Small tank rehabilitation and the environment: A forgotten aspect

Anura S. Widanapathirana,
Consultant Agricultural Economist.

Small irrigation tanks which are generally known as minor schems are those with an irrigable area (command) of less than 80 hectares. Most of these tanks were constructed in the ancient times some 2000 years ago. They have been in operation since the earliest times and about 20,000 tanks originally built in the pre-christian era are in operation even now. Hence, it can be considered that small tanks are well adapted to the socio-cultural and agroecological milieu of the country since the ancient times. There have been several programmes to refurbish (rehabilitate) these schemes some of which have already dilapidated badly. The rehabilitation was attempted in the early 1970s. Since the minor tanks themselves are well adapted to the prevailing environment the need for environmental protection may not have been felt in the past. Accordingly, the past programmes have not considered the environmental dimensions in their rehabilitation. However, through recent surveys and observations in the minor schemes, it is now realized that environmental porblems are emerging which have found to be of high magnitides. It is noted that these problems are being corrected under the present National Irrigation Rehabilitation Project (NIRP) which is expected to rehabilitate over 1,000 minor tanks in the country. The NIRP is making some specific strategies to safeguard the environment in the process of rehabilitation of some selected minor schemes.

This paper discusses some important environmental issues which must be taken into consideration in the process of rehabilitation of minor schemes of the country.

Three dimensions

There are three basic dimensions to the environment of minor schemes which should be considered in the process of their rehabilitation. They are the present environmental problems, problems which might be created by rehabilitation and, strategies to rectify the existing and new problems. It is important to recognize all these dimensions which should be carefully studied in order to alleviate environmental problems associated with these schemes.

Present problems

Mainly because of the change in population and the resultant changes in the land and other resource use patterns, environmental problems of various types have emerged in the minor schemes. Existing environmental problems are varied and complex the severity of which depend on the particular status of the scheme with respect to its location and the agro-ecological area.

Catchments (area above reservoir) of most schemes are devoid of forest cover where various types of land use such as chena, plantation and housing take place. The most important environmental problem is soil erosion, be it in the catchment or adjoining areas. Poor and inappropriate land use in the upstream areas encourage soil erosion. Second, poor agricultural practies such as inappropriate use of agro-chemicals, land tilling and other in appropriate agronomic practices contribute not only to soil loss but also deterioration in the quality of irrigation and even groundwater. It is reported that in some areas, domestic and agro-wells already contain high contents of Nitrogen reglecting the poor status of Adoption of chemical fertilizer practices. Lack of tree cover is another contributory factor for the inadequate organic matter in the soils. The organic matter binds the fertilizer and other chemicals thus inhibiting their passage towards water ways. Third, removal of existing trees and almost total absence of any reforestation programmes are other factors contributing to soil erosion, distorted run off patterns and deterioration in water resources . The fourth problem is siltation of irrigation canals,

irrigable fields and on other structures thus creating additional problems and costs. Finally, in schemes located adjacent to urban and industrial centres. various types of pollutants are emitted to the irrigation canal network thus deteriorating the canal environment. For instance, a scheme adjacent to Kurunegala town is polluted with effluent emitted from a garage which has already taken all visible forms of life in the main irrigation canal. Another scheme near Gampola town is polluted from the sewerage and water used for rice parboiling. Mainly as a result of these pollutants, the canal has lost all its fish population. In Kalutara district, the main pollutant is rubber latex which is disposed into the canal system. In Kandy area, paddy husks and saw dust are the main pollutants released to irrigation canals.

Lack of social integrity among the settlers is another serious issue affecting the social environment is these schemes. In the past, people in minor systems were seen as organized groups with a high degree of cohesion. These social ties have been destroyed and several social problems are now seen in these schemes. As a result of these social pressures, there are instances where availble land and water resources have not been put into best use even when water is in abundant supply.

Problems created by rehabilitation.

As was mentioned before, protection of the environment has not received specific attention in the past rehabilitation prohects. The objective of past programmes and projects have been to complete rehabilitation without much regard for the protection of the environment. Because of this, some of the very interventions introduced through these projects have found to be causing environmental problems. Examples are borrow pits, stripping the land of vegetation and non establishment of vegetable cover, not having programmes to promote social integration, etc. The borrow pits are serious environmental hazards where rain water is collected thus acting as centres of mosquito breeding. There is not a singular project where the lost vegetable cover was established by the project itself. Social problems are created by removing such habitats as reeds and rattan areas in the vicinity of irrigation schems. These habitats offer employment opportunities for the rural people and their disappearance is considered as a serious social problem.

Because of lack of appreciation of the issues involved including the property rights and lack of beneficiary participation, there have been instances where construction of concrete structures have taken place on schemes which apparently belonged to the people. This has disrupted the social integrity of rural people in these schemes. It is still disheartenting to note that some structures constructed in early 1980 s have not been used even once up to the present time. It may be questioned whether such structures were actually required by the people. Some of them may not have the knowledge and skills in the operation and maintenance of these new structures. All of them add more confusion and serious problems of property rights have been raised.

Action Programme

Because of the seriousness of the environmental problems facing minor schemes which were in harmony with the people and nature for several centuries, it is to utmost importance to implement environmentally sound package of practices through the process of rehabilitation in future projects and programmes. The issues involved can be shown in terms of several principles.

First, a well planned programme should be worked out right from the begining with the full participation of the beneficiaries. Such a programme should invoulve awareness building, training and the provision of materials such as seedlings for the local people.

Second, a programme to minimize environmental problems should include careful planning with a thorough analysis of the existing environment, method of construction of borrow areas and how they should be treated after excavation and development and implementation of a awareness building and training programme. The analysis should include all the environmental problems and any new problems which might be creaated by rehabilitation activities should be made minimal. Adequate care must be exercised to minimize creation of new environmental problems through rehabilitation interventions. Planning should include the provision of sufficient budgetary and other support for the establishment of nurseries which should be managed by the beneficiaries themselves. Tree nurseries should be established slightly before the com-

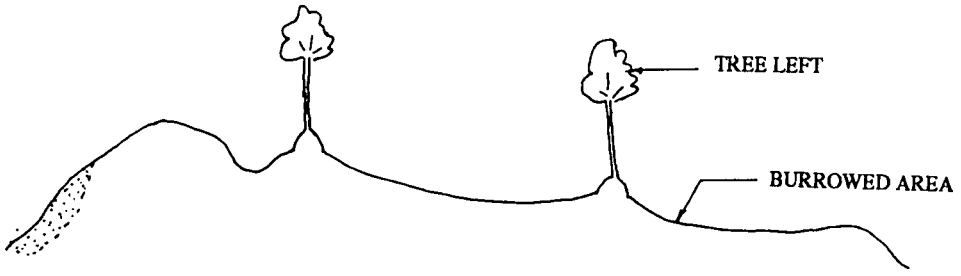

Figure 1: Leave trees behind in making borrow pits

mencement of physical work and planting coincide with the actual physical work wherever possible. By the time physical work is over the trees planted are already rooted and the resultant exposure of the soil to natural forces will be minimal with low soil displacement and protection of the environment.

Third, location of borrow pits should be such that some existing trees are left to stand on the borrow areas. These trees should not be removed during the process of excavation (Figure 1). As much as possible the removal of existing tree cover should be made minimal.

In making borrow pits, the top soil should be collected separately and the pits themselves should be constructed along the slope of the land. This will facilitate natural drainage and rain water collection could be avoided (Figure 2).

Finally, all the rehabilitation work should be planned and implemented together with the beneficiary people involved. All work should be executed by user groups. Hence, promotion of user groups should be done well before construction. Civil work should be contracted out to user groups who should be provided with training and financial management. The groups will rely on local labour in wage work compared to outside labour. Implementation of environment protection and awareness building is much more convenient, cost-effective and sustainable when implemented through user groups as opposed to working through individuals. There are some encouraging examples in this direction mainly from the irrigation sector. This principle must be followed right from the inception of the interventions.

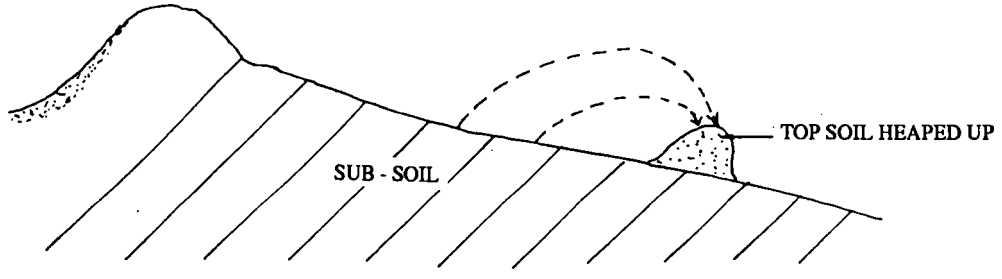

Figure 2: Top soil heaped up separately before making borrow pits

Fourth, training and awareness programmes should begin at the time of commencement of physical work which must be aimed at educating the people in protecting the environment. The educational programme should ne broad-based to cover all environment-related aspects such as fertilizer and chemical use, tree planting and aftercare, soil and moisture conservation, etc.

If the strategies discussed above are followed while taking a positive look into the environment, the environmental problems facing minor irrigation schemes could be overcome. Such a strategy should be given high priority in future development work.

Once the removal of soil is over, the top soil should be placed back and the pits closed down. The surface should be even off to facilitate natural drainage (Figure 3 and 4).

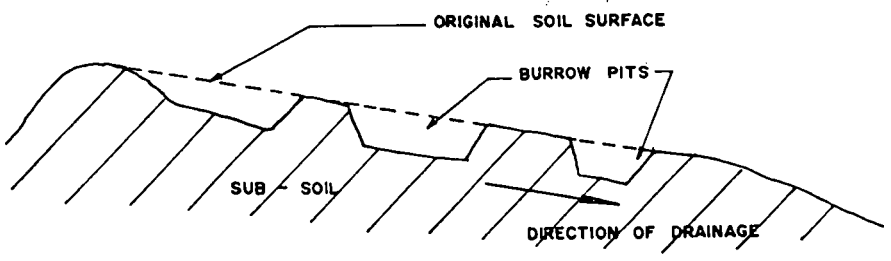

Figure 3: Make borrow pits along the slope of the land

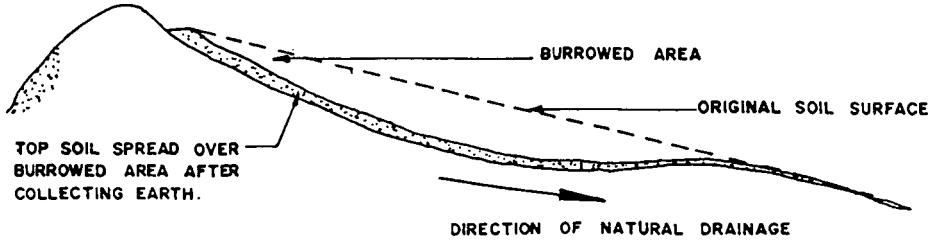

Figure 4: Smoothen the borrowed areas and top soil brought back