fodder for animal and fuel-wood and timber for household activities. In second type fruit trees are planted on border of agricultural field. It not only provide wood and timber but also fruit for household use and sometimes for commercial use also. So agro forestry should also be promoted for the better of environment.

6.1.3. Management of Barren Uncultivable Land

Barren and uncultivated land can be managed as following
• Forest area development and plantation
• Construction of ponds and tanks for water storage. That will help increasing irrigation facilities, other uses and simultaneously recharging ground water level
• This land can be used for expansion of agricultural land after proper treatment of soil
• This land can also be developed for stadium, schools, buildings, residential areas and for other common property uses.
• It could also be used for Khalihan if it is nearby fields.

6.1.4. Management of Fallow Land

• Very old fallow land should be developed as orchards with the plants needed less water requirement like mahua.
• Irrigation facilities are needed to be developed more extensively so that the farmers should not compel to leave the land fallow.
• Focus should be given on growing dhaincha or sanai crop instead of leaving it fallow that can be used for green manure of soil if the land is intentionally leaving fallow.
• With proper attention and institutional facilities fallow lands needs to be converted into agricultural land as to meet the increasing hunger demand of population.
• There are some fallow lands which cannot be converted into agricultural land, should be used as water reservoir by converting it into tanks and ponds and thus these tanks and ponds after rainy season can be used for fish, water nut or lotus production.

6.1.5. Management of Barren Cultivated Waste Land

This land could be converted into areas of social forestry or pastures. At some places such lands could also be used for fodder cultivation. In most of the cases these lands are the result of lack of proper attention. By monitoring and paying proper attention these lands may be developed for better situation.
6.1.6. Management of Non Agricultural Land

Due to increase in population the area under non agricultural land is increasing drastically. This land can be managed as following-

- The acquisition of agricultural land in Tanda block is increasing which needs to be evaluated.
- Major developmental projects should not be passed on agricultural land if not extremely important.
- Multistory building construction i.e. vertical development should be preferred instead of horizontal. This will save more land which can be used for other purposes.
- A green strip should be developed on both sides of road.
- Those who construct houses or buildings on agricultural land should be fined heavily. This will demoralize the encroachers of agricultural land that will be beneficial for environment and society.
- All the industrial development should be environment friendly. The government should give his priority on controlling environmental hazards due to industrial output.
- As far as possible barren and uncultivated land should be used in the construction work.

6.1.7. Management of Land Under Miscellaneous Trees, Groves and Pastures

Land use in this category is decreasing continuously since the formation of the district as it is being the first victim of the population growth and conversion of other uses. This land can be increased by 0.50-1.0% by converting old fallow land in such amount of area under this category. It was proposed because it felt that it would be difficult to bring back all the old fallow land under cultivation. Reduction of such areas increases run off of rain water. Such areas are best suited for agro forestry.
6.2. Agricultural Development Planning and Management Strategies

It is mentioned earlier that cereal based cropping pattern is common in the area. Agricultural production can be increased extensively through expansion of areas under cultivation, and intensively by increasing cropping intensity or through increasing agricultural productivity.

6.2.1. Irrigation Management and Plan

Irrigation is the backbone of agriculture as the efficient use of irrigation facilities supplied by minimizing losses can be better helpful for the future of agricultural development. The district has mainly tube wells and canals are the two source of irrigation where tube wells cover more than 80% area of irrigation. The role of private tube wells are very important source of irrigation and government tube wells hardly share 5.39% of the total irrigated area in 2012. The dependency of ground water for irrigation is very high in the district. Following measures should be taken to discourage the dependency of ground water for irrigation-

1. Existing ponds and lakes should be properly managed and maintained for storing rain water to reduce the reliability of tube wells for irrigation.
2. The fallow and barren land can be used for making ponds for water storage that can be used for irrigation purpose.
3. People should be made aware about the use and importance of it.

The water resource can be better utilized by using better techniques in irrigation. Farmers should be given adequate training and financial help to adopt new techniques. Following techniques can be adopted for better irrigation prospects-

Check irrigation method is very practical method for irrigation which does not need any extra financial support. In this method the entire field is divided into number of leveled plots which is irrigated one by one in succession. Loss of water through deep percolation and surface run off can be minimized and
adequate irrigation of the entire farm can be achieved using this technique. The problem of water logging in sloppy field can be minimized using this technique.

Sprinkler irrigation can also be adopted for providing uniform irrigation throughout the farm. In this method water is spread into the air and allowed to fall on ground just like rain water. It is suitable to all types of soil except heavy clay and suitable for irrigating crops where the plant population per unit area is very high. It is most suitable for oil seeds and other cereal and vegetable crops. However it is suited for raw fields and is an expensive technique. Ordinary farmer cannot afford the initial cost.

Drip irrigation method is also very useful technique for saving water loss, can be used in the area. It is also known as trickle irrigation. This method enhances plant growth saves labour energy, improves fertilizer application efficiently and controls soil erosion. It is most suitable for raw crops like vegetables and other high value crop. However it is also a cost effective technique and without sufficient financial support an ordinary farmer cannot afford its cost.

Despite this irrigation technique mulching of field can be very helpful for checking evaporation from the field and frequency of irrigation.

6.2.2. Canal Irrigation Management

1. A parallel drain should be developed along canal network on both side to store the seepage of canal, that should be connected to other drain of the area to let the stored water pass away as water logged due to seepage causes increase of salinity and fertility loss.

2. Canal system should be developed in Bhit block as well as in the southern blocks of the region to minimize the dependency of ground water for irrigation.

3. Due to heavy silting frequent overflows occur in canal, which requires regular clearance of silt from the bottom every year before rabi irrigation.

4. Tails of most of the canals are left unconnected with natural channel causing stagnation of water in farms and results into delayed sowing and
increase in salinity. Therefore all such tails should be properly connected with the natural channel.

5. Due to cutting of canal banks at places by local people, water fails to reach tails and consequently needy areas remain unirrigated. To remove these problems a village level society should be formed under the leadership of village headman to look into such interventions and to inform irrigation authorities when such problem becomes unmanageable.

6.2.3. Integrated Pest Management

The application of pesticide is quite common in the study area. The control of pest enables a crop to yield maximum production within the limitations of its environment. Chemicals, while killing a particular pest, may destroy the natural enemies of the pest and thereby aggravate the situation. The hazards of environmental pollution, ill-effects of excess chemicals, the loss of ecological balance and the consequent danger to heath require controlled use of pesticides. It is due to application of pesticides that the insects like butterflies and glow warm are on the verge of extinction. The integrated pest management strategy aims at optimization of the natural controlling factors. The herbicides and weedicides should be promoted instead of chemical pesticides. Bio-pesticides should also be promoted. Animal urine, garlic, tobacco leaves and neem leaves can be used as bio-pesticides. The chemical pesticides should be replaced by bio-pesticides.

6.2.4. Management of Use of Fertilizers

Fertilizer is a key input for increasing agricultural production. Use of fertilizer is increasing in the study area and on the contrary the fertility status of the soil in main and micro nutrient is not good which shows that the farmers are not using it in a scientific proportion. Following measures should be taken for ideal fertilizer application

- Farmers should be made aware and encouraged about soil testing.
- Main and micro nutrient should be applied according to the guidelines given after testing of soil.
Pulses should be included in the crop cycle to increase nitrogen percentage in the soil.

Farmyard manure, bio fertilizers, green manure and vermicompost are the environment friendly fertilizers. Farmers should adopt these manures and fertilizers instead of only chemical fertilizer.

**Bio fertilizers** may be a good source for fertility supplement as it is considered as an effective, cheap and renewable supplement to chemical fertilizers. Rhizobium has been found to be affective for pulses and oilseeds. Blue-green algae are affective for lowland paddy crop. The government of India has established a national and several regional centers to provide bio fertilizers.

**Green Manure** crops are of great importance in making the farm land fertile. Green leguminous crop when they attain some height, are ploughed in the field along with their roots, stems and leaves. This helps all the nutrients the plant had obtained from the soil to go back to the soil. Nitrogen, which the bacteria at the roots of the plants had obtained from the atmosphere, is also received by the soil in the form of nitrogen. Sun hemp dhaincha, barseem and pulses like black gram, green gram, horse gram, kidney beans, cluster bean, pigeon pea and peas etc. are grouped into green manure crop.

**Farmyard manure** is very important and environment friendly source to make soil fertile. Farmland manure includes cow dung, urine of animals and straw (which is used for the purpose of sitting of animals). Almost 50 percent of the dung is in the form of protein and it takes long time to decay and plants obtain their nutrition from this material much later. The quantity of straw that is used to save urine from being lost forms great volume of farmyard manure. Human extract and urine can also be used as manure. One of the easiest methods of converting human extract is to mix it with ash in suitable amount with lime or dry soil.

**Vermicompost** is an organic manure. It is a product or process of composting biological waste material, plant residues etc. using worms.
Earthworms turn organic waste into very high quality compost. Farmers should be encouraged and trained to use vermicompost instead of chemical fertilizers.

6.3. Livestock Resource Development Planning and Management Strategies

Animals are the integral part of our eco system. As the number of livestock is reducing day by day it is the need of the hour to enhance animal husbandry in the area. This can be achieved by the incorporation of animal farm houses. It will also generate a great amount of farmyard manure that can be used in the farm for increasing productivity. Following measures should be taken to manage livestock resource-

1. The dairy can be very helpful in increasing the number of milch animal; simultaneously it will fulfill the milk demand of the people.
2. The dead animal should be buried outside the residential area to prevent diseases to spread. This will be helpful in cleaning the atmosphere and air.
3. For livestock development there is a need to increase the area under good fodder crop as well as the availability of fodder in all the seasons. In addition to lack of fodder and pasture the prevailing insanitary condition of cattle require adequate veterinary facility at the radius of 2-5 km.
4. Cross breading of the animal is all the necessary to increase good quality livestock.
5. Milk production can be enhanced in the region by rearing the cows like shahiwal, buffalos like murrah and goat like jamunapri. The rearing of many more advanced and cross breed animal should be promoted, the government can support rearers financially to adopt these varieties.
6. The farmers also require technical training for scientific domestication of these animals for commercial purpose. The size of livestock has also a serious bearing on land use. The increase in livestock means more agricultural land would be required for pasture which will put an extra pressure on agricultural land. Therefore livestock farming should be made
practical in such a way so that it can keep harmony and balance between livestock and agricultural land.

7. Cattle dung can be used for bio gas plant. Bio gas is a clean unpolluted and cheap source of energy in rural areas. It consists of 55-70% methane which is inflammable. Bio gas plant is commonly known as gobar gas plant. It not only provides fuel for cooking purpose but also organic manure for agricultural land. The animal rearer should be encouraged to adopt bio gas technique. The construction process of the bio gas plant is as follows:

First of all a pit is dug of about 10 feet deep then a water-tight cement cylinder (with brick or gravel) is constructed for the storage of slurry of cattle dung and water. Next, a wall is built across the middle, extending up from the bottom, not quite to the top. Inlet and outlet pipes are installed. The whole unit is water-tight. The cement cylinder is covered with metal cover for the storage of gas. The metal cover is connected to the gas stove in a kitchen through a rubber tube as shown in the figure 6.1.

Figure 6.1 Cross section of bio gas plant
To operate it we need to prepare slurry of cattle dung in the mixing tank which then goes down the pipe to the bottom of the one side. This side of the cylinder gradually fills and overflows to the other side. Meanwhile, the whole mass bubbles methane up to the top. It collects under the large metal cover. The gas builds pressure and can be taken off through a rubber tube to a gas stove in a kitchen.

6.4. Water Resource Development Planning and Management Strategies

6.4.1. Rain Water Harvesting

Though the area comes under safe zone in terms of ground water development but additional precautions should be taken to maintain the present water table. Rain water harvesting can be an ideal way of recharging ground water. The collection and filtering through a filter medium and percolation of rain water into the ground are the three stages of in the process of harvesting rain water. Rainwater harvesting using ground or land surface catchment areas can be a simple way of collecting rainwater. Compared to rooftop catchment techniques, ground catchment techniques provide more opportunity for collecting water from a larger surface area which needs to be developed throughout the district. Urban sewage should be prevented from entering into recharge structure. Storage tanks for rain water storage should be made compulsory as a part of building which will be very useful for reducing the dependency of ground water. The rooftop catchment and surface runoff harvesting techniques are as follows-

I. Rooftop Catchment

The rooftop catchment is cleaner when compared to ground level catchments. The roof of the house is used as the catchment for collecting rain water. It needs gutters, P V C pipes, filter unit and storage tank. Gutters are channels fixed to the edges of roof all around to collect & transport the rainwater from the roof. The rainwater is stored in the tank collected from roof through filter. For small scale water storage plastic buckets, jerry cans, clay or cement jars, ceramic jars, drums may be used. For larger quantities of water, the system
will require a bigger tank. Recharge trench, recharge pit, well or recharge shaft can also be connected to the pipe instead of rainwater collection tank to recharge ground water level using the same technique.

![Diagram of rooftop catchment system](image)

Figure 6.2

II. Surface Runoff Harvesting

Maximum rainwater flows away as surface runoff during rainy season. This runoff could be caught and used for recharging aquifers by adopting appropriate methods. Existing ponds and tanks needs to be dug deep before the arrival of rain so that maximum rainwater can be stored in it. Barren and unused land should be used as pond and tank construction to store maximum surface runoff. Ground catchment techniques provide more opportunity for collecting water from a larger surface area by retaining the flows (including flood flows) of small creeks and streams in small storage reservoirs (on surface or underground) created by low cost (e.g., earthen) dams.
6.5. Human Resource Development Planning and Management Strategies

Man as a resource plays very important role in the development of a region thus it becomes very necessary to formulate a strategy for human resource management. The proposed management plan is as follows-

6.5.1. Population Control

High growth rate of the population is the challenging problem of the area which needs to be managed. For better and effective implementation of planned programme in the district it is necessary to take some preventive measures of population growth in future. People should be encouraged to adopt family planning. Specially the poor and marginal population should be targeted for spreading awareness because they are less aware about the family planning. In order to accept the small family norm it is very much necessary to popularize the family welfare programme in rural areas with film shows, personal contact with individual families or the distribution of contraceptive among people.

6.5.2. Skill Development

Only getting educated is not enough in current circumstances. The area has a literacy of 71.20 percent in 2011 but there is huge number of unemployed population. This problem can be eradicated by skill development. It is the need of the hour to start a skill development programme in the area at local level. Job oriented education may also help in utilizing maximum human resource for constructional work. For self employment pisciculture, sericulture, horticulture, apiculture, floriculture etc. needs to be popularized in the region.

6.5.3. Health Care

Good health condition develops the working efficiency of man. A network of health care centre in the interior of the rural areas needs to be developed to avail medical facilities to each and every rural population. It will not only help in increasing health conditions of the people but also help in eradicating
superstitious thinking of the people, when many people used to go to the enchanters in absence of proper health care facilities.

6.5.4. Environmental Awareness

Our each and every action directly or indirectly effects our environment. As has been observed from survey that the perception and attitude of the people towards environment is not good so it is the need of the hour to spread awareness among people about the environmental problems. Though the government is spreading awareness through the means of communication like television and radio but there is a lack of adaptation. Meanwhile the village headman can be given the task of spreading awareness as he can monitor and suggest at local level.

Some Other Suggestion for Resource Utilization, Environmental Management and Development of the Area

- The latrine room in houses should be constructed on priority so that the use of open area for defecation should be changed and health hazard situation could be eradicated.
- Public toilets may also be constructed at the villages by gram panchayat to save our environment from faeces disposed by man in an open space.
- Unauthorized land capture of gramsabha by miscreants must be released at any cost and maintained in public welfare
- Soil testing centre should be equipped with modern techniques and more facility should be provided for soil testing as it was observed in the survey that soil test centre at Akbarpur had no facility to test micro nutrients of soil.
- To increase economic condition of the farmers, production of cash crops throughout the region needs to be encouraged. Though it is the second ranking crop in the district but it covers only 5.55% of the total sown area which needs to be expanded.
- Multiple crop combination with wheat and rice like moong, urd, arhar, potato, sugarcane etc. needs to be sown at large scale as wheat and rice are only the dominating crop of the region.
• Closed sewage system is all necessary to be developed in the area to minimize the breading of mosquitoes.
• Household waste should be disposed outside the village instead of throwing here and there so that the disease hazard caused by flies can be reduced. The non bio degradable waste like plastics should be removed from the dumping site to make it reusable as manure in the fields.

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