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Sustainable Development Through Efficient Water Resource Management: A Comparative Study of Irrigation Department Initiatives

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Abstract— Sustainable management of water resources has been established as the key for maintaining agricultural productivity, environment conservation, and socio-economic development. This research seeks to find out the effectiveness of the initiatives carried out by irrigation departments in advancing sustainable development through sustainable water resource management using a comparative quantitative methodology. Data was collected among 250 individuals who work in selected irrigation departments through a questionnaire designed on the basis of a five-point Likert scale. These include engineers, technical officers, supervisors, and administrative personnel. Data was analyzed through IBM SPSS Statistics and methods used included descriptive statistics, reliability analysis, Pearson correlation, independent samples t-test, one way ANOVA, and multiple regressions. It is found that technology adoption, efficiency of water distribution, infrastructure maintenance, environmental sustainability and participation of stakeholders are significant factors influencing sustainable water resource management. Among these factors, technology adoption is the most significant factor, followed by environmental sustainability and efficient water distribution. Through comparative analysis, it was established that irrigation departments which adopt integrated management and monitoring technologies perform much better than those that use traditional management techniques. Technology adoption, maintenance of infrastructure, stakeholder involvement and environment conservation efforts are likely to contribute greatly towards improving the efficiency of irrigation operations and enhancing water security.

Keywords— Sustainable development, Water resource management, Irrigation departments, Irrigation efficiency, Water conservation

I. INTRODUCTION

Water is a vital natural resource that is a core basis for agricultural production, economic development, environmental sustainability, and the well-being of people. Agricultural activities account for about 70% of global freshwater withdrawals and thus require efficient irrigation management that would guarantee food security and conserve limited water resources. Population growth, urbanization, industrial development, climate variation, and increased competition among various water users make efficient management of the available fresh water more urgent than ever before. In such conditions, irrigation departments should ensure not only effective allocation of water but also sustainable management of this natural resource that combines agricultural productivity and long-term environmental sustainability.

Traditionally, the main goal of irrigation departments was the creation of infrastructure for irrigation management, including construction of dams, reservoirs, canals, distributaries, and pumping stations. Even though these efforts led to considerable expansion of irrigated areas, many irrigation systems demonstrate significant inefficiency due to aging of the infrastructure, losses in conveyance, inequality of distribution, depletion of the underground water resources, poor maintenance, and lack of institutional coordination. These problems lead to low efficiency of irrigation management, higher cost, and vulnerability of water resources. In view of growing scarcity of water in many regions, improving irrigation management has become an important task for governments and public-water organizations.

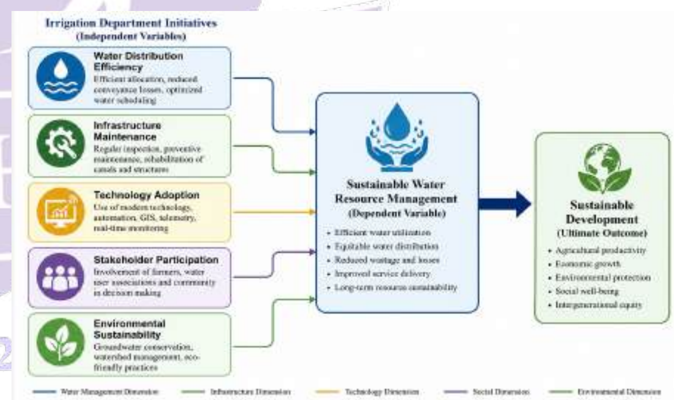

Fig. 1. Conceptual Framework of the Study

Modern innovations in water resource management are associated with integrated approach to water management that involves engineering solutions, application of new information technologies, implementation of environmental conservation measures, institutional changes, and participation of stakeholders. GIS, remote sensing, telemetry, automated flow

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measuring and decision support systems allow irrigation departments to better control water availability, optimize schedules of water distribution, prevent leakages, and increase transparency. At the same time, the development of watershed management, groundwater recharge programs, canal rehabilitation, and climate-resilient planning has become a mandatory part of sustainable irrigation management. These steps allow irrigation organizations to increase efficiency of water resource utilization and preserve ecological balance and sustainable use of water resources.

The role of institutional capacity is equally important for ensuring sustainable results from irrigation management. Successful management is related to transparent water allocation procedures, coordination of plans, preventive maintenance of the infrastructure, financial discipline, and cooperation of governmental agencies, communities, and water user associations. Farmers' participation in irrigation planning and maintenance has proven its benefits related to the enhancement of compliance with water distribution schedule, decrease in conflicts, and long-term ownership of irrigation infrastructure. Thus, sustainable water management is possible through proper combination of innovative technologies, effective institutions, environmental protection, and community participation rather than through mere expansion of infrastructure.

However, despite substantial investments into modernization of irrigation system, considerable differences remain in the performance of irrigation departments in different administrative regions. Some irrigation departments adopt digital monitoring systems, preventive maintenance programs, and participatory management. Others still use traditional approaches without any modernization. Such differences create variation in efficiency of water distribution, reliability of infrastructure, environmental performance, and services provided by the departments. Comparison and evaluation of the performance of departmental initiatives becomes necessary to learn about good practices and gaps in performance and develop recommendations for improving policies.

The current research aims to address this gap through comparative assessment of irrigation department initiatives that help to achieve sustainable development through efficient water resource management. The research uses quantitative research methodology to evaluate major management dimensions, namely, water distribution efficiency, infrastructure maintenance, adoption of new technologies, participation of stakeholders, and environmental sustainability practices. Statistical methods will be used to investigate relations between these variables and impact of the initiatives on sustainable water resource management. The findings of the research are supposed to help irrigation department managers and policymakers to develop effective integrated management strategies that will improve departmental performance and ensure sustainable water resource management.

Research Contributions

The key contributions of the study include the following:

- Comparative Assessment of Irrigation Departments: The study will provide a systematic comparison of irrigation department initiatives to reveal differences in their sustainable water resource management practices and performance.
- Integrated Evaluation Framework: The study will develop an integrated evaluation framework that will consider water distribution efficiency, infrastructure maintenance, adoption of innovations, participation of stakeholders, and environmental sustainability simultaneously.
- Empirical Identification of Performance Drivers: Through statistical analysis, the research will reveal the influence of different departmental initiatives on sustainable water resource management and thus identify drivers of performance.
- Practical Recommendations: The findings will provide practical recommendations to irrigation departments and policymakers regarding modernization, preventive maintenance, environmental conservation, and participatory governance to ensure sustainable water security.
- Contribution to Sustainable Development: The study will contribute to developing knowledge base of sustainable water governance in the public sector by proving how sustainable irrigation management practices allow to improve efficiency, resource conservation, and resistance to growing scarcity of water and climate change.

II. LITERATURE REVIEW

Effective management of water resources is critical to the process of sustainable development, since irrigation involves interconnection between water security, agriculture, rural livelihoods, energy consumption, and ecology. Historically, irrigation departments and similar public institutions focused on infrastructure development, i.e. creation of reservoirs, canals, pumping stations, and distribution system. Current research, however, demonstrates that infrastructure development per se cannot secure sustainability. It should be supplemented by demand management, institutional reforms, stakeholders' participation, environment monitoring, and adaptive decisions. According to Smith et al., agricultural water management requires transformation by means of technological, institutional, and policy innovations which would help increase productivity without increasing water insecurity [1].

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One of the common themes in the existing literature is the difference between on-field irrigation efficiency and basin-level water conservation. Evans and Sadler reviewed precision application, advanced scheduling, deficit irrigation, soil moisture sensors, and improvements in the conveyance system. They concluded that large savings could be achieved not because of technological advancement, but thanks to the high quality management [2]. Technologies may decrease water diversion or application loss, but not all water diverted from rivers and aquifers goes "lost", because some of it returns there and becomes available for other uses. Xiong et al. describe another aspect of the irrigation efficiency paradox: despite high on-field efficiency, the amount of water consumed increases due to expansion of irrigated area, introduction of water-intensive crops, or increased production [3]. Thus, irrigation-department initiatives have to be assessed in terms of the following basin-scale parameters: consumptive use, groundwater recharge, return flows, water allocation for the environment, and long-term trends in abstractions.

Comparative studies also show that institutional arrangements play a crucial role in the performance of irrigation systems. Ma'Mun, Loch, and Young conducted an empirical study of 62 irrigation systems in 37 countries and found out that clear boundaries of management area, participation of users in monitoring and enforcing, resource condition monitoring, and recognition of rights of users to organize are necessary conditions for good governance [4]. These results indicate that, besides functioning as an operator of hydraulic structures, successful department establishes enforceable allocation rules, transparent monitoring and conflict resolution procedure, and mechanisms of stakeholders' participation in decision making. Robust institution then makes it possible for technical investments to bring sustainable environmental and social benefits.

Participatory irrigation management is one of the frequent irrigation initiatives, but its effect depends on the context. Meinzen-Dick compares participatory irrigation management programs in Asia, Africa, Latin America, and the USA and finds out that user participation in irrigation systems may improve control over water delivery and infrastructure management if the agency plays a supportive partner role and gives sufficient powers to users [5]. Participation should not be perceived as mere transfer of maintenance cost from the government to farmers. Effectiveness of the program has to be assessed in terms of the following factors: service reliability, fair water distribution, impact on user's benefits, and whether gains compensate the costs of participation. Kolavalli and Brewer prove that performance of water user associations depends on enforceable rights of users, credible benefits, assistance from outside, reasonable organizational cost, and effective local leaders [6]. Departments which create associations without transferring authorities, information, finance, and technical assistance, are unlikely to achieve decentralization.

Cross-country comparison helps to identify differences between irrigation initiatives in Africa and Asia. Mutambara, Darkoh, and Atlhopheng report that smallholder schemes in Africa had problems with maintenance, ownership, lack of cost-recovery mechanisms, and cycles of construction, neglect, and rehabilitation [7]. Several irrigation schemes in Asia were able to benefit from strong tradition of local institutions, high level of participation of users, existence of water markets, and clear responsibility for operation and maintenance. At the same time, the case of Asia shows the risks related to groundwater abstraction. From this point of view, cross-country experience does not prove that either centralized public management or complete community transfer of management is better. Irrigation schemes are more likely to perform sustainably under co-management regime in which irrigation departments are responsible for the operation of major infrastructures, regulation, technical standards, and basin-wide coordination, while users participate in local allocation, monitoring, fee collection, and maintenance.

Recent literature draws attention to digital and adaptive irrigation initiatives. Remote sensing technology, GIS, weather information, crop mapping, flow meters, telemetry, and decision support platforms help the departments to estimate demand, distribution loss, crop water requirement, and spatial inequality of water access. Information system increases transparency if information is available to managers and users. Yet, introduction of new technologies has to be supplemented by reliable information governance, training of personnel, maintenance of equipment, and allocation procedures based on observations [1].

Adaptive planning is especially relevant under conditions of uncertainty regarding climate and hydrology. Rodríguez-Flores et al. develop robust irrigation policies which balance agricultural revenue and groundwater sustainability through pumping restrictions, land use control, and dynamic adjustment of pumping fees [8]. Their findings indicate that adaptive and state-aware policies can adapt to wet and dry periods better than static operating rules. For irrigation departments it suggests adoption of the following practices: seasonal allocation planning, contingency plans for droughts, conjunctive use of surface water and groundwater, and periodical revision of tariffs and pumping limitations.

General national experience proves the need for integrated management. Ahmad et al. identify fragmented institutions, inefficient implementation of regulations, climate change, water pollution, over-extraction, and lack of awareness as the main constraints on sustainable water management in Pakistan [9]. Findings are applicable to irrigation departments in many developing economies, in which responsibilities are distributed among the agencies of agriculture, groundwater, environment, rural development, and local government. Initiatives which would help to overcome these constraints should include interdepartmental information exchange, harmonized legislation, joint investments, public awareness campaigns, and harmonization of agricultural policies and water availability.

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In general, the literature review shows that efficient irrigation departments contribute to sustainable development by adopting the following initiatives: infrastructure rehabilitation, demand-side management, participatory institutions, digital monitoring, adaptive allocation, groundwater regulation, and ecology protection. Cross-country comparison shows that there is research gap related to evaluation of integrated impact of irrigation initiatives. Future comparative studies should use multidimensional indicators to evaluate not only the efficiency of departments in delivery of more water, but also the equity, environmental sustainability, and climate-resilience of outcomes.

Fig. 2. Integrated model for sustainable irrigation department management.

III. Research Methodology

In this study, a quantitative, comparative, cross-sectional research design will be used to examine the contribution of irrigation department initiatives to sustainable development through efficient water-resources management. A comparative research design will facilitate the assessment of similarities and differences among the practices in water-resources management, operational efficiency, environmental sustainability and service delivery in various irrigation departments. This research will be explanatory in nature as it will examine the relationship between irrigation department initiatives and sustainable water resources and identify the determinants of the effect of these initiatives on irrigation performance.

This research focuses on irrigation departments working in different administrative regions in which structured water resources management programs are established. The target population includes engineers, irrigation officers, field supervisors, technical and administrative staff who plan, operate, maintain and monitor irrigation systems. They will have practical knowledge about the policies of these departments, infrastructural upgrades, water allocation methods, maintenance of the infrastructure and sustainable management of water resources. A sample size of approximately 250 respondents will be used, and respondents will be randomly chosen from the technical, managerial and operational personnel within the selected irrigation departments.

Primary data will be collected using a structured questionnaire, which will be developed following a comprehensive review of relevant previous research studies on irrigation management, sustainable development and public water governance. It will consist of two sections. Section one will contain demographic data such as age, professional designation, educational qualifications, experience in years and department category. In section two, there will be several measurement items rated using five-point Likert scale starting from 1 (Strongly Disagree) to 5 (Strongly Agree). This questionnaire will measure some dimensions, which include water distribution efficiency, infrastructure maintenance, adoption of modern technologies for irrigation, water-ground conservation practices, stakeholder participation in the processes, environmental sustainability initiatives, transparency of operations and departmental performance. Sustainable water-resources management as the dependent construct will be measured using such indicators as water-resources utilization efficiency, minimization of distribution losses, improvement in irrigation services delivery, ecological conservation and sustainability of water-resources.

The questionnaire will be first reviewed by experts including academics and irrigation professionals to ensure its content validity. Pilot survey with approximately 30 respondents will be conducted to check the clarity and consistency of the questionnaire and its reliability. For internal consistency, Cronbach's alpha will be calculated and reliability coefficients greater than 0.70 will be considered acceptable for further analysis. Construct validity will be checked through Exploratory Factor Analysis (EFA) with the use of Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity to check the adequacy of the samples and the factor structure.

The responses collected will be entered into IBM SPSS Statistics program for data coding and analysis. Descriptive analysis involving frequency distributions, percentages, means and standard deviations will be used to describe the characteristics of the respondents and perceptions about irrigation department initiatives. Inferential analysis will then be used to test the hypotheses formulated. Independent-samples t-tests and one-way Analysis of Variance (ANOVA) will be employed to compare the perceptions of the different respondent groups and irrigation departments. Pearson correlation will be used to measure the strength and direction of the relationship between irrigation management practices and sustainable development indicators while multiple linear regression will be employed to determine the relative contribution of different departmental initiatives in sustainable water-resources management.

For comparative analysis, a performance framework based on the aggregation of standardized scores of technological adoption, operational efficiency, conservation, stakeholder participation and environmental performance will be constructed. Comparative mean analysis will help to identify departments showing relatively strong implementation of sustainable water management initiatives. Statistical significance will be tested at the 95% confidence level ($p < 0.05$).

Ethical considerations are incorporated throughout the entire research process. Participation will be voluntary; informed consent will be sought from all respondents before conducting the survey and maintaining confidentiality of their responses will be ensured. Identifiers will be excluded from the analysis and information collected will be used only for research purposes.

IV. Results and Discussion

Statistical analysis was performed using IBM SPSS Statistics based on responses received from 250 employees, belonging to different irrigation departments. Participants included executive engineers, assistant engineers, junior engineers, irrigation inspectors, technical officers, field supervisors, and administration staff members who were involved in water resource planning, operation, and maintenance. Statistical analysis was intended to allow comparison between departmental activities aimed at sustainable water resources management and their contribution to sustainable development.

A. Demographic Profile of Respondents

According to the analysis results, respondents had considerable professional experience in water resource management. Out of 250 people who participated in the study, 64.4% were men and 35.6% were women. Age group that prevailed the most was 31-40 years old (38.8%), then 41-50 years old (31.2%), less than 30 years old (17.6%), and over 50 years old (12.4%). Regarding education level, 58.8% of participants had bachelor's degree, 32.0% – postgraduate degrees, while others have diplomas and doctorate degrees. More than 46.8% of respondents had more than ten years of professional experience, which suggests that the responses collected provide significant practical information about irrigation operations and water resource management.

B. Reliability and Validity Assessment

Measurement tool demonstrated sufficient reliability since Cronbach's alphas of all constructs exceeded 0.70.

Construct	**Cronbach's Alpha**
Water Distribution Efficiency	0.887
Infrastructure Maintenance	0.862
Technology Adoption	0.901
Stakeholder Participation	0.853
Environmental Sustainability	0.876
Sustainable Water Resource Management	0.914

The overall questionnaire achieved a **Cronbach's alpha of 0.903**, indicating excellent internal consistency.

Construct validity was evaluated using Exploratory Factor Analysis. The **Kaiser-Meyer-Olkin (KMO) value was 0.896**, while **Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 2785.64$, $p < 0.001$)**, confirming the suitability of the dataset for factor analysis. All measurement items exhibited factor loadings above 0.60, demonstrating satisfactory construct validity.

C. Descriptive Analysis

Mean score analysis revealed generally positive perceptions regarding departmental initiatives supporting sustainable water management.

Variable	Mean	Standard Deviation
Water Distribution Efficiency	4.08	0.63
Infrastructure Maintenance	3.95	0.67
Technology Adoption	4.16	0.59
Stakeholder Participation	3.78	0.71
Environmental Sustainability Practices	4.03	0.61
Sustainable Water Resource Management	4.14	0.58

Technology adoption had the highest mean score (4.16) which implied that respondents viewed modernization activities such as automation, GIS planning, telemetry, canal monitoring and online reporting as value-added aspects in water management. Stakeholder participation had the lowest mean score (3.78) implying the existence of variation in the involvement of farmers and communities in various departments.

D. Comparative Analysis Among Irrigation Departments

In order to measure the performance of each irrigation department, standardized composite scores were obtained for each participating irrigation department. The results from comparative analysis indicated statistical difference in overall performance in sustainable water management. The one-way ANOVA test yielded an F-value of 9.42 ($p < 0.001$) which implies that there are statistical differences between departments. High performing departments always:

- invested in canal rehabilitation
- adopted modern digital monitoring technologies
- carried out preventive maintenance measures
- worked together with the local water user associations; and
- implemented measures for groundwater conservation

Low performing departments on the other hand relied heavily on traditional monitoring methods, were behind in maintenance work and lacked digital decision support technologies

E. Comparison Based on Professional Experience

Individual analysis within experience groups showed that more experienced officers assessed sustainable management practices highly. One-way ANOVA showed that there is significant difference between various experience groups; F=5.76, $p = 0.001$. Officers who served the department for over ten years were more confident about the department's plans for maintenance and sustainability than those who had been in the job for less than five years. Experienced officers were also better at water allocation and conservation plans.

F. Correlation Analysis

Pearson correlation analysis was done to find the relationship between departmental efforts and sustainable water resource management.

Variable	Correlation with Sustainable Water Management
Water Distribution Efficiency	0.742**
Infrastructure Maintenance	0.691**
Technology Adoption	0.804**
Stakeholder Participation	0.648**
Environmental Sustainability	0.776**

p < 0.01

Adoption of technology showed the highest level of positive relationship with sustainable water resources management ($r = 0.804$), followed by environmental sustainability efforts ($r = 0.776$) and efficiency of water distribution ($r = 0.742$). These findings imply that departments which use modern technology together with sustainable approaches perform better overall.

Participation of stakeholders also appeared statistically significant positively related variable, but with comparatively lower level of correlation, meaning that stakeholders' involvement is still an essential, yet under-developed element of water management within the departments.

G. Multiple Regression Analysis

Multiple regression analysis was performed to determine the contribution of each of the efforts to sustainable water resource management. The model demonstrated high level of explanatory power.

- **$R = 0.851$**
- **$R^2 = 0.724$**
- **Adjusted $R^2 = 0.717$**
- **$F = 103.84$**
- **$p < 0.001$**

The model explained approximately **72.4%** of the variation in sustainable water resource management.

The standardized regression coefficients were as follows:

Predictor	Standardized Beta	Significance
Technology Adoption	0.336	<0.001
Environmental Sustainability	0.292	<0.001
Water Distribution Efficiency	0.241	<0.001
Infrastructure Maintenance	0.187	0.003
Stakeholder Participation	0.142	0.019

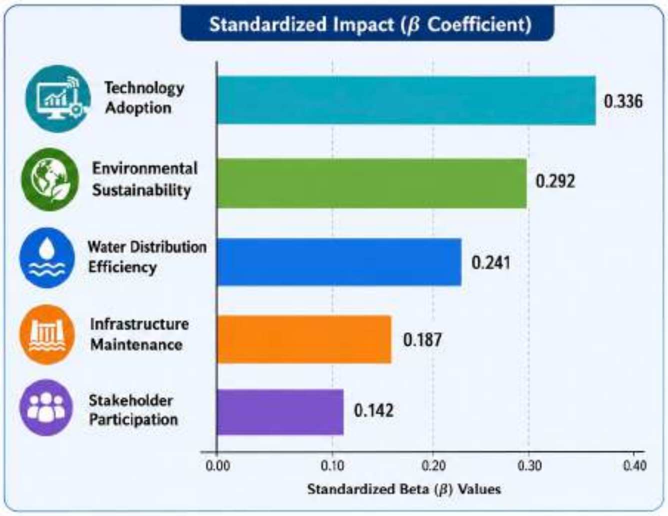

Fig. 3. Integrated model for sustainable irrigation department management

Technology adoption became the main predictor of sustainability performance. Departments using automated systems of monitoring, computerized mapping, telemetry-based measurements of flow, and computerized planning performed much better from the viewpoint of sustainability performance.

Environmental sustainability initiatives were identified as the second best predictor. Initiatives related to the recharge of groundwater, watershed management, optimal canal management, pollution reduction, and ecological monitoring had an immense impact on the sustainability of water resources.

Water distribution efficiency became one of the main predictors of sustainability performance because canal lining, leakage reduction, scheduling optimization, and fairer distribution improve irrigation performance while decreasing water losses.

Infrastructure maintenance had a moderate positive influence which proves that inspection, maintenance, renovation of aging structures and repairs are crucial for irrigation performance.

Although stakeholder participation has the smallest coefficient, the impact remains significant since it shows that cooperation with farmers and water user associations improves allocation process, increases maintenance performance and contributes to adherence to conservation practices.

H. Discussion

The results obtained empirically show clearly that the proposition about the necessity of the integration of technological, managerial, institutional and environmental practices for the sake of sustainable irrigation development is supported. High explanatory power of the regression model means that those variables completely explain the variance of the dependent variable. Adoption of technology turned out to be the main predictor since computerized monitoring makes possible real-time measurement of water flows, early identification of leaks, improvement of scheduling of water release and increased transparency of allocation of water resources. Environmental sustainability initiatives also proved to be of equal importance for sustainable development of irrigation system. Departments actively implementing programs of watershed management, recharge of groundwater, ecosystem conservation and water saving had more chances to sustain availability of water resources in spite of increased climatic unpredictability and agricultural needs.

The significant impact of water distribution efficiency confirms that modernization of canals and optimization of planning remain key objectives of irrigation departments. It not only reduces water losses but also improves equity between water users by improving schedules of water release.

Infrastructure maintenance had a significant impact as well which proves the value of regular inspection, prevention and renovation of structures and repairs.

Stakeholder participation had the lowest standardized coefficient but its impact is still positive which means that there is considerable potential in the future. Those departments which have active interaction with farmers, water-user associations and other communities achieve better compliance with schedules and better support of conservation practices. In general, the results show that irrigation departments adopting integrated approach consistently perform better than the departments relying on conventional engineering. Therefore, sustainable management of water resources is achieved through the integrated application of technological modernization, preventive maintenance of infrastructure, conservation of environment, water allocation and governance.

V. Practical Implications

The insights obtained from the study have practical applications for the departments concerned with irrigation, policy makers, and water resource management agencies working towards improving the sustainability and efficiency of operations. First, the irrigation departments should embrace the use of technology such as GIS, remote sensing, telemetry, and decision-making software to facilitate surveillance of water distribution in order to minimize the losses in the process. Secondly, there is need for implementation of preventive maintenance programs for the canals, dams, reservoirs, and distribution infrastructure rather than reactive repairs to ensure reliability and to reduce the cost of maintaining the infrastructure.

Fig. 4. Recommended policy framework for sustainable irrigation management

There is need for increased participation of stakeholders through collaborations with farmers, water users' associations, and local communities in order to increase transparency in water allocation, efficient use of water resources, and sustainability of the projects. The environmental conservation measures such as groundwater recharge, watershed conservation, and efficient irrigation scheduling should be adopted to cope with water shortages in the wake of climate change.

Policy makers should focus on establishment of an integrated framework of water management which should incorporate technological advancement, institutional building and interdepartmental cooperation. Training of technical personnel, performance monitoring using sustainability indicators, and evidence-based policy making can also help improve the management of irrigation. Overall, these interventions will go a long way in enhancing the productivity of agriculture, water resource conservation, climatic change adaptation, and sustainable development goals through improved public irrigation management.

VI. Conclusion

In this study, the impact of irrigation department programs in achieving sustainable development by means of efficient water resource management is studied using a comparative quantitative approach. It was found that sustainable operation of the irrigation department is determined by a combination of such factors as the implementation of technological innovations, proper management of the infrastructure, environmental protection, and stakeholder participation in decision-making, but not only physical infrastructure.

According to the statistical analysis conducted within the study, the following positive relations were identified between water distribution efficiency, implementation of technologies, maintenance of the infrastructure, environmental sustainability initiatives, participation of stakeholders, and sustainable water resource management. However, among the analyzed factors, implementation of new technologies had the greatest impact on sustainable irrigation performance, which emphasizes the importance of technological innovations in the processes of planning and making decisions. In addition, the environmental sustainability initiatives contributed greatly to the increase in the level of water safety and sustainable use.

Consequently, the main conclusion that can be made from the obtained results is the need to implement the integrated approach in the management of the irrigation department, which will consist of engineering, data-based, and institutional measures along with the participation of the stakeholders. The above strategy will allow increasing the efficiency of irrigation, reducing the loss of water, providing the environmental protection, and developing agriculture in a sustainable way.

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