Guidelines for Implementation of Schemes and Projects on Sustainability under Accelerated Rural Water Supply Programme (ARWSP) & Prime Minister's Gramodaya Yojana (PMGY) – Rural Drinking Water

DEPARTMENT OF DRINKING WATER SUPPLY
MINISTRY OF RURAL DEVELOPMENT
GOVERNMENT OF INDIA

W-11052/ 02/ 2000 – TM-II

Government of India

Ministry of Rural Development
Department of Drinking Water Supply

9th Floor, Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi – 110 003

Dated: October 24, 2000

Guidelines for
Implementation of Schemes and Projects on Sustainability under Accelerated Rural Water Supply Programme (ARWSP)
&
Prime Minister's Gramodaya Yojna (PMGY)–Rural Drinking Water

1. Introduction

1.1 Under Rural Water Supply Programme, Government of India provides assistance to States/ UTs for making provision of portable drinking water in the rural habitations of the country. To implement the same, in the year 1999, Government of India issued detailed **Guidelines for implementation of Rural Water Supply Programme.** Acknowledging the necessity of sustainable water supply source, provisions on sustainability of sources have been made under para 7.1 and 7.2 of the Guidelines.

1.2 As is well known, ground water is the principle source of drinking water in the rural habitations of the country and almost 85% of the rural water supply is dependent on ground water. It has also been observed that in many such habitations, due to excessive drawal of ground water, environmental degradation and poor recharge , at many places sources are becoming dry and thus systems become defunct. It has also been observed that in many areas, it leads to emergence of quality-related problems like excess fluoride , iron and arsenic contamination, and salinity ingress in the drinking water sources. It has also been seen that due to depleting ground water table, after a gap of few years, once fully covered habitations again become no source habitations. In such instances, all this leads to wastage of precious public investment.

1.3 Starting from year 2000-2001, a new initiative in the from of Prime Minister's Gramodaya Yojana (PMGY) has been started. Under PMGY, Rural Drinking Water is one of the components. **Guidelines on Prime Minister's Gramodaya Yojana – Rural Drinking Water** have been issued separately. Acknowledging the problem of sources and systems becoming defunct and sustainability of these sources and system emerging as a major issue, it has been decided to earmark 25% of the 20% fund for Sub-Mission projects under Accelerated Rural Water Supply Programme (ARWSP) and 25% of Prime Minister's Gramodaya Yojana –Rural Drinking Water in water stressed areas, for taking up projects/ schemes on Sustainability.

2. Rationale

2.1 The recent resolve of the Government of India to provide drinking water source in all habitations of the country in five years and the recurrence of drought in many parts of the country has necessitated the urgency to lay renewed emphasis on sustainability of sources. There are many factors responsible for sources becoming defunct and dry, viz.

2.1.1 competing demand of ground water for irrigation, industrial and other purposes,
2.1.2 excessive drawal of ground water without taking into consideration the recharge,
2.1.3 low electricity tariff for agricultural and industrial use,
2.1.4 lack of scientific input and management of ground water,
2.1.5 misuse of precious water and treating it as a free, ever lasting commodity,
2.1.6 lack of applying sustainability principle in drawal of ground water etc.

2.2 The rapid and accelerated drawal of ground water in the country has led to alarming decline in ground water level in some areas and consequent stress on ground water resources. The tube well and pump technology has been responsible for raising agricultural production and meeting the demands for domestic and industrial water needs. Over–exploitation of ground water and non-completion of surface water schemes have resulted in marked lowering of ground water levels. In certain parts of the country, ground water levels are depleting rapidly, thereby also causing adverse environmental impact. This has resulted in imbalance of the ground water at such places resulting in threat to ground water sustainability. The situation can be retrieved by launching massive rainwater harvesting, ground water recharge and water conservation programmes throughout the country.

2.3 In the report on **Ground Water Resources of India** brought out by the Ministry of Water Resources, Government of India in 1995, the status of ground water development and exploitation in the country has been analysed. According to this Report, out of 5,165 blocks in the country, 247 blocks have been declared as **over – Dark.** Further, NABARD has also completed the list of **Dark, Grey** and **White** category of Blocks / Mandals / Talukas / Watersheds and it has placed 603 Blocks /

Talukas / Mandals / Watersheds under **Grey** category.

2.4 The over riding considerations in favour of a well-planned and regulated development of ground water is.

2.4.1 protection of source against over-exploitation;

2.4.2 protection of source against quality degradation; and

2.4.3 socio-economic equity in ensuring guaranteed minimum provision to al sections of the community.

2.5 It is common knowledge that water supply is a State subject. Accordingly, Government of India has been pursuing with States the need and urgency for water conservation and ground water recharge. Some of the alternative techno-economically feasible options for ensuring sustainability of the sources include rain water harvesting , conservation and recharge of ground water and these can be attempted through a variety of techniques.

2.6 The projects/ schemes on sustainability of sources have been taken up under Mini-Mission and Sub-Mission progarmmes of the RGNDWM. At present, such projects/ schemes can be taken up under Sub-Mission on Sustainability component of ARWSP. However, it has been felt that sufficient projects/ schemes are not being covering Not Covered (NC)/ Partially Covered (PC) habitations , tackling quality related problems etc. takes precedence over long-term solution i.e. sustainability. Although guidelines issued in 1999 provide for sustainability of sources, but it has also been felt that these require to be further elaborated.

3. Strategy

3.1 To achieve the goal of sustainability of sources, following strategy shall be adopted.

3.1.1 Treating water as a economic resource instead of a free commodity and ensuring participation of local commodity in planning , development , and implementation of projects/ schemes relating to water supply.

3.1.2 Encouraging States/ UT's to adopt and implement Model Bill to regulate and control development of ground water especially in water stressed areas.

3.1.3 Planning and implementation of water supply schemes/ projects and ground water management based on the principle of sustainability.

3.1.4 Making ground water recharge compulsory in ground water based water supply schemes and wherever possible, only replenished amount of ground water should be extracted. Concept of water auditing on the line of natural resource auditing should be introduced in the water supply projects/ schemes.

3.1.5 Gradual withdrawal of all subsidies relating to water supply to industry, irrigation and agricultural sector.

3.1.6 Intensive awareness generation on the necessity of conservation of water and encouraging adoption of self-regulation amongst community through extensive Human Resource Development (HRD)/ Information , Education and Communication (IEC) programmes.

3.1.7 Monitoring of ground water level twice a year (pre and post monsoon period) to

3.1.8 Dual water supply in critical areas by reserving fresh/ treated water exclusively for drinking and cooking.

3.1.9 Revitalisation of traditional system of water harvesting involving community/ NGOs, civil society, Panchayati Raj Institution (PRIs).

3.1.10 Institutionalising community based rain water harvesting by including sense of ownership for sufficient and effective operation and maintenance of water harvesting structures like check-dam , percolation pond , etc.

3.1.11 According priority to watershed development and management , and promoting conservation of forests as it accelerates ground water recharge.

4. Formulation of projects/ schemes on Sustainability

4.1 In such a vast and diverse country like India, it is very difficult to prescribe uniform guidelines for taking up schemes/ projects and activities for sustainability of sources as agro-climatic conditions, hydro-geology of the regions, local traditions and customs vary. However, some broad principles can be followed and taken into consideration while planning , implementing and managing rural water supply programmes and Sub-Mission on Sustainability. Broadly, following principles should be followed to achieve sustainability of sources:

4.1.1 While formulating a project / scheme for portable rural water supply, participation of local community in planning, implementation, operation and maintenance should be ensured. Preference should be given to locally manageable and sustainable schemes/ projects in terms of system and sources.

4.1.2 In projects/ schemes based on ground water , emphasis should be given to ensure that only replenishable amount of water is drawn and in-built provision is made in the project/ scheme itself for ground water recharge at least equivalent to drawal. Like in forest management where harvesting is limited to only annual growth and capital stock is left untouched, the same principle should be applied for the exploitation of ground water, while formulating rural water supply schemes.

4.1.3 In water stressed and quality affected areas, every effort should be made to switch over to dual water supply system under which safe and treated water is made available for drinking and cooking purposes, and for other purposes, supply of water is met from other sources.

4.1.4 To meet supplementary domestic requirement , efforts should be made to harvest rain water and, store and use the same.

4.1.5 Acknowledging the primacy accorded to provision of drinking water and thus, to protect and enhance the life of existing water supply systems especially in water stressed areas, State Governments/ PRIs should regulate exploitation of ground water for purposes, other than drinking water especially in close vicinity of existing drinking water supply source.

5. Implementation of projects/ schemes on Sustainability

5.1 For implementation of projects/ schemes/ activities under Sub-Mission on Sustainability, following broad guidelines should be followed.

5.1.1 From 2000-2001, 25% of the 20% of the fund earmarked for Sub-Mission programme under ARWSP i.e. 5"% of the total fund available under ARWSP, should be spent on ground water recharge / rain water harvesting etc. Similarly, under Prime Minister's Gramodaya Yojana - Rural Drinking Water in water stress areas, 25% fund has been earmarked for taking up projects/ schemes on rain water harvesting , artificial recharge and sustainability. The fund of these schemes can be utilised on such sources, which are (to be) used by general public without any restriction. No fund out of this programme should be spent on taking up words on sources owned by individuals/ a family.

5.1.2 While taking up projects/ schemes for sustainability of sources, following factors should be taken into consideration :

i. water availability
ii. favourable topography
iii. physiography and hydrogeological setup
iv. infiltration and percolation characteristics of vadose zone
v. hydrologic characteristics of the aquifers such as capacity to store, transmit and yield water
vi. techno-economic feasibility, etc.

5.1.3 All possible efforts should be made to protect traditional drinking water sources used as public sources and in case such sources have become defunct/ dry, wherever possible, such sources should be rejuvenated and projects/ schemes can be taken up under Sub-Mission on Sustainability.

5.1.4 People should be encouraged to explore various technological options for ground

water recharge and rainwater harvesting to select most appropriate one to undertake the same according to their local requirement.

5.1.5 All such programmes/ projects and schemes on Sub-Mission should be implemented with active participation of local community and traditional knowledge and wisdom practiced in the region should be utilised to the maximum extent possible.

5.1.6 While selecting the technology for sustainability of sources, to the extent possible , efforts should be made to identify, adopt and adapt such technologies, which can be managed, implemented, operated and further expanded by local people / community.

5.1.7 While taking up projects/ schemes under sustainability, techno-economic viability of the project should be carried out to decide about the best available option to take up rainwater harvesting/ water recharge.

5.1.8 Operation and maintenance (O&M) is of critical importance for efficient functioning of any water supply system. However, activities taken up for sustainability of sources and system are generally aimed at source augmentation for sustained yield and increasing the life span of source. The dividing line in between operation & maintenance and rejuvenation and revitalization of source is very thin and blurred. There is a close linkage between sustained availability of the source and sustained functioning of the system. Under Sustainability, it is envisaged that routine repair works, activities relating to general operation and maintenance will not be taken up and only such activities/ works would be taken up, which lead to increase in sustained yield and augment the source. Under Sustainability, to harvest rainwater and ground water recharge, following works can be taken up, though the list is only illustrative and as such not exhaustive;

i. Nalla bunding:

Nalla bunds are constructed across bigger streams/ nallas to conserve the water

ii. Contour bunding:

Contour bundiing is a watershed management practice to build up soil moisture storage. It is to arrest run-off through bunds connecting equal ground elevations referred to as contours.

iii. Contour trench:

Contour trench is the reverse of the bund. Trenches are excavated at different contour levels to conserve the run off in trenches, facilitating percolation of stored water underground.

iv. Gully plugging:

Gully plug, as the name implies is a small conservation structure across small gullies and streams in hilly areas to slow the run-off of the flowing water.

v. Check dams:

Check dams are constructed across small streams, having a gentle slope and are feasible both in hand rock and alluvial formation.

vi. Pits and shafts:

Recharge pits and shafts are usually adopted for effecting direct point recharge and are highly relevant from recharge point of view of spot sources. Even defunct dug-wells can be converted into recharge pits.

vii. Basin/ percolation tanks:

Percolation tanks, located at hydro-geologically favourable points are conservation structures aimed at including maximum percolation of harvested rainwater.

viii. Surface Channels:

Surface channel is a technique for including appreciable percolation of stream flow underground by suitable modification in the channel pattern.

ix. Ground water dams:

Groundwater dam is to check-dam with the difference that the dam is constructed below ground to conserve mainly sub-surface flow (ground water). These are also known as underground Bandharas and Sub-surface Dylces.

x. Injection wells:

Injection wells are similar to conventional tube wells but designed with the specific purpose of directly augmenting ground water storage of an over exploited aquifer (generally a confined aquifer-under pressure).

xi. Connector wells:

Connector wells are specifically designed structures to facilitate recharge of highly stressed aquifer by transfer of water from a comparatively less stressed/ surplus aquifer through appropriate connection.

xii. Storage tanks:

Storage tanks through conventional or specially designed structures are used generally for storing rainwater.

xiii. Dug well recharge:

To rejuvenate and supplement open wells, clean rainwater is directed into such wells after tasking necessary steps to prevent silt, pesticides, other pollutants etc.

xiv. De-siliting of tanks:

Desiliting and deepening of existing tanks/ ponds would not only augment storage but also induce augmentation of ground water.

xv. Roof top harvesting:

Roof top harvesting is a technique to collect rainwater specially designed roof tops for storage and to use in future.

xvi. Inter watershed transfer:

Inter watershed transfer is a concept similar to inter – basin transfer of water. It is possible to increase the catchment storage through diversion of water from perennial streams from a nearby watershed.

xvii. Gabion structure:

Gabion structure is a type of check dam constructed across small nalla to conserve flow of water in such a way that no submergence takes place beyond the nalla course. Locally available boulders packed in a steel wire mesh are placed across the nalla.

xviii. Village tanks:

Village tanks can be gainfully used as recharge structures by de-siliting and by providing appropriate modifications like cut-off trench in the upstream side.

xix. Bore hole flooding:

Bore hole flooding is a direct sub surface recharge technique. While attempting the technique, proper care should be taken to ensure compatibility of quality of feed water with source water quality for achieving optimum recharge.

xx. Stream augmentation:

Stream augmentation is a direct surface technique and is achieved through suitable modification in the stream channel , like widening , leveling , etc , aimed at spreading the flow over a large area.

xxi. Aquifer modification:

Aquifer modification is a technique to replace less permeable formation material like clay/ slit by permeable like sand/ gravel/ pebble at the top to facilitate maximum recharge. In case of hard rocks, the same objectives is achieved by bore hole blasting / hydrofracturing techniques.

xxii. Ditch and Furrow:

Ditch and Furrow methods are recharge techniques adopted generally in areas with uneven topography and attempted through flat bottomed and closely spaced

ditches/ furrows.

xxiii. Surface spreading:
Surface spreading is the most popular and cost effective method for undertaking sub-soil recharge of shallow aquifers.

xxiv. Jacket well technique:
Jacket well technique is adopted to increase the yield of dug well by increasing its effective diameter through drilling of shallow small diameter bores (100 mm) around the well in a circular pattern.

xxv. Trench-cum-filter bore well technique:
It is another method adopted for augmenting ground water storage like constructing a series of trenches (2m X 2m) cum filter bore hole (150m X 2m) along the streambed.

xxvi. Rainwater recharged bore well technique:
This technique is adopted in foothill zones, utilising the hill slope run off by recharging the boreholes through slotted casing pipe provided at the top portion.

xxvii. Revival & revitalization of wells:
In case of old wells, which require revival and are used as a public source, works relating to revival and revitalization can be taken up. Under this repair works should not be taken up as there is a provision for taking up repair works under Operation & Maintenance (O&M) of ARWSP.

5.1.9 Restoration, revival, revitalization and upgradation of existing/ traditional rain water harvesting structures viz. tanks, khadins, bawli, bavdi, kund, kundi, kuttais, ovu, chappris, chuhi, deir, dhab, dong, gangvo, garanda, go, kunta, honda, jhalara, jhalars, jheel, kadahu, khup, khola, kohar, nadis, ahars, dug-cum-embankment type of water harvesting structures, bandharas (weirs), kohapur type open weirs, repat, revu, sagaira, kua, tadaka, tamparas, tataka, vapi, village ponds, stoen lined tanks, ooranies, anekola, anaikkatu, bandha, etc. can also be taken up under the sustainability.

5.1.10 Under Sustainability, schemes can also be taken up for developing such sources, which may have been taken up under any other scheme and / for any other purposes, but it has subsequently been decided to use the source exclusively for drinking and domestic purpose.

5.1.11 Under Sustainability, all such activities/ works, which are pre-requisite to take up sustainability projects/ schemes can also be taken up. These activities are as under.

i.) basic surveys including contour survey, hydro-geological, hydrological surveys, remote-sensing surveys, soil classification and land capability analysis.

ii.) monitoring, using satellite imagery at regular intervals to evaluate impact of recharge structures on the overall sustainability of source,

iii.) specific design analysis or resolution of specific technical problems through research/ action/ operational research assignments, and

iv.) such other technical inputs as well as help to achieve better results for all or any of the activities mentioned above.