

**DEPARTMENT OF AGRICULTURE
MINISTRY OF AGRICULTURE & FORESTS
ROYAL GOVERNMENT OF BHUTAN**

**NATIONAL IRRIGATION POLICY
(REVISED 2012)**

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Acronyms, Abbreviations

DAO	Dzongkhag Agriculture Officer
DoA	Department of Agriculture
IWRM	Integrated Water Resource Management
M&E	Monitoring & Evaluation
MoAF	Ministry of Agriculture & Forests
MoWHS	Ministry of Works & Human Settlements
NIP	National Irrigation Policy
PES	Payment for Environmental Services
QQTP	Quantity Quality Time Place
R&D	Research & Development
RDC	Regional Development Centre
RGoB	Royal Government of Bhutan
RIWaM	Regional Irrigation & Water Management
RNR	Renewable Natural Resources
RUB	Royal University of Bhutan
SMART	Specific Measurable Attainable Realistic Time bound
WUA	Water Users Association

Glossary

Chuzhing	Terraced land for paddy cultivation
Dzongkhag	Administrative unit – District
Dzongkhag Tshogdu	District Development Committee
Geog	Administrative unit – Block
Geog Tshogde	Block Development Committee
Kamzhing	Dry land

1. Preamble

1.1 Purpose

This is the revised National Irrigation Policy (NIP) of the Royal Government of Bhutan (RGoB), and is intended to provide policy direction in the irrigation sub-sector to address its current and future issues. It provides clear direction on the measures that need to be adopted to increase the irrigated area and to improve irrigation water management and optimal utilization of national water resources for crop production.

1.2 Rationale

The current NIP (1992) is biased towards open-channel irrigation systems that are solely designed for paddy cultivation. The policy emphasizes more on community participation for construction and maintenance of these systems, and does not provide clear directions for a holistic irrigation development. Water resources development other than diversion of streams, improved water management practices and different irrigation technologies which are essential for sustainable irrigation systems and improved crop production have not received proper attention. Further, the policy ignores the importance of irrigating crops (mainly cash crops) other than paddy in increasing rural livelihoods and income. Despite the abundance of water resources at the national level a significant proportion of the arable land remains under rain-fed conditions while about 10% of the irrigation systems are non-functional. Research on on-farm water management and irrigation initiated in the early 2000s has not taken off well due to lack of adequate trained professionals and financial resources. Irrigation technology and on-farm water management have not improved much and remains rudimentary.

Since 2002 certain institutional changes have impacted on irrigation development. Increasing decentralisation has decentralised planning, management and monitoring of development activities to local government namely the Dzongkhag Tshogdu and Geog Tshogde. Within the Ministry of Agriculture & Forests the responsibility of implementing NIP at the field level has been transferred from the erstwhile irrigation engineers to agriculture extension staffs after the engineering units run independently by sectors were consolidated into a single engineering sector in the Dzongkhags. This change has had a drastic impact on irrigation development because the irrigation engineers trained and experienced with NIP implementation no longer are necessarily mandated to implement the NIP. Engineers in the Dzongkhags also no longer have the required capacity to better plan and design irrigation projects. The irrigation sub-sector is also inadequately funded and coordination and M&E is not effectively carried out. The roles and responsibilities of the main coordinating and implementing agencies namely the Engineering, Agriculture and Horticulture Divisions (more recent) of the MoAF at Head Office and other agencies like Dzongkhags and Geogs vis-à-vis irrigation are not clearly outlined.

Legislation enacted after 1992 has impacted irrigation development procedures. Among the legislations, the Bhutan Water Policy (2003), Land Act of Bhutan (2007) Environmental Assessment Act (2000), Cooperatives Act of Bhutan (Amendment 2009), Water Act (2010) and the Local Governance Act (2009) are the main ones. The NIP risks being non-compliant, reiterative and confrontational with provisions of these Acts.

The numerous inadequacies outlined above demonstrate the pressing need to revise the current NIP, which will provide a proper framework and direction for irrigation development in the near future.

2. Legal and Policy Environment

The **Land Act of Bhutan (2007)** maintains the provisions of the Land Act (1979) on management of irrigation water including water allocation and maintenance of channels. It requires that water allocation and mobilisation of labour for maintenance of irrigation be in accordance with the size of land holdings.

The **Bhutan Water Policy (2003)** focuses on conservation of water resources and integrated water resources management. It also emphasizes that water allocation to the agriculture sector must be compatible with the objective of food security. It stresses on achieving efficiency in irrigation through applied and adaptive research. The Policy also suggests pricing policies to serve as an economic instrument to enhance efficiency of water use.

The **Water Act (2010)** specifies that irrigation water will be managed under the coordination of the Ministry of Agriculture and Forests as the Competent Authority. Water management will be organised on an integrated river basin level to achieve economic efficiency, social equity and environmental sustainability. The Act provides that proponents intending to abstract water for large schemes without obtaining environmental clearances and those not adhering to the “polluter pays” principle will be prosecuted according to the Penal Code of Bhutan. It further stresses that irrigation schemes will be managed by self-governing rules and regulations of WUAs, and that WUAs have to be registered with the Competent Authority. Harvesting of groundwater, rainwater, fog and any other sources is encouraged to prevent local and seasonal water scarcity.

In terms of water use, the Act accords second priority to irrigation after drinking water. Prior approvals from the National Environment Commission are required for larger schemes enlisting water use by conjunctive water users along the water course. The Act protects customary water rights and practices in vogue in that it gives them recognition if there is sufficient water available and if the rights are equitable and fair. Quantity of irrigation water for allocation as well as labour contribution for scheme maintenance will be based on size of land holdings. Moreover, new users intending to acquire water for their land from an existing WUA will receive water only if it is adequate at source.

The **Cooperatives Act of Bhutan - Amendment (2009)** and the **Cooperatives Rules & Regulations of Bhutan (2010)** provides for WUAs to be registered with the Competent

Authority (either the Planning Officer at the Dzongkhag level or the Geog Administration Officer at the Geog level) within 6 months of formation as a Farmers Group.

The **Local Governance Act (2009)** decentralises planning, management of implementation and Monitoring & Evaluation (M&E) to local governments namely the Dzongkhags and Geogs exercised through the Dzongkhag Tshodus and Geog Tshogdes respectively. With this, irrigation development among other activities will also have to be planned, the implementation coordinated and monitored by Geog Tshogdes.

The Environment Assessment Act (2000) establishes procedures for the assessment of potential effects of strategic plans, policies, programs and projects on the environment. It also has provisions for determination of policies and measures to reduce potential adverse effects and promote environmental benefits. The Act also identifies agricultural effluents in water having a deleterious impact on the health of people drinking water from shared water courses.

The **Environmental Protection Act (2007)** provides for the establishment of an effective system to conserve and protect environment for regulation and promotion of sustainable development in an equitable manner. It also rules that no person shall discharge or emit or be permitted to discharge or emit any pollutants in excess of such standards as may be prescribed. The Act asks for the establishment of standards for emission or discharge of environmental pollutants from various sources. It also ensures that only reasonable amounts of water for environmental flows to protect fresh water biodiversity for maintenance of ecosystem functions.

The **Forestry & Nature Conservation Act of Bhutan (1995)** prohibits blocking, storing or diverting any river, stream, irrigation channel, waterfall, underground water source or any other water source or water course. The Act also prohibits disposing garbage or other waste material, and polluting any water source or water course. Further, the Act restricts felling of timber and extracting timber within 100 feet of the bank or edge of any river, stream, water course, or water source.

3. Problem Statement

1. Irrigation development and management is characterized by low levels of investments, lack of clear long term development plans and lack of water storage systems to enable temporal availability of irrigation water. These lead to low production levels and low productivity of agriculture crops.
2. Support by the Department of Agriculture in capacity building for scheme management is inadequate and hence many water user associations are not well organized resulting in poor management of irrigation schemes and early scheme failure.
3. Many irrigation structures are poorly designed and constructed mainly due to shortage of engineers for proper planning, designing and adequate supervision. Further, beneficiary contribution of labour is also poor due to farm labour shortages. These have inevitably led to poor quality schemes that are highly prone to damage during peak monsoons and high water demand periods. Irrigation schemes are also often washed away during natural calamities rendering them unusable when most required.
4. There is limited technical knowledge, awareness and capacity leading to poor design and construction, and hence unsustainable irrigation schemes.
5. The awareness, practice and enforcement of catchment protection and management and monitoring are poor, and accordingly there are limited resources allocated for catchment management. This has led to conflicts among conjunctive water users/uses from a common source. Pollution of water by agro-chemicals has not been assessed so far. Therefore, there is a need to implement proper catchment management and monitoring. There is also a need to create awareness and implement Payment for Environmental Services (PES).
6. Water at the channel and on-farm are not managed efficiently resulting in land degradation and water wastage, consequently reducing water and crop productivity. The impact is pronounced in areas that face seasonal reduction in water quantity at the source (s).
7. Low cost alternative irrigation technologies yet to be explored in Bhutan although potential exists.

4. Principles

The National Irrigation Policy of Bhutan (2010) is based on the following principles:

- i) Community participation for irrigation development to instil a sense of ownership of irrigation schemes;
- ii) Equitable allocation of available water ;
- iii) Diversification of irrigation for crops grown on both *Chuzhing* and *Kamzhing*;
- iv) Assured irrigation water supply for *Chuzhing* cultivation and protection of prime agriculture land;
- v) Optimal utilisation of alternate water resources for irrigation;
- vi) Enhance water management and productivity;
- vii) Environmental responsibility in irrigation and drainage;
- viii) Revitalised institutional arrangements for improved irrigation services delivery
- ix) Inter-sectoral planning and management of water resources based on Integrated Water Resources Management principles;

5. Scope

The NIP applies to all irrigation schemes in the country.

6. Vision

A stable and productive agriculture sector with dynamic and sustainable irrigation systems that enhances food security and stimulates economic growth.

7. Objectives

The Policy objectives are:-

1. To accelerate investment in the irrigation sector for the achievement of national food self-sufficiency and food security goals;
2. To empower beneficiaries through a farmer-centered approach for effective participation at all levels (planning, implementation, operation and management);
3. To pursue new approaches to sustainable irrigation infrastructure development and maintenance;
4. To pursue environmentally sustainable IWRM approach in irrigation development;
5. To ensure reliable and efficient water use for intensification and diversification of irrigated crop production;
6. To delineate institutional roles and strengthen institutional capacity at all levels for the planning, implementation and management of irrigation development;

7. To strengthen technical support services and to develop, promote and disseminate new practices, innovation and technologies that are appropriate, manageable and affordable;
8. To strengthen implementation of Monitoring & Evaluation system.

8. Policy Statements

Policy objective 1: **To accelerate investments based on identified needs in the irrigation sector for the achievement of national food self-sufficiency and food security goals.**

Statement 1.1 An Irrigation Development Master Plan shall be developed.

Statement 1.2 Increase and sustain investment in irrigation. This will be done through a double pronged approach of mobilising resources by the Ministry of Agriculture & Forests (RGoB) and through demand creation by the agriculture sector at Dzongkhag and Geog level in Dzongkhag Tshogdu and Geog Tshogde.

Statement 1.3 Alternative water resources like water harvesting, groundwater, pumping water from major rivers and linking up with future hydro power projects to use water stored in reservoirs for irrigation shall be explored and mainstreamed. Coordination by the Ministry of Agriculture & Forests with the Ministry of Economic Affairs and other stakeholders for exploring the feasibility and use of water from hydro-power reservoirs for irrigation will be strengthened.

Policy objective 2: **To empower beneficiaries through a farmer-centred approach for effective participation at all levels (planning, implementation, operation and management).**

Statement 2.1 The Department of Agriculture shall facilitate and support formation of functional WUAs among the beneficiaries through capacity development. The Department of Agriculture shall update the NIP guidelines (modules).

Statement 2.2 The beneficiaries shall register with the Competent Authority in accordance with the Cooperatives Act of Bhutan (2009). The Department of Marketing & Cooperatives will facilitate registration of WUAs as farmer groups at national level through necessary rules and regulations.

Statement 2.3 The Department of Agriculture in coordination with the Department of Marketing & Cooperatives, through Dzongkhag and Geog authorities, shall monitor the status and functioning of WUAs.

Policy objective 3: **To pursue new approaches to sustainable irrigation infrastructure development and maintenance.**

- Statement 3.1* Appropriate irrigation technologies shall be tested and promoted.
- Statement 3.2* To ensure sustainability of the irrigation schemes proposed, feasibility studies (technical feasibility, social and economical benefits) shall be done one year before implementation.
- Statement 3.3* The cost of all new irrigation scheme constructions shall be borne by RGoB and implemented by the project executing agency of the RGoB.¹
- Statement 3.4* For renovation of schemes, the project executing agency of the RGoB shall provide wages for skilled labour, materials, and their transportation to construction sites. The unskilled labour shall be provided by the beneficiaries based on the principle of equity and; depending on their capacity to contribute and fund available for their scheme.
- Statement 3.5* Routine maintenance shall be taken up by WUA.
- Policy objective 4:** **To pursue environmentally sustainable IWRM approach in irrigation development.**
- Statement 4.1* Catchment and water management principles shall be integrated with overall irrigation development. Farmers shall be trained and informed on the advantages of good catchment management practice, including effective catchment protection.
- Statement 4.2* Irrigation water (effluent discharges) quality standards shall be developed by the Competent Authority stipulated in the Water Act (2010), for dissemination and compliance.
- Statement 4.3* IWRM approach in irrigation development shall be implemented. Where applicable Payment for Environmental Services will be facilitated at a river basin or watershed level among irrigation and other conjunctive users of water.
- Statement 4.4* Environmentally-friendly measures in planning, construction and management of irrigation schemes shall be followed.

¹ Dzongkhag & Geog administrations, Department of Agriculture etc.

- Policy objective 5: To ensure reliable and efficient water use system for intensification and diversification of irrigated crop production.**
- Statement 5.1* Appropriate conveyance technology shall be promoted to reduce water wastage; and awareness on proper on-farm water management shall be created, including Statement 1.3.
- Statement 5.2* Water management research shall be carried out by RDCs in close collaboration with RUB and best-practice results disseminated and adopted.
- Statement 5.3* New technologies for irrigation diversification beyond paddy crop, with appropriate incentives and support to farmers shall be promoted.
- Policy objective 6: To strengthen institutional capacity at all levels for the planning, implementation and management of irrigation development.**
- Statement 6.1* Regional Irrigation and Water Management (RIWaM) unit shall be instituted under the existing RDCs to co-ordinate, facilitate and support irrigation development in the Dzongkhags.
- Statement 6.2* Sufficient, qualified and trained staff shall be placed at all levels, especially at the local level for planning, implementation and management of irrigation development.
- Statement 6.3* It shall be ensured that units involved in irrigation development are adequately equipped with material and logistical resources to enable them to effectively carry out their responsibilities.
- Statement 6.4* Institutional arrangements for irrigation services delivery particularly at dzongkhag level vis-a-vis other engineering services and the MoWHS shall be reviewed. Stakeholders at all levels participating in irrigation development will be responsible and accountable in delivery of services for irrigation development.
- Policy objective 7: To strengthen technical support services and to develop, promote and disseminate new practices, innovation and technologies that are environmentally sustainable, appropriate, manageable and affordable.**
- Statement 7.1* Capacity development of engineers at all levels in irrigation survey, design and estimation on all irrigation technologies shall be built.
- Statement 7.2* Research, development and promotion of more efficient and appropriate technologies such as water harvesting, groundwater, pumping water from major rivers and hydro-power reservoirs, drip and sprinklers shall

be carried out.

Policy objective 8.1: To strengthen implementation of Monitoring & Evaluation system.

Statement 8.1 The dzongkhags are principally responsible for development of irrigation facilities in their area. As such they will be responsible for monitoring and reporting on the irrigation activities and facilities under their jurisdiction.

Statement 8.2 A comprehensive inventory of irrigation in the country shall be carried out and maintained. The RIWaM instituted at the regional RDC shall be mandated to monitor and evaluate the irrigation schemes and the functional status of WUA in collaboration with Dzongkhags.

Statement 8.3 Additional indicators on irrigation and NIP implementation in the design of the M&E system shall be incorporated.

9. Implementation Arrangements

The Ministry of Agriculture & Forests is mandated with irrigation development in the country. Irrigation is not only about building infrastructure but encompasses management of irrigation systems by water users for enhanced crop productivity to achieve food security and livelihood goals. It, therefore, requires a multi-sectoral approach combining the inputs of engineering, agriculture extension, and water and agricultural research. This section delineates the roles and responsibilities of various stakeholders at different levels.

9.1 Roles and responsibilities of stakeholders

Stakeholder	Roles and responsibilities
<i>Gross National Happiness Commission</i>	<ul style="list-style-type: none"> • Overall national planning • Resource mobilization and allocation for irrigation development • Monitoring & evaluation of irrigation policies, plans and programmes
<i>National Environment Commission</i>	<ul style="list-style-type: none"> • Competent Authority for the enforcement of Water Act • Provide guidance and coordinate integrated water management at watershed and river basin levels • Coordinate with MoAF to frame and disseminate rules and regulations of the Water Act related to irrigation • Provide standards and guidelines on agricultural effluents in water • Mediate conflicts related to irrigation water if referred to the Commission
<i>Ministry of Agriculture & Forests</i>	<ul style="list-style-type: none"> • Lead and coordinate irrigation policy formulation and strategic planning at the RNR sector level • Represent irrigation and the RNR sector in the National Water Committee/Commission and other relevant fora • Facilitate the formulation of rules and regulations for irrigation development as required by the Water Act • Facilitate sourcing, soliciting and mobilization of funds for irrigation development • Allocate and distribute human resources equitably and adequately • Strategic planning of watershed management (IWRM principles) including the coordination of effective protection of catchments and land use at national level • Review and evaluate effects and impacts of legislation and policies related to irrigation
<i>Department of Agriculture/Engineering Division</i>	<ul style="list-style-type: none"> • Strive for sustainable irrigation development in the country • Plan and coordinate implementation of the irrigation programme • Initiate and promote appropriate irrigations systems, diversify and adopt innovate and environmentally friendly approaches to enhance crop productivity • Institutionalise R&D on irrigation and water management • Facilitate compliance with agricultural water effluent standards • Promote environmentally sustainable IWRM approaches

- Develop adequate and competent human resources for effective implementation of the irrigation programme
- Ensure dissemination and implementation of the National Irrigation Policy
- Review and update the NIP Procedural Manual
- Plan and implement all large irrigation schemes including those that the Dzongkhags do not have the capacity for.
- Provide technical support to Dzongkhags for irrigation development
- Monitor and evaluate irrigation programme and NIP at the national level
- Issue Environmental Clearance for construction of irrigation schemes

*RNR Research
& Development
Centers/RIWaM*

- R&D of appropriate irrigation technologies in collaboration with other research institutes both in the country and region
- Research and dissemination of good water management practices
- Develop extension manuals for proven good water management practices and technologies
- Disseminate and implement the National Irrigation Policy and its Procedural Manuals in the region
- Planning and development of all large irrigation schemes and centrally executed irrigation projects in the region
- Provide technical support to Dzongkhags for irrigation development
- Provide training to Dzongkhags based on a capacity needs assessment
- Monitor and evaluate irrigation programme and NIP at the regional level
- Submit quarterly progress reports to the Department

*Dzongkhag
Agriculture
Sector*

- Overall coordination of the irrigation programme in the dzongkhag
- Create awareness on NIP and provide advice on criteria to be fulfilled for government assistance in irrigation during Dzongkhag Tshogdu (DT) meetings
- Facilitate and provide technical backstopping in identification and appraisal of irrigation programme in the dzongkhag
- Enforce, implement and monitor NIP and its Procedural Manual in the dzongkhag
- Promote appropriate irrigation technologies and good water management practices in the dzongkhag
- Coordinate skill development activities for staff and farmers related to irrigation and NIP in the dzongkhag
- Take lead coordination role in preliminary investigations and multi-disciplinary feasibility studies
- Facilitate registration of WUAs
- Monitor and evaluate the irrigation programme in the Dzongkhag
- Compile and submit quarterly progress reports to the Department
- Create and maintain an inventory of irrigation schemes in the Dzongkhag

*Dzongkhag
Engineering
Sector*

- Responsible for irrigation engineering services in the dzongkhag
- Provide technical inputs in preliminary investigations and multi-disciplinary feasibility studies
- Carry out detailed survey, design, drawings, estimates and bill of quantities of feasible irrigation schemes

- Tendering and contract administration of new irrigation constructions
- Constructions supervision and quality control
- Facilitate outsourcing of irrigation engineering services to private sector in the dzongkhag
- Submit physical and financial progress report to DAO for onward submission to Department of Agriculture (DoA)
- Monitor and evaluate irrigation construction programmes

*Geog
Agriculture
Extension
Officer*

- Assist communities in identification of irrigation schemes for construction/renovation
- Create awareness on NIP and provide advice on criteria to be fulfilled for government assistance in irrigation during Geog Tshogde (GT) meetings
- Liaise with the GT in planning, execution and monitoring of irrigation schemes
- Implement and monitor NIP and its Procedural Manual
- Promote appropriate irrigation technologies and good water management practices
- Collaborate with RNR RDCs in research activities on irrigation and water management
- Coordinate skill development activities for farmers and WUA members
- Take lead role in preliminary investigations and multi-disciplinary feasibility studies
- Process for environmental clearances
- Facilitate the drafting and finalization of WUA Constitution & By-laws by WUA
- Facilitate registration of WUAs
- Compile and submit monthly progress reports to the Dzongkhag
- Create and maintain an inventory of irrigation schemes of the geog
- Monitor and evaluate the irrigation programme
- Assist in the day-to-day supervision of irrigation construction and renovation works

*Geog
Tshogde/LG*

- Plan, mobilize funds and implement irrigation projects in accordance with NIP, Guidelines and its Procedural Manuals
- Coordinate with DAO, DE and EA for planning and implementation of irrigation projects
- Day to day monitoring of irrigation projects
- Formation and strengthening of WUAs
- Registration of WUA as a cooperative

10. Way Forward

On approval of the NIP, within 2011, the following tasks will be implemented by the Department of Agriculture led by the Agriculture Division with support from the Engineering Division:-

1. Drafting of Guidelines to operationalise the NIP
2. Revision of the NIP Procedural Manual
3. Sensitisation at all levels on the revised NIP
4. Training of implementing agency staff on NIP and irrigation development
5. Implementation of NIP

11. Monitoring & Evaluation

It is imperative that irrigation development is subjected to intensive monitoring and evaluation to provide an assessment of the situation analyses and projections to future attainment of development in the sector. The system is to be instituted at various levels in order that there is logical progression of information produced at one level and used at a higher level for decision-making as well as a feedback system from higher level to producers of the M&E data.

Central to this system is the definition and use of good indicators conforming to SMART (Specific, Measurable, Attainable, Realistic and Time bound) and QQTP (Quantity, Quality, Time, Place) principles. These indicators will be used to collect data and monitor level of improvement over the baseline condition, for which a baseline survey is necessary. A comprehensive irrigation development inventory will serve as the baseline. Training of data managers on the M&E system and training of data collectors at the Geog, Dzongkhag, RDC, Agriculture Division and Engineering Division will be a necessary and useful investment.

12. Definition

Irrigation: Within the context of this policy, Irrigation is defined as a system consisting of structures and facilities for conveying water from a source to the agricultural field which the local community/group collectively operate and maintain for their common use.

Routine maintenance: it shall include activities such as clearing canals/pipes of vegetation, sediments, repairing minor damages to canal embankment, gates, intake structures that can be performed by the beneficiaries without external assistance.