

## **Procedural Guidelines for Implementation of Ground Water Irrigation Schemes in Irrigation and Water Resources Management Projects (IWRMP)**

The most important strategy for groundwater irrigation component of Irrigation and Water Resources Management Project (IWRMP) will be that deep tube wells will be installed only in those areas, where STW is not technically feasible. Secondly, the Deep tube-wells will be installed in blocks or clusters only, so that a well-defined command area could be irrigated by the tube wells in the cluster. As a result, it is expected that the cost of developing other supporting infrastructures and services, such as electricity transmission and supply network, technical support services, agricultural support services, agricultural market development and others, could be optimal and more effective. However during implementation, the size of the sub-project or cluster area might vary according to the prevailing topographic and hydrological condition in the command area. The necessary infrastructures such as electrical lines, transformers, and rural roads will be developed based on the scheme and its command area. It is envisaged that the capacity building, sensitization to users and mobilization activities will be focused on this sub-project basis to implement the IWRMP more efficiently and effectively. Certain key assumptions are made to plan and implement the groundwater schemes:

- a) New groundwater irrigation development areas will be selected primarily in those areas where other sources of irrigation means are not available and/or are not adequate to achieve the level of efficiency as stipulated by the APP (1994), National Water Plan (NWP) (2005) and the Irrigation Development Vision (2005). These plan documents have envisioned year-round irrigation facility development, including conjunctive use of surface and groundwater, in the agency as well as farmers' managed surface water schemes.
- b) Based on the available data on arsenic testing in groundwater (Report on 'Sate of Arsenic in Nepal, 2003' and other recent data), Village Development Committees (VDCs), where shallow aquifers are free from arsenic contamination problem (i.e. arsenic content level below 50 ppb limit – the interim national standard for drinking water in Nepal), have been identified as the potential areas for groundwater sub-project development, both STW and DTW schemes.
- c) Because of the low capital and operating costs, the project has emphasized on developing STW sub-projects (clusters), where the tube wells will be operated by electric motor operated pumping sets. Therefore, priority will be given to those VDCs, where electricity supply system already has a full coverage, followed by those VDCs where this facility is available in parts of the VDC area.

- d) Deep tube well irrigation sub-projects will be restricted to those areas only, where shallow tube-wells are not feasible, because of their hydro-geological conditions.
- e) The groundwater sub-projects will be targeted to those rain-fed areas, where poverty stricken subsistence farmers are in a majority, and where there is a potential to make significant improvements in their living standard through STW irrigation. Integrated Social and Environmental Assessment (ISEA) survey and assessment will support such area for implementing the groundwater schemes.
- f) The STW schemes will be owned by the group of farmers (WUG) within the command area of each well (average 3 ha per STW). It will be managed, operated, repaired and maintained by the group members itself.
- g) Once the schemes are constructed, the DTW schemes will be commissioned to the respective WUGs (farmers within the command area of 30 ha of each well), who will bear the responsibility of managing, operating, repair and maintaining the schemes at their own cost. These WUGs will be registered at the respective GFOs, as per the existing Irrigation Policy and Irrigation Regulation.
- h) In each sub-project (i.e. cluster), all the WUGs within the sub-project area will form a Water Users' Association (WUA) with the representation from each WUG. As per the existing Irrigation Policy and Irrigation Regulation, the WUAs will be duly registered at the District Water Resources Committee and will operate as the umbrella organization of the groundwater irrigators for collective effort in agricultural development in the area.
- i) The project has also envisaged incorporating programs to enhance the capacity of the farmers and the local workshop technicians in repair and maintenance of the electro-mechanical equipment of the tube-well systems.
- j) In all the sub-projects, the Integrated Crop and Water Management Program (ICWMP) of the component D of the IWRMP will be implemented for agricultural economic development in the areas.

### ***Process and Steps for Implementation of the Ground Water Irrigation Schemes:***

**Step 1 HYDROGEOLOGICAL STUDY/CLUSTER IDENTIFICATION:** Based on the available hydro geological data, existing surface & GW irrigation schemes, and the availability/proximity of the support infrastructures such as electric power, rural road, agro-markets and agricultural support services, the GFO

identifies the cluster areas suitable for STW/DTW sub-project development. The MIT provides assistance to the GFO, if necessary.

**Step 2** **INFORMATION DISSEMINATION:** The GFO, after consulting with the DADO, disseminates information to the VDCs of the identified clusters about the IWRMP and its implementing procedures. VDC officials and the farmers obtain the full details about the project from the GFO and discuss among themselves about participating in the project. The RID keeps inventory of the existing clusters and update data on groundwater resources availability in the area/district. Local NGOs/CBO will be involved in sensitizing the farmers and group formations for DTW sub-project formulation. They will assist and support the farmers to form ad-hoc WUA committee.

**Step 3** **APPLICATION:** Farmers hold discussions among themselves, assisted by NGOs, and organize into groups (for each DTW/STW cluster) and form an ad-hoc WUA Committee for each cluster (i.e. sub-project). The WUA together with the GFO will delineate the cluster area, whose sizes will be 300 ha each. The size of the area may be compromised if there are genuine constraints from physical, technical and social aspects. The WUA prepares its program, completes the APPLICATION FORM and submit it along with the up-front cash deposit to the GFO. The first installment of (Rs.200 per hectare) up-front cash will be 0.5% of the total cost of the DTW/STW system. The sub-project will provide 11 KV Rural Electrification and Access Road Improvement in 3000 ha STW cluster area at project cost whereas WUA will drill STW, install 4 inch casing pipe along with, filter, pump, motor and 440 volt LT line from 11 KV HT line at their own cost. The GFO assists the sub-project area farmers in this process. The GFO receives the APPLICATION FORM along with the up-front cash, and screens all the forms thus received to verify that they meet the requirements of selection criteria for identification study. The GFO, with assistance of the DADO, selects the clusters for sub-project identification studies, and informs SAC/DDC of the selection list.

- Step 4** **SUBPROJECT IDENTIFICATION:** The GFO, the DADO/ASC and Sub-project staff visit the cluster sites, collect the relevant data and prepare IDENTIFICATION REPORT for each cluster. The GFO discusses the Identification Reports in the Sub-project Appraisal Committee (SAC), and prioritizes the clusters for further studies. The MIT provides assistance, if necessary. The respective WUA ad-hoc committee liaises with the sub-project identification team and discusses the project proposals during this stage. NGOs/CBOs will facilitate the GFO and farmers in the identification activities.
- Step 5** **FEASIBILITY STUDY:** The GFO/RID prepares Feasibility Study programs for the prioritized clusters, and conducts detailed feasibility study after obtaining approval from the RID. This may be conducted by the GFO itself or may use the service of the local consultant. The WUA Ad-hoc committee members and the farmers are actively involved with the feasibility study team in collecting data, conducting surveys, and in designing and estimating the cost of the sub-project. All the pre-existing irrigation and drinking water ground water schemes will be tested for arsenic content in their groundwater and will be an integral part of the feasibility report. The feasibility report will contain a detailed project design, including the design and cost for electricity supply network in the ground water development sub-project area. The feasibility study will be supported by lithologic investigation by investigative slim hole in the sub-project area. In case of the DTW sub-projects, this investigation should indicate good potential of deep aquifers, but not the shallow aquifers. IEE/EIA assessment would be carried out according to the prevailing guidelines mentioned as per integrated social environmental management framework (ISEMF). The MIT and RAD staff will provide technical support and assistance to the feasibility study team of the GFO or the consultant. Prepares the Integrated Social Environmental Management Plan in consultation with the ad-hoc WUAs and NGOs to find the social and environment dimensions of the sub-project areas defining marginal, subsistence farmers, disadvantaged groups, gender issues and environment problems.

- Step 6 APPRAISAL:** SAC appraises the Feasibility Study Reports and recommends to the RAC for approval. The MIT/RID team appraises the feasibility report by checking the detailed designs, drawings, and cost estimates, supported by site verification. The WUA and the farmers assist the field survey team and confirm the proposed project design, and the project sites. If found necessary, the MIT/RID may suggest for additional surveys and for upgrading the feasibility study report. The TA team undertakes technical review of the sub-project feasibility report and endorses it. With the endorsement of the TA Team and the recommendation of the MIT/RID, the SAC submits the sub-project report to the RAC. The appraisal document from RAC shall be sent to GWRDP for review before approval by PICC through OPD.
- Step 7 INTENSIVE INFORMATION DISSEMINATION, FARMERS' MOBILIZATION & ORGANIZATION:** Once the sub-project is approved by the PICC, the GFO mobilizes the NGO for intensive information dissemination to the beneficiary farmers in the sub-project area. The WUA plays an active role in this activity, and it is the main responsibility of the NGO that they provide full details about the project and mobilize the farmers into forming the WUGs. The farmers obtain all the information about the project and its implementation procedures and organize themselves into the Water User Groups (WUGs). The GFO approves the groups after field verification.
- Step 8 RESOURCE MOBILIZATION:** In case of DTW, the WUA deposits the balance amount of the up-front cash to make deposit of 0.5% of the total cost of the DTW system, whereas in case of the other ground water development schemes, the full cost of well drilling, installation of well with pipe, filter and the LT 440 V electricity connection and electric pumping set, will be borne by WUA where the project will provide 11 KV HT rural transmission line and rural access road to these cluster area of about 300 ha at project cost. The GFO prepares sub-project implementation plan, together with the WUA,

DADO, NGO and other stakeholders. The RID approves the implementation plan and includes in the annual work plan.

**Step 9      FORMALIZE FARMERS' ORGANIZATION AND PARTICIPATION:**

The NGO sees that the WUA finalizes its constitution by the general assembly of all the members, and that the WUA is registered. In this process, the TA team, GFO and DADO/ASC also provide necessary technical and advisory assistance. The WUA then signs a memorandum of understanding with the GFO in front of the general assembly for the implementation of the sub-project in the area.

**Step 10     COST ESTIMATION, APPROVAL AND TENDER DOCUMENT**

**PREPARATION:** After RAC and PICC approval, GFO informs the RAD, DADO, DDC and the WUA about the approval of the sub-projects. The GFO then discusses the final cost estimate, including the cost sharing arrangements, with the WUA, to which, the WUA and its members agrees. The invitation of tender bid, their evaluation and award of contract will be carried out as per the rules and regulations of the government of Nepal.

**Step 11     CONSTRUCTION:** The GFO starts the construction works only after ensuring that the WUA has deposited a total of 15% of the total cost, cash and kind combined, in case of DTW subproject, while in the case of other ground water subproject, full cost of drill, installation of casing pipe filter pipe line with centrifugal electric pumps, LT electricity connection, will be born by WUGs through WUA. The project will provide full cost of HT transmission line and access rural road to cluster area. The up-front cash will be collected from WUG and deposited in the joint account of GFO and WUA. The civil construction work may be contracted out or may be done by force account. The GFO staff supervises the drilling works; tube well testing, pump installation, power supply line and other civil works. The WUA also forms a construction supervision committee, which supervises all tube well and civil

work construction, pumping set and electric fittings suppliers, and ensures their quality before the payment to the contractor or the suppliers. *In case of the ground water development schemes, the respective water user groups (WUGs) will drill well, install casing pipe, filter and purchase the pumping set and install LT electricity connection at their cost.*

**Contract Commissioning:** Any piece of contract, when completed should be commissioned by GFO technical staff in association with WUA and contractor within the liability period of contractor. Contractors would rectify the defects noticed duly.

#### **Step 12**

**COMMISSIONING:** The GFO, DADO/ASC staff and the WUA and the beneficiary farmers make a walkthrough of the system and identify the defects and operational problems. The WUA certifies that all facilities constructed and installed are working properly. The GFO prepares a completion report and WUA signs the certificate of completion for the work, and informs the MIT, which is entered into the MIS system for record.

#### **Step 13**

**OPERATION & MAINTENANCE:** The WUA of the DTW sub-projects gets back its 0.5% cash amount deposited as up-front cash, and deposits in a bank account as the seed money for future O & M. From this time on, the WUA assumes the full responsibility of all future operation and maintenance of the tube well system, pumping sets and electric components of the pumping system. In case of the other ground water development schemes, once the scheme is complete, the system becomes the property of the group, and their maintenance and repair will be the responsibility of the group members. The groups will be encouraged to set up a repair and maintenance fund, for which the project will provide support in their capacity building. With the assistance of the DADO, NGO and the GFO, WUA and its member farmers strengthen their linkages with the private workshops, and agricultural support service

providers. The GFO, DADO, NGO and TA play advisory roles to help in developing capacity of the WUA in O & M and water management aspects. When necessary, these agencies organize appropriate training programs. The GFO arranges budget for unforeseen remedial measures, such as due to disaster and other eventualities. The Integrated Crop Water Management program under IWRMP will be activated in those areas for overall agriculture production enhancement activities.

**Step 14**

**RESULT FRAMEWORK AND MONITORING:** The Result framework and monitoring of component A (Groundwater) defining project development Objective. Internal Outcome indicators, Baseline survey, Target values, Data collection and reporting and use of intermediate Outcome Monitoring to verify the timely and satisfactory completion of component A. The responsibility for data collection and reporting will be done by IDD/IDSD, GFO and WUA. GWRDP shall be responsible for monitoring ground water (GW) sub-projects. Monitoring and Evaluation system shall comply participatory methods leading to participatory monitoring and evaluation.

## **Flow Chart for Implementation of Groundwater Irrigation Schemes under IWRMP**

