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Water and Environment Support
in the ENI Southern Neighbourhood region

Ministry of Water & Irrigation
وزارة المياه والري

NRW Policy for Jordan

MAY 2024

WATER AND ENVIRONMENT SUPPORT IN THE ENI SOUTHERN NEIGHBOURHOOD REGION

The "Water and Environment Support (WES) in the ENI Neighbourhood South Region" project is a regional technical support project funded by the European Neighbourhood Instrument (ENI South). WES aims to protect the natural resources in the Mediterranean context and to improve the management of scarce water resources in the region. WES mainly aims to solve the problems linked to the pollution prevention and the rational use of water.

WES builds on previous similar regional projects funded by the European Union (Horizon 2020 CB/MEP, SWIM SM, SWIM-H2020 SM) and strives to create a supportive environment and increase capacity all stakeholders in the partner countries (PCs) of the South and East Mediterranean.

However, in order to ensure the coherence and effectiveness of EU funding or to promote regional cooperation, the eligibility of specific actions can be extended to neighbouring countries in the Southern Neighbourhood region.

ACKNOWLEDGEMENTS:

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We also express our gratitude to the dedicated professionals and experts within the water utilities in Jordan, the Utility Performance Monitoring Unit, and the Project Management Directorate whose invaluable insights and technical expertise have enriched the policy development process. We also extend our thanks to the donors that are active in the NRW reduction efforts in Jordan, whose active participation and collaboration have been essential in shaping this policy document; namely the EU, USAID, KFW, EIB, JICA, GIZ, AFD and the World Bank. Special thanks also go to the contributions made by existing projects in the field, namely, the USAID funded Water Governance Activity (WGA) and Management Engineering Services Contract (MESC) for the collaborative spirit demonstrated; providing insights, data, and best practices from their extensive experience in the field.

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ABBREVIATIONS

AAC	Aqaba – Amman Conveyance and Desalination Project
AFD	Agence Française de Developpement
ALC	Active Leakage Control
AW	Aqaba Water Company
BOT	Build Operate Transfer
BoQ	Bill of Quantities
CAPEX	Capital Expenditure
CIP	Capital Investment Program
CIS	Customer Information System
CNRWU	Central Non-Revenue Water Unit
CP	Concept Paper
CSS	Comprehensive Subscriber Survey
CW	Central Workshop
DMA	District Metering Area
DPL	Development Policy Lending
DPP	Development Partnership with the Private sector
DCMMS	Dorsch Consult Maintenance Management System
DZ	Distribution Zone
EPC	Engineering, Procurement, Construction
ERP	Enterprise resource planning
EU	European Union
FARA	Fixed Amount Reimbursable Agreement
FASEP	Fonds d'Etudes et d'Aide au Secteur Privé/ Funds for Technical Assistance for Project Preparation
GIS	Geographic Information System
GIZ	German Agency for International Cooperation/ Deutsche Gesellschaft fuer Internationale Zusammenarbeit
GoJ	Government of Jordan
IMF	International Monetary Fund
IWA	International Water Association
JEPCO	Jordan Electricity and Power Company
JICA	Japan International Cooperation Agency
JOD	Jordanian Dinar
JRP	Jordan Response Plan
JVA	Jordan Valley Authority

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KfW	Kreditanstalt fuer Wiederaufbau German Development Bank
KPI	Key Performance Indicator
MCM	Million Cubic Metres
MESC	Management Engineering Services Contract
MMS	Maintenance Management System
MoF	Ministry of Finance
MWI	Ministry of Water and Irrigation
MoPIC	Ministry of Planning and International Cooperation
M&R	Maintenance & Repair
M&V	Measurement and Verification
NGWA	Northern Governorates Water Administration
NRW	Non-Revenue Water
OMS	Operations Management Support
O&M	Operation & Maintenance
PBC	Performance Based Contracting
PI	Performance Indicator
PPP	Public Private Partnership
PRV	Pressure Reducing Valve
PSP	Private Sector Participation
P&L	Profit & Loss
ROI	Return on Investment
RRF	Repair and Rehabilitation Fund
SCADA	Supervisory Control and Data Acquisition
SIV	System Volume Input
SOP	Standard Operation Procedure
ToR	Terms of Reference
UPMU	Utility Performance Monitoring Unit
USAID	United States Agency for International Development
WAJ	Water Authority of Jordan
WGA	Water Governance Activity
WLRP	Water Loss Reduction Project
WP	Working Paper
WSS	Water Supply and Sanitation
YWC	Yarmouk Water Company

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FOREWORD

This policy document has been elaborated within the framework of the water component of the EU funded" Water and Environment Support (WES) in the ENI Southern Neighbourhood region" project and its activity N-W-JO-2 entitled "Elaboration of non-revenue water policy for Jordan" The activity was implemented in partnership with the Jordanian Ministry of Water and Irrigation (MWI) and the Central Non-Revenue Water (NRW) Unit. The overall objective of this activity was to support Jordan's water sector in its on-going efforts to reduce nonrevenue water, thus contributing to improved network efficiency, improved service provision and increased cost recovery.

The non-revenue water policy builds on the real situation and lessons learnt from pilot projects and other work in Jordan. The document represents a collaborative effort between the main actors in the water sector and provides guidance and recommendations for a comprehensive and sustainable NRW management in the Jordanian water sector in order to achieve the national goals for reduced and sustained NRW - consistent with the proposition of Jordan's national strategy for water.

During 2023, the first version of the non-revenue-water policy document was drafted. A technical taskforce was formed by H.E. Mohammad Najjar - Minister of Water and Irrigation, and its members were designated to review it during a 2-day retreat that was held on 12 and 13 September 2023, in the Dead Sea. Since then more interviews were carried out to ensure the inclusion of the main actors' concerns and issues in the policy draft. The document was hence revised to reflect all the comments received including from the main donors engaged in NRW reduction and management interventions. The policy was also developed in close conjunction with the approved NRW strategy and action plan and as such has to be seen as a complementary approach to support and guide the implementation of the approved NRW strategy within the water sector institutions.

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1 PREAMBLE

The Ministry of Water and Irrigation (MWI) is responsible for the sector governance. The role of the MWI will center on providing strategy and policy formulation, decision making, centralized data collection, Geographic Information Systems and monitoring the water sector institutions.

This NRW Policy is meant to provide guidance and recommendations for a comprehensive and sustainable NRW management in the Jordanian water sector.

It shall be read and applied in close conjunction with the National Water Strategy, the National NRW Strategy of May 2022 and the NRW Masterplan of September 2019.

NRW management is a complex undertaking and will need a structured and systematic approach of all concerned business units. The NRW policy should help and guide the various stakeholders and utility companies in achieving the objectives and goals agreed.

Sustainable NRW management and -reduction is essential and a precondition for the upcoming AAC (Aqaba – Amman Conveyance and Desalination Project) and other projects on the supply side.

A strong institutional capacity, a key pillar of the NRW strategy is the most difficult to build as the existing resources and quality of professional personnel are at present by far not able to cope with the huge workload and needed inputs.

All concerned parties need to commit to a collaborative approach and transparency in all actions. Isolated solutions should be avoided and the measurement, monitoring and controlling as one of the key pillars of the NRW strategy will be implemented on priority basis.

Support from the private sector will be needed to achieve the objectives and must be acquired on top priority basis.

Contrary to most of the previous approaches not only the commercial and network maintenance units have to be part of the NRW management; but as well planning/ design and operations.

The role of the NRW units in each company will have to be redefined. These units are not the ones directly reducing NRW. For the administrative losses the commercial business units, covering connections, meter reading, billing and collection, have to bear the responsibility, whereas the physical loss reduction is related to design, tendering and construction on the investment side and the operations are to cover the adherence to standards, distribution zones, pressure management, maintenance and repair.

The NRW units in each utility company have to engage in active leakage control, monitoring of NRW levels, analyse and identify intervention areas for future action and support/ advice the other business units on innovative solutions in NRW management and organisational development.

The Central NRW unit will have to monitor the NRW levels countrywide, coordinate all NRW related programs/ projects between MWI and the donors on one side, and with the WAJ and the utility companies on the other side.

Having developed the NRW policy, its application and implementation will be the next challenge and requires the engagement of all concerned parties.

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2 FACTS AND FIGURES

Jordan is one of the most water scarce countries worldwide. Together with the dramatic geopolitical changes in the region and the resultant rapid growth in population due to two waves of refugees (Iraq and Syria) the water sector since more than 20 years is in a kind of permanent crisis mode.

Although the Ministry of Water and Irrigation (MWI) implemented different initiatives to reduce the water losses, the available data (TABLE 2-1) shows that Non-revenue water (NRW) is one of the major factors affecting the supply of water for domestic and other uses.

The persistently high level of NRW over the past 25 years is causing financial losses of more than JOD 350 million/year to the Water Authority of Jordan (WAJ) and the three Public Water Companies. In the old National Water Strategy of Jordan for the horizon 2016 - 2025, the Government proposed to target reduction of NRW by 3-6% per year with 30% nationally by 2025 and technical losses reduced to below 15% (MWI, 2016). The Ministry in May 2022 launched the updated National Water Strategy to cover the period 2022 -2040 with a target of 25% NRW reduction or below in the year 2040.

Despite considerable international support through the Jordan Response Plan (JRP), the requested investments for the water infrastructure were only partially provided and did not cover the total needs of the sector. The COVID-19 pandemic worsened the situation as more water had to be supplied to the public, but revenues fell as meter reading and collection were suspended for three months.

The impact of all the above-described factors is in a way reflected in the high NRW figures (2022) as shown in TABLE 2-1.

TABLE 2-1: NRW IN GOVERNORATES – OFFICIAL FIGURES 2022

Governorate	# of subscribers	Supplied Water	Billed Water	NRW%
Amman	767,862	213,816,033	116,108,031	45.7
Zarqa	191,460	61,984,224	28,697,544	53.7
Madaba	48,297	10,867,225	6,026,771	44.5
Balqa	97,435	48,828,999	15,455,577	68.3
Irbid	246,275	59,803,860	36,277,127	39.3
Mafraq	61,381	36,565,755	11,413,779	68.8
Jerash	35,520	9,817,464	4,773,101	51.4
Ajloun	25,670	6,753,589	3,737,167	44.7
Karak	51,829	26,399,012	17,725,824	32.9
Tafieleh	18,800	16,199,404	5,541,545	65.8
Ma'an	27,786	8,466,533	4,419,743	47.8
Aqaba	44,537	21,104,734	10,023,652	52.5
Kingdom	1,616,852	520,606,832	260,199,860	50.0%

Source: Central NRW unit

The Government of Jordan (GOJ) recognized the importance of NRW reduction and in 2021 adjusted the NRW targets by setting a new target of 2% reduction each year until 2028 and then 3% until 2032.

In close communication and cooperation with international funding agencies, MWI in 2018 prepared a NRW masterplan and strategy, providing the basis for the financial engagement of key funding agencies, ultimately reaching commitments of more than JOD 1 billion.

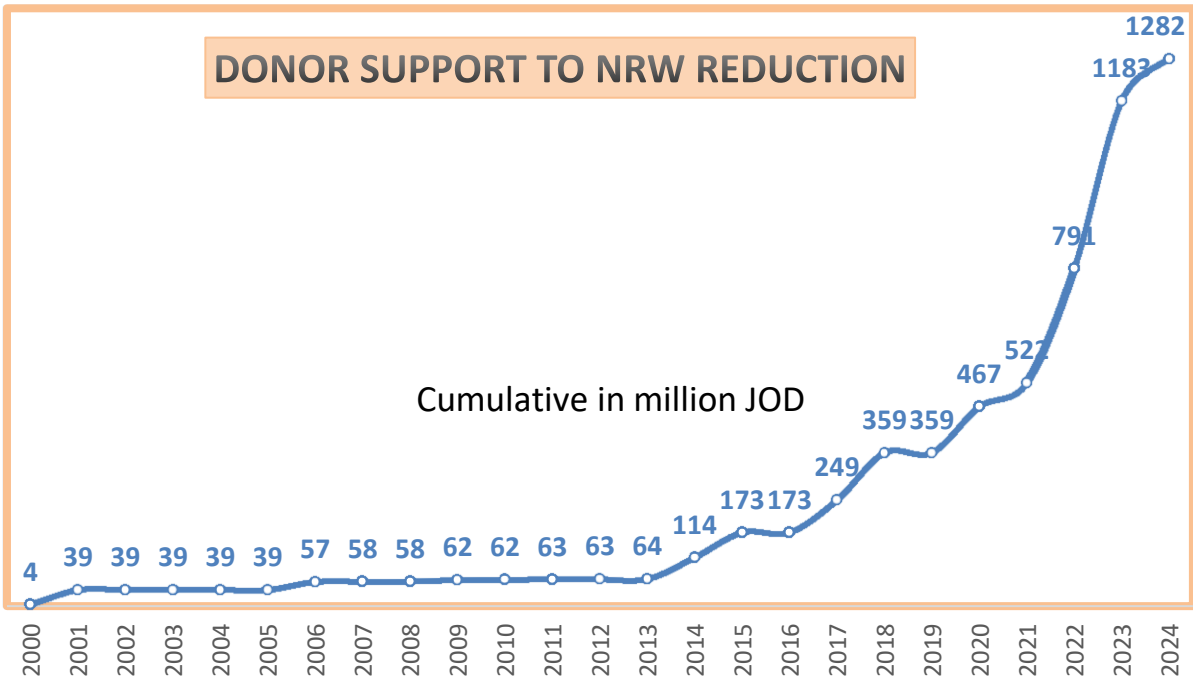
With investments of this size, for the first time during the past 25 years adequate financial resources are available to tackle the NRW in a comprehensive way.

Compared to investments for NRW reduction between 2000 – 2010 of about JOD 63 million, the secured investment volume between 2011 – 2020 increased about 7-fold and reached JOD 459 million.

For the period 2021 – 2030 already more than JOD 774 million is secured and could exceed JOD 1 billion over the coming years.

Although the reduction of NRW has been a part in all official strategy papers, the decision by MWI/ WAJ to make NRW reduction besides energy efficiency a real top priority was only taken around 2015. Over the past 20 years numerous funding agencies were supporting NRW activities but sizeable financial commitments were only rising from 2017 onwards (Figure 2-1). The United States Agency for International Development (USAID) funding with more than USD 300 million in grants and by Kreditanstalt fuer Wiederaufbau German Development Bank (KfW) with more than EUR 150 million provided a real boost and contributed to the start of a substantial initiative to reduce NRW.

FIGURE 2-1: COMMITED FUNDS FOR NRW REDUCTION



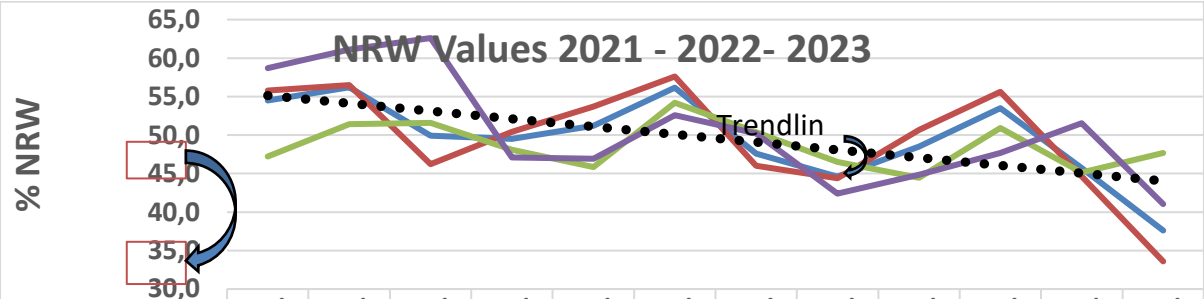
However, the sustainability of such huge investment can only be achieved with a competent team of professionals and an enabling institutional environment closely monitoring and controlling the impact of the measures to be designed and implemented.

NRW management is a continuous and never-ending task in a water supply system. The mindset from top management down to the lowest level has to change accordingly and all business units have to take up the responsibility to reduce NRW to acceptable levels.

A positive development has been observed since 2021 as can be seen in Figure 2-2. Within the past three years (01/21-12/23 a reduction of more than 10% took place . This result has been achieved primarily by the engagement of the management and staff in the utility companies, despite the lack of resources like transport, equipment and repair materials.

The NRW policy paper is to guide and support the various stakeholders and the concerned organizational units in the water sector in the implementation of the NRW Water Strategy.

FIGURE 2-2: NRW REDUCTION 2021 – 2023



	Q1/21	Q2/21	Q3/21	Q4/21	Q1/22	Q2/22	Q3/22	Q4/22	Q1/23	Q2/23	Q3/23	Q4/23
National	54,5	56,2	49,9	49,5	51,2	56,2	47,6	44,6	48,5	53,5	45,7	37,6
Miyahuna	55,8	56,5	46,2	50,4	53,7	57,6	46,0	44,4	50,7	55,6	44,6	33,6
YWC	47,2	51,4	51,6	48,1	45,8	54,2	50,4	46,5	44,5	50,9	45,1	47,7
AWC	58,7	61,1	62,6	47,1	46,9	52,6	50,2	42,4	44,9	47,7	51,5	41,0

3 NRW POLICY STATEMENTS

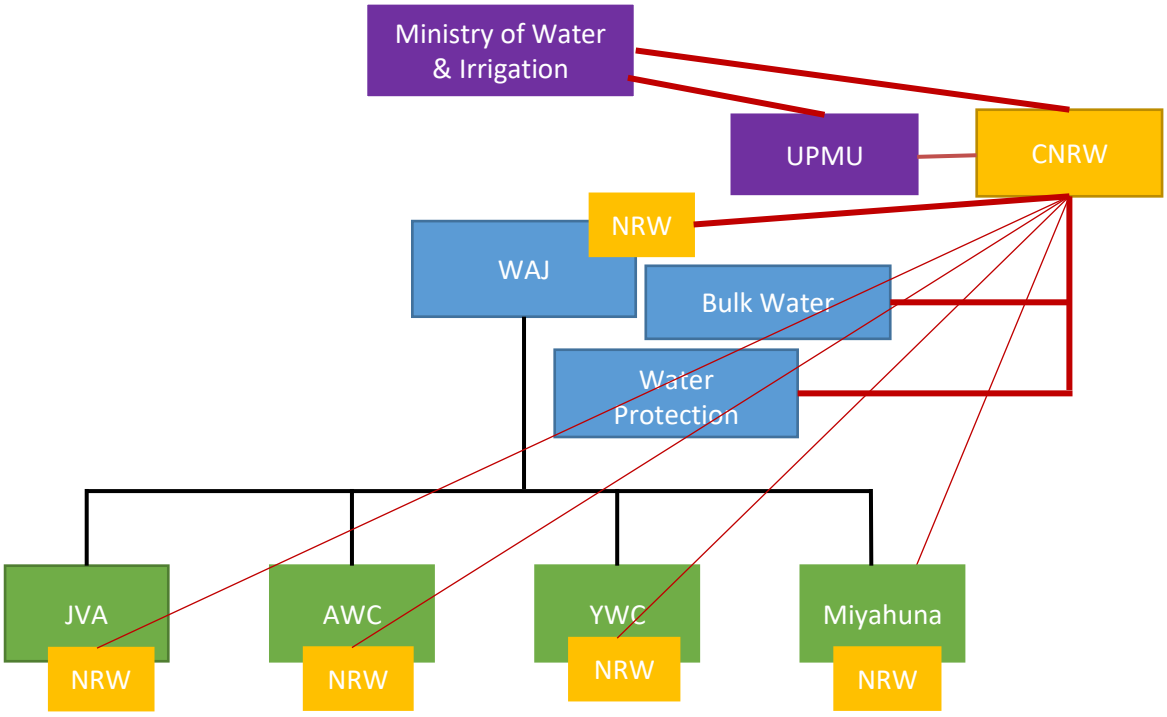
A NRW policy is covering and affecting all water sector institutions and has to be embedded in the day to day business. Most important is the dissemination of the policy in the Water Authority of Jordan, Jordan Valley Authority and the Water Utility Companies as shown in Figure 3-1.

One of the major tasks once the NRW policy has been approved by MWI will be its enforcement down to the lowest possible working level. This needs a variety of actions like

- Workshops on governorate level to explain the policy;
- Discussion/Identification of the kind of support needed to implement the policy;
- Empower the CNRW unit with capacity building and enforcing the policy;
- Include the Jordanian private sector in selected NRW activities.

Other stakeholders will be as well indirectly involved, in adjusting the legal framework, providing the needed funding and introducing state of the art technologies.

FIGURE 3-1: ROLE OF CENTRAL NRW UNIT IN IMPLEMENTING NRW POLICY



The NRW policy has been developed along seven main elements and including cross cutting themes :

1. National Priorities – Institutional/ Legal Framework
2. NRW management – Principles and Standards
3. NRW Planning, Monitoring and Reporting
4. Real Loss reduction – Operation and Maintenance
5. Apparent Loss Reduction - Customer Services
6. Technology and Innovation
7. Capacity Building and Training

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These main elements are described in the subsequent chapters and always start with a Policy Statement. Wherever needed more detailed supporting text has been added to explain the statements.

3.1 NATIONAL PRIORITIES – INSTITUTIONAL/ LEGAL FRAMEWORK

Policy Statement 1

Water is a scarce and precious resource and a key to the continued socio-economic development of Jordan.

The national priorities will be guiding the overall NRW management and shall be incorporated/ reflected in the business planning of each respective utility company.

As the development of new water sources and the planned mega projects will drastically increasing the cost per cubic meter of water, the NRW figures have to be minimized prior to commissioning of the mega projects.

The reduction of real (physical) losses is to be regarded as an untapped resource and must be intensified on top priority basis.

The national priorities will be reflected in the stakeholder discussions and planning, in particular with the Ministry of Finance, the Ministry of Planning and International Cooperation and the respective international funding agencies.

Depleting groundwater sources, population growth and the heavy impact of several waves of refugees are forcing the Jordanian water sector to utilize desalination on a large scale to satisfy the future water demand of the Jordanian population.

At present the water tariffs cover about 70% of the O&M costs, and the gap will widen dramatically when the upcoming mega projects will be commissioned. With the present NRW of around 50%, such projects will economically threaten the financial viability and sustainability of the water supply services in Jordan.

The reduction of NRW to acceptable levels below 25% in 2040 as outlined in the National NRW Strategy is therefore a national priority and must be achieved even before 2040. International support from various donors has been received as shown in Figure 2-1 and provides an adequate investment volume.

Stakeholders play an important role in the Jordanian water sector and are directly affecting the way the Ministry of Water and Irrigation (MWI) and the Water Authority of Jordan (WAJ) are carrying out their business. The international support through various donor organizations and funding agencies are the backbone of all capital investment projects.

Critical is the relationship with the Ministry of Finance as it, last not least, covers the operational losses and the debt service for the whole water sector. WAJ and the utility companies need to reflect the progress in NRW reduction in the water sector performance monitoring, and discussions for the introduction of performance budgeting in the utility companies will be initiated by MWI.

To secure and maintain the support of the international agencies the water sector institutions are obliged to utilize the funds for the NRW reduction in an effective and efficient manner. The institutional framework will be adjusted and reinforced accordingly.

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3.1.1 INSTITUTIONAL FRAMEWORK

Policy Statement 2

The strengthening of the institutional capacity is a key pillar for the successful implementation of the NRW strategy and policy. A significant reorganization of the water sector institutions is required to increase efficiency and responsiveness.

To manage the NRW activities, clear responsibilities embedded in the institutional framework of the water sector will be:

Strategy development, policies, monitoring and control on national level will be the responsibility of **MWI**, supported by a

- **Central NRW unit** overseeing compliance and transparent reporting of NRW data by the utility companies;
- **Utility Performance Management Unit (UPMU),** monitoring KPI'S and being the nucleus of the future regulator.

The **Water Authority of Jordan (WAJ)** was established under the Water Authority Law No. 18 of 1988, *as amended* to be an autonomous corporate body and is the owner of all water supply and wastewater assets. Following the establishment of the three public utility companies, its future role in direct operational tasks will be reduced to a bulk supplier and provider of central services**.**

WAJ will ensure appropriate standards related to planning, design and implementation of capital investment projects under special consideration of NRW related parameters. The **PMD-NRW Directorate** will monitor all NRW related capital investment projects and provide technical support to other WAJ organizational units engaged on NRW control.

The three Public Water Companies, i.e. **Jordan Water Company** (**Miyahuna), Yarmouk Water Company (YWC) and Aqaba Water company (AW)** have been established under the Companies Law of Jordan, No. 22 of 1997 as retail or distribution companies.

The three utility companies, operating all water facilities and distribution systems, are responsible for managing and keeping control over the NRW in their service areas. The regular business processes and workflows providing the most significant impact on NRW reduction are related to the departments in charge of the customer management, operations and maintenance & repairs. NRW/ performance monitoring units in each company will be provided with appropriate tools, equipment and qualified experts to support the respective business units responsible for the NRW reduction.

The **Private Sector** is already playing an important role in the capital investment programs, and in the future will be engaged on a much higher level in the operations' management. The outsourcing of specific activities like billing, replacement of meters, maintenance & repair have been successfully introduced and will be expanded.

The MWI will adopt the most efficient and effective means for optimizing the NRW management. The NRW reduction from the present unsustainable high levels requires a systemic approach and strengthening/ adjustment of the existing institutional arrangements.

As outlined in the National NRW Strategy, the strengthening of the institutional capacity is a key pillar for the successful implementation of the strategy.

The existing institutional framework cannot cope with the requirements not only in planning, design and construction and project management; but as well in the operational business units .

The recently established **Central NRW unit** in MWI will be assigned with coordination of projects and monitoring the performance of NRW reduction, in close cooperation with the NRW units in each respective utility company and WAJ.

Regarding the NRW activities, major donor funded NRW projects will be planned and designed through **WAJ** and managed by the **PMD**; whereas the implementation of projects will be the responsibility of the utility companies.

Considering the huge number of projects, the utility companies must ensure an adequate number of professional staff for design, tendering and supervision, Project Management Units need to be established in each company to cover the additional workload.

A sustainable NRW management will be secured by **NRW units** in the utility companies, and each company need to report the status of NRW quarterly; from 2024 onwards on monthly basis.

The role of the NRW units needs to be re-defined and clear responsibilities and tasks assigned by WAJ and the management in the public companies. The widespread perception that these units are responsible for the reduction of NRW is misleading as the business units like commercial, maintenance & repair and operations are the real drivers of NRW reduction.

3.1.2 LEGAL FRAMEWORK

Policy Statement 3

The existing legal framework is in general adequate and allows the introduction of a performance based and efficient NRW management.

It will be essential to apply and enforce the laws, rules and regulations consequently and do not allow violations.

One example is the Ameeri law which will have to be applied to control illegal use of the water. It is a strong tool which ultimately allows the confiscation of property.

The **Ministry of Water and Irrigation (MWI)** has the overall responsibility for the water sector. It communicates with the international funding agencies, formulates policies and strategies for the water sector and guides the executing agencies in formulating medium and long-term Capital Investment Program (CIP). For the NRW Initiative the MWI will coordinate the donor contributions and set the priorities for utilization of the funds plus the overall performance monitoring of the NRW reduction activities.

The **Water Authority of Jordan (WAJ)** was established under the Water Authority Law No. 18 of 1988, *as amended* to be an autonomous corporate body and is the owner of all water supply and wastewater assets. Following the establishment of the three public utility companies, its future role in direct operational tasks will be reduced to a bulk supplier and provider of central services.

The three Public Water Companies, i.e. **Jordan Water Company** (**Miyahuna), Yarmouk Water Company (YWC) and Aqaba Water company (AW)** have been established under the Companies Law of Jordan, No. 22 of 1997 as retail or distribution companies. Although the ownership of the assets remains with WAJ, it has no direct authority to interfere in the day-to-day business and should work through the Management Committee of each company.

The companies, although semi-autonomous are financially depending on WAJ as long as they cannot cover at least their operating cost. An effective NRW management will contribute to the financial sustainability of the water sector operations and measures taken to reach at least the O&M cost recovery will have to be reflected in the business planning.

Besides the specific NRW monitoring, the Utilities Performance monitoring Unit (UPMU) will report on the overall performance of the utility companies and issue annual reports. It reports to the Water Minister, and in the future should be the nucleus of an independent regulatory unit for the water sector.

3.2 NRW MANAGEMENT - PRINCIPLES AND STANDARDS

Policy Statement 4

NRW is to be regarded as an untapped resource, not as an unavoidable, secondary problem difficult to manage. The reduction of real losses will make more water available to the customers.

NRW management is a cross-cutting activity and of concern to all business units in the utility companies and WAJ. A systemic and comprehensive approach through an integrated NRW management will be introduced to reduce campaign-type ad hoc decisions and to provide more transparency and sustainability.

Important principles for setting priorities in NRW reduction will be:

- Precedence of apparent loss reduction above cost-intensive rehabilitation and restructuring of water networks, addressing the most critical issues on priority basis;
- Capital investment projects to include dedicated budgets for NRW reduction measures and maintenance throughout the project periods;
- Adequate provisions in Capital investment projects to be made for decommissioning redundant networks, and pre-/post NRW measurements;
- The operational units for distribution networks will be responsible for real loss reduction, establishment of a reliable data base etc.
- State of the art applications will be introduced in the National Complaints Centre to improve the quality of no-water and leak complaints and increase the speed of leak repairs in the maintenance divisions. This will encourage the public to report problems in the distribution network and will help operations to adjust the intermittent supply schedules.

NRW reduction practices will have to be integrated with the utility companies' day to day activities.

All concerned utility companies, WAJ and JVA, will introduce and agree on standards and methodologies as proposed for example by IWA and modifying them to reflect the Jordanian conditions and establish unified water balance calculations.

Standard Operation Procedures (SOP's), methodologies and principles of NRW management will be introduced in all companies and business units to improve business operations and to increase efficiency.

The utility companies will include the needed budget provisions to ensure that adequate resources will be available for establishment and enforcement of SOP's.

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All business units need to work together for a long lasting and sustainable NRW reduction and need to use collaborative work methods which in turn will enable the identification of deficiencies and development of appropriate solutions to solve problems on short notice.

A systemic and comprehensive approach through an integrated NRW management (Figure 3-2) will help in reducing campaign-type ad hoc decisions and provide more transparency.

This integration needs a well-established data management and improved communication skills which will be developed in line with the introduction of advanced information technology like ERP, CIS, GIS and other applications.

FIGURE 3-2: INTEGRATED NRW MANAGEMENT

One key pillar of the National NRW strategy – measurement, monitoring and control is a priority for implementation for an effective NRW management. The installation of reliable and automated metering devices and the data transfer through SCADA is ongoing, and it is related to not only bulk metering, but need to include DMA metering and domestic consumption meters.

Considering the fact that all activities have to be carried out in an imperfect “live” system, the adjustment of DZ and DMA boundaries is dynamic and will have to be always reflected in the monitoring and controlling systems.

Adequate hardware and communication infrastructure is in the process of being procured and installed. At the end huge amounts of reliable data will be produced and the human error in data collection minimized. However, data is not information and information is not knowledge unless integrated IT based solutions like ERP, GIS, MMS etc. will be enabling the analysis and development of targeted action on reported deficiencies and impact monitoring to enlarge the knowledge basis.

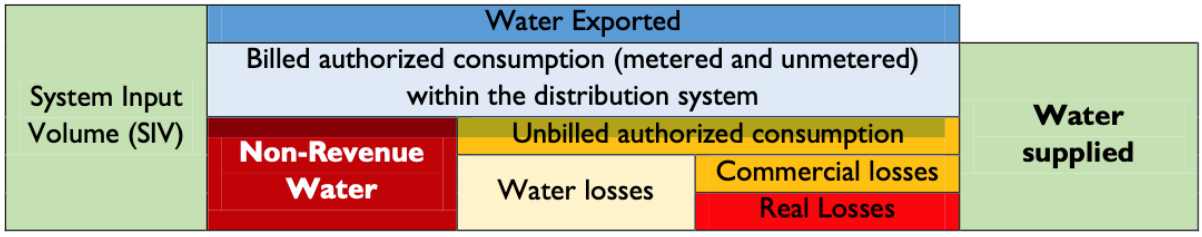
It is important among all concerned utility companies, WAJ and JVA, to introduce and agree on standards and methodologies as proposed for example by IWA and modifying them to reflect the Jordanian conditions. One example is Figure 3-3, showing the standard IWA Water Balance.

This standard water balance has been modified in the National NRW Strategy reflecting the fact that percentages of System Volume Input (SIV) must not be used for target setting and/ or making technical comparisons.

The calculation of the NRW indictor in accordance with the National NRW Strategy will be based on the water supplied to the distribution system (not SIV).

A good discussion has been published by the Leaksuite Library Ltd. Under the title "Water Losses: It's Time to Ditch the Percentages". https://www.leakssuitelibrary.com/pros-abandon-percents-of-siv/ and shall be considered.

FIGURE 3-3: SIMPLIFIED IWA STANDARD WATER BALANCE (LAMBERT, 2019)



Implementation of standards and their enforcement require facilities and expertise, which involve significant costs. Enforcement, particularly, requires commitment and coordination between many agencies and at many levels within the government.

At present, Standard Operation Procedures (SOP's), methodologies and standards in NRW management are used by WAJ and some companies, but not coherent all over the sector institutions.

The utility companies will have to include the needed budget provisions to ensure that adequate resources will be available for establishment and enforcement of SOP's.

The Central NRW unit will follow up with the utility companies and support the regional NRW units to either update or develop the needed SOP's.

3.3 NRW PLANNING, MONITORING & REPORTING

Policy Statement 5

Planning and design will be addressed in a more holistic way and shall include all processes in the water sector.

NRW is a composite KPI, reflecting the performance of the utility. All business units need to work together for a long lasting and sustainable NRW reduction, using collaborative work methods which in turn will enable the identification of deficiencies and development of appropriate solutions to solve problems on short notice.

Capital investment projects shall include adequate provisions to address NRW at an earlier stage - during design and construction. Tertiary network rehabilitation and house connections must be included in any network rehabilitation project and provisions included for maintenance and repair services throughout the project period. Special attention shall be given to the disconnection of redundant distribution networks.

Wherever areas with redundant distribution network exist, the utility companies shall define projects to permanently remove those and include them in the investment budget.

Other important principles for setting priorities in NRW reduction will be:

- Precedence of apparent loss reduction above cost-intensive rehabilitation and restructuring, addressing the most critical issues on priority basis,
- The operational units for distribution networks to be made responsible for real loss reduction, establishment of a reliable data base etc.

One key pillar of the National NRW strategy – measurement, monitoring and control is a priority for implementation for an effective NRW management.

All concerned utility companies, WAJ and JVA, will introduce and apply standards and methodologies in accordance with IWA recommendations and modify them to reflect the Jordanian conditions. The modified water balance will be the basis for the calculation of the NRW.

Applying standards and its enforcement require additional facilities and expertise. The related, significant costs will be reflected in the budget and adequate funding made available by the utility companies and WAJ. Enforcement requires commitment and coordination between many agencies and at many levels within government.

Establishing regular reporting cycles are essential not only in the operational units. Monitoring the NRW development is important to enable MWI/ WAJ to plan interventions and secure support from international funding agencies.

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Based on the priorities set by GOJ, MWI and the water companies, NRW programs/ projects will be developed using reliable data and information. The source of most of the data are the utility companies. The design needs to consider the special conditions in each respective company and in case of rehabilitation and restructuring of distribution networks, the Technical Directorates in the utility companies and the Water Affairs Department in WAJ must include requests from the NRW units in each respective company.

The Central NRW unit will comment on the proposed design and tender documents of major projects coming out of the CIP, certifying that NRW relevant elements have been included and will have an impact on the NRW levels.

Of particular importance is addressing some key problems in the distribution networks:

1. Dis-connection of old, redundant networks.
2. Replacement of tertiary networks and house connections where 85% of all reported leaks occur.

The detailed NRW monitoring shall be done by the NRW units in each company or governorate down to the Distribution Zone/ District Metering Area. The Central NRW unit shall be working in close coordination with these units but has to play as well an auditing role and carry out random checks in the operational units. The intervals should be at least on monthly basis, with the improvement of the information management systems, real time access could be introduced.

NRW management is a complex issue and requires several NRW indicators to be monitored.

1. Intermittent supply regime/ duration of water supply
2. No. of complaints on leaks and speed of repairs
3. Operating pressure
4. Consumption per connection
5. Connection density
6. Meter condition and replacement

Key performance indicators (KPI's) have to be agreed upon with all concerned parties.

The Central- and the companies' NRW units will provide reports on quarterly/ monthly basis to all concerned stakeholders and will be providing NRW related data and information to the UPMU for their annual reporting. The extent of reporting (monthly, quarterly, yearly) and level of detail will be agreed with all concerned parties.

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3.4 REAL LOSS REDUCTION - OPERATION AND MAINTENANCE

Policy Statement 6

The limited water resources in Jordan and the physical condition of the water distribution systems forced the utility companies to switch to an intermittent supply regime all over the country. A transition to a 24/7 or continuous supply will be an objective in the long run and must be actively pursued wherever possible.

Generally, real or physical loss reduction will be addressed through a comprehensive, collaborative and integrated approach across all organizational units, i.e.

- Planning & design,
- Construction (quality of workmanship)
- Rehabilitation (tertiary network/ house connections)
- Operations (Central control, pressure & flow, rationing regime)
- Maintenance & Repair

Activities to reduce real losses will comprise short term measures (horizon 1-5 years) and medium/ long term measures (5 – 15 years) focusing on distribution network restructuring/ rehabilitation, requiring massive investments.

The Operations Directorates will be made responsible for the reduction and control of real losses in NRW management. This will be achieved by collaborating with the other concerned units like Maintenance & Repair, Technical and Planning/ Design.

The existing National Complaints Centre will be modernized and the leak repair services organized in such a way that repair and response time can be reduced and the repair data documented to enable a targeted analysis and quick action..

Adequate budgets need to be provided to cover equipment and spare parts and possibly the engagement of private sector companies to apply an active leakage control.

One of the key pillars in the National NRW Strategy is focusing on physical loss reduction, the proposed investment of 1.08 billion JOD constitutes almost 85% of the total capital investment.

The outputs/ actions as described in Table 3 of the Strategy are quite comprehensive and will be implemented over a period of 5 to 10 years.

In parallel, immediate action needs to be taken to reduce in particular the leakage by focusing on maintenance and repair services and operations control.

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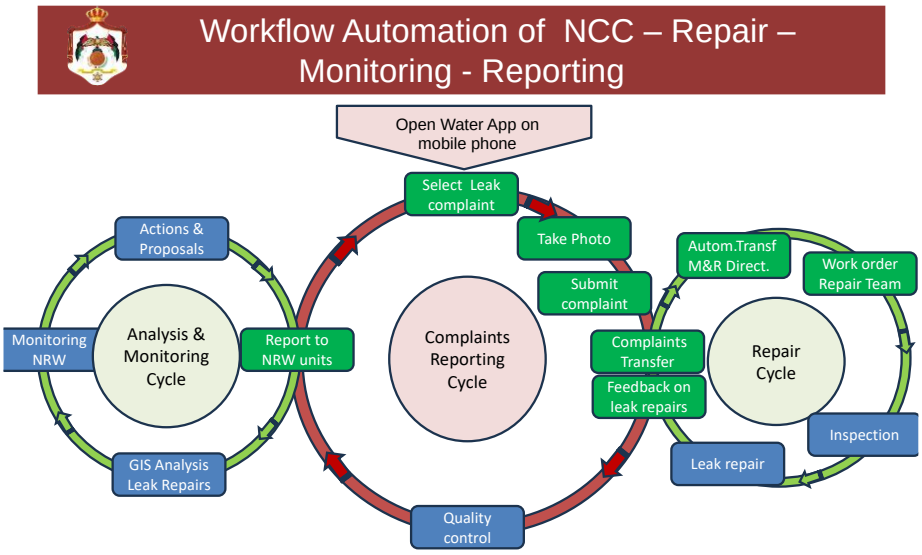
It is imperative to modernize the existing National Complaints Centre and the leak repair services. It requires moderate investments; important is the introduction of state of the art mobile applications for registration of complaints and documentation of repair management.

The time between reporting a leak and fixing it must be kept as short as possible and on average should not exceed one day.

A proposal to automate the processes and document the results in a GIS database (Figure 3-4) will enable the NRW units to analyse and propose targeted actions to reduce the leakage levels. The boxes in green colour show the automated processes. Ongoing activities by utility companies and Technical Assistance projects should be coordinated to enable the roll out and implementation of the modernized systems as soon as possible.

In the past the Operations Directorates have not been heavily involved in NRW management. To the contrary, these units often violated DZ/ DMA boundaries and thus increased NRW levels and operating pressures in already restructured and rehabilitated areas.

FIGURE 3-4: WORKFLOW INTEGRATION COMPLAINTS/ REPAIR/ REPORTING CYCLES´



The priority in operations to ensure a reasonable water supply to customers during the supply period is valid, but should not result in higher water losses.

In the future the Operations Directorates must be responsible for the reduction of NRW. This can be achieved by collaborating with the other concerned units like Maintenance & Repair, Technical and Planning/ Design.

A tight operations control must be established and maintained to reduce the real losses to an acceptable level. This must be established by utilizing advanced information technologies like SCADA/ GIS and should cover not only the water sources; but as well the network management by installing flow and pressure logging equipment and linking it to a central control room.

By using GIS and hydraulic modelling software, the pressure control and the water distribution will be saving water and will increase supply safety.

Once the operations provide more reliable data and the repair services will control the visible leaks, an active leakage control will be introduced, focusing on critical areas and wherever possible switching some areas to a 24/7 supply. This will reduce real losses and reduce the stress on the physical infrastructure.

Maintenance & repair services must be organized to cover the huge number of reported leaks. Miyahuna has the best and reliable reporting with more than 130,000 leaks/year. The other utility companies and governorates are to establish similar systems. All utility companies shall report the repair status on monthly basis.

Adequate budgets need to be provided to cover equipment and spare parts and possibly the engagement of private sector companies to regain control over the leak repairs.

The central complaints system should be organized in a way that the complete cycle – from complaint recording, location, execution and completion of a repair – is documented in a database for analysis and action (Figure 3-4).

3.5 APPARENT LOSS REDUCTION - CUSTOMER SERVICES

Policy Statement 7

In some governorates the apparent loss component is the major contributor to high NRW levels. An efficient customer management will be the key to reduce NRW within the short term horizon of 1 – 5 years.

Precedence of apparent loss reduction above cost-intensive rehabilitation and restructuring will be needed, addressing the most critical issues on priority basis:

- Development of a clear meter management policy and replacing or relocation of domestic meters.
- Due to intermittent supply conditions, meters will under-register after less than 2 years. Meters will have to be replaced after maximum 5 years.
- The outsourcing of meter replacement, meter reading and billing and involvement of the private sector will increase the billed quantities and deliver immediate results.
- The utility companies will be further developing appropriate incentive schemes to increase the productivity of their staff.

The establishment of a reliable Customer Information System (CIS) in the utility companies in combination with the GIS will be providing the needed data for the NRW measurement and increase the quality of data.

Illegal consumption and illegal connections will be actively targeted by using available legal options like the Ameeri law.

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Apparent loss reduction must receive a higher level of importance and should precede cost-intensive network rehabilitation and will deliver quick results in NRW reduction.

In some governorates the apparent loss component is the major contributor to high NRW levels and indicates a weak customer management, therefore the NRW management need to address the main components:

- Meter connections/ disconnections
- Meter reading
- Billing

The establishment of a real Customer Information System (CIS) is the basis for the key functions. the business processes need to be based on reliable customer data, comprehensive customer surveys to update and locate the customers geographically, using GIS to manage customer complaints and subsequently breaking the meter reading monopoly by enabling rotation of meter readers.

Outsourcing of selected functions to the private sector should be possible and the illegal connections/ consumption should be actively targeted by using available legal options like the Ameeri law.

The contact to the customer to improve the relationship, and the establishment of easier payment channels in rural areas will increase the presence of the utility company in the field.

Immediate measures to reduce the administrative losses have been initiated and the domestic meter replacement has been identified to be a major contributor in NRW reduction. However, it's not the change of meters alone, the bad condition of many house connections and meter locations needs additional inputs and funding.

The utility companies must prepare proposals for the meter replacement with the objective to replace about 800,000 meters within one year.

As the in-house capacity for such a big workload may not be sufficient, the utility companies will need to involve private sector companies and outsource part or all of the work.

3.6 TECHNOLOGY AND INNOVATION

Policy Statement 8

Information technology will be a key and cross cutting theme in the NRW management.

MWI/ WAJ and the utility companies will coordinate and develop a concept to manage the huge amounts of data and decide where and how the data processing and information flows should be accessible for the day-to-day work by the different business units.

The Central NRW unit and the NRW units in WAJ and the utility companies will develop a monitoring concept for the needed NRW performance indicators to match the reporting requirements of the different government institutions and funding agencies.

Metering and measurement should be automated as much as possible to reduce the human error.

The National SCADA will cover all water sources and shall be used for pressure management in the DZ and DMA. The objective should be to:

a) Obtain key data of the water sources like flow and pressure, to prepare a reliable water balance and define the system volume input and water supplied to each utility company.

b) regain control over the water distribution and rationing regime on the basis of real-time data acquisition to save water and reduce real losses.

The water companies will be obliged to not only collect data; but to develop appropriate analysis tools to optimize operations. The use of GIS and hydraulic modeling will be integrated in such tools and business processes.

Mobile applications will improve the contact with the customers and enable them to not only to manage their subscription but to support the utility companies by directly reporting on leaks, no water or sewerage blockages. With such information integrated into the business processes like leak repair, water distribution a quick response and feedback will improve customer satisfaction and enhances the image of the water sector.

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3.6.1 TECHNOLOGY

Information technology is a cross cutting theme in the NRW management. The present IT environment in the water sector can be characterized by a mix of old systems, not reflecting the state-of-the-art technology (NCC, X7). Advanced systems like ERP, GIS and SCADA are only partially integrated into the business operations and the proposed, advanced integrated systems currently under development are not yet rolled out and need to be integrated into the regular business processes.

The utility companies are focusing on their direct needs and have developed individual solutions on their own.

Within the NRW initiative the USAID funded programs are actively supporting the introduction of integrated solutions and improvement of data and information management.

MWI/ WAJ and the utility companies in close cooperation with USAID will coordinate and develop a concept to manage the huge amounts of data and decide where and how the data processing and information flows should be accessible for the day-to-day work by the different business units.

The Central NRW unit and the NRW units in WAJ and the utility companies will develop a monitoring concept for the needed NRW performance indicators to match the reporting requirements of the different government institutions and funding agencies.

Metering and measurement should be automized as much as possible to reduce the human error. The National SCADA will cover all water sources and shall be used for pressure management in the DZ and DMA. The objective should be to:

a) Obtain key data of the water sources like flow, pressure, to prepare a reliable water balance and define the system volume input and water supplied to each utility company.

b) regain control over the water distribution and rationing regime on the basis of real-time data acquisition to save water and reduce real losses.

The water companies will be obliged to not only collect data; but to develop appropriate analysis tools to optimize operations. The use of GIS and hydraulic modeling must be integrated in such tools and business processes.

The commercial services should be introducing a comprehensive Customer Information System, which covers all business processes and is integrated with the ERP.

Advanced tools for the field services, like meter reading, maintenance and repair, customer complaints centers and others should be introduced on priority basis.

The already installed ERP systems should be integrated into all business workflows and wherever needed, linked to other software solutions.

3.6.2 INNOVATION

The fast technological development in NRW management is important for an active leakage control.

Innovations in the leak detection technologies should be tested and introduced if providing additional benefits and showing an impact on NRW reduction.

Innovative solutions like for example the SmartBall technology that allows the location of leaks and map pipeline networks with a minimum invasive intervention.

The information technology using smart water meters will allow a real time management of water distribution networks and a better communication and contact with the customers.

Mobile applications will improve the contact with the customers and enable them to not only to manage their subscription but to support the utility companies by directly reporting on leaks, no water or sewerage blockages. With such information integrated into the business processes like leak repair, water distribution a quick response and feedback will improve customer satisfaction and enhances the image of the water sector.

The NRW units should engage with professional organizations, other international utility companies to ensure that new innovations will be communicated and discussed with all concerned water sector institutions and public companies.

3.7 CAPACITY BUILDING & TRAINING

Policy Statement 9

Capacity building is essential when introducing new technologies and management techniques.

Qualified personnel will be essential not only for the management and implementation of the ongoing NRW initiative also for several other critical aspects, including operations management, maintenance and repair, data analysis and monitoring, innovation and technology Implementation, project management, financial management, etc. :.

For a sustainable NRW management the operation of the water supply systems and commercial units, the advanced information management systems and analysis tools will be embedded in the workflows and require qualified professionals with good communication skills and experience in applying collaborative work methods.

MWI, WAJ and the utility companies have to ensure the recruitment of professional experts and operating staff. The engagement of private sector companies or individual professionals will be compulsory if the expertise cannot be provided in-house.

The intervention of the WAJ administration on utility staff management will have to be reduced to the minimum and the authority of the utility companies strengthened.

Extensive training programs have been provided by WAJ, the utility companies and Technical Assistance projects. For the NRW management, the needs will be re-defined on the basis of the improved workflow procedures and business needs and, wherever possible, shall follow the coaching on the job principle.

Whoever provides training and capacity building measures will be obliged to monitor the impact in the day to day work and recommend adjustments, if needed.

Human Resources Development is a one of the pre-conditions for the modernization and re-organization of the existing institutional framework. Although clear policies already exist concerning

the terms of employment and benefit packages of government workers, more transparent procedures concerning recruitment and job's terms of reference are required. Further clarity is also needed concerning national priorities for technical and management skills and the means through which they will be transferred.

Capacity building has been and is ongoing through numerous Technical Assistance programs since 1995. Although these programs covered a wide variety of training in many fields and partly on-the-job coaching, the impact was limited. Some factors negatively affecting the capacity building are:

1. The rigid bureaucratic rules and institutional environment makes it difficult to apply modern management and technical solutions,
2. Trained professionals used the gained qualifications and knowledge to move to the private sector and countries with more attractive employment conditions (which is a proof that the training was successful);
3. The impact of the capacity building measures was not assessed nor monitored.

Future capacity building programs must include an ex-post support and an impact monitoring to enable the adjustment of the training and secure the focus on the real business needs.

Whereas MWI, WAJ and JVA have limitations in offering attractive salaries, working environment and a medium/ long term career path, the utility companies can offer better conditions and especially for the NRW management have to use the financial resources provided by the various funding agencies.

Incentives for excellence will be introduced in compliance with the business requirements for qualified and motivated personnel. In some governorates performance-based incentive schemes for the existing staff have been proven to increase efficiency of services especially in customer management. The utility companies need to further develop transparent incentive schemes for different business fields.

Equally important is the engagement of the private sector as the limitation of experienced professionals in NRW management within the water sector institutions will be a bottleneck for a speedy implementation of the NRW programs and projects.

Important though, is to establish a kind of partnership between private sector and utility companies.

Any NRW reduction contract should include provisions for training utility staff within the scope of work. Working side by side and coaching on-the-job will be a more practical way of building the qualification of staff and focusing on the real workflows in the business units.

ANNEX 1

NRW Activities & Projects from year 2000 - 2030

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Period	Name	Funded by	Type of Funding (Loan = L, Grant = G)	Project amount [million]	Currency	Project amount in JOD (2022)	Main tasks/ activities for NRW reduction	Region	Project Executing Agency	Results/ Impact	Incorporated in business process
Completed projects up to 2010											
1996 - 2011	Capacity development project for NRW reduction in Jordan	JICA	G	??			Supply of leak detection & flow measurement equipment, training of WAJ staff, pressure reduction in selected distribution zones	WAJ HQ , Zarqa governorate	WAJ	Equipment used in most govenorates, pressure reducing valves not operational or by-passed	Partly
2000 - 2011	OMS Operations Management Support	GIZ	G	6	EUR	4.3	Water loss analysis in Zarqa pilot area. Introduction of Micro PSP in Madaba & Balqa to reduce administrative losses	Aqaba/ YWC/ Zarqa governorate	WAJ	Actual distribution network in Zarqa 86% longer than documented in as-built info. Micro PSP partially successful, billed & collected amounts increased by >60%, active customers by >25%, but NRW only marginally reduced.	Only during OMS presence, legal problems in Balqa and problems in PSP contract design for Balqa prompted WAJ to stop Micro PSP.
2001 - 2009	Support to PMU management	EU	G	8	EUR	5.7	Establishment of a NRW Directorate in PMU, Building expertise and carrying out NRW measurements and analysis of water losses, training WAJ staff develop projects for NRW reduction	WAJ HQ	PMU	Directorate was dissolved in 2012	No
2001 - 2019	WLRP Northern Governorates +RRF	KfW	L	40.2	EUR	28.5	Replacement of distribution network and house connections in selected areas, supply of material	YWC	YWC	Not measured, patchwork approach and lack of flow metering did not enable YWC to target problematic areas, little impact on NRW	No
2006 - 2011	WLRP Water loss reduction Karak, incl. Accompanying measures	KfW	L	26.5	EUR	18.8	Replacement/ restructuring of distribution network to gravity supply, replacement of house connections in selected areas, NRW reduction (planned) from 51% to 25%	Karak governorate	PMU	No impact on NRW, post evaluation reported increase of NRW	No, O&M suffering from inadequate budgets, lack of interest in change management.
2007 - 2009	PPP Pressure management/Leak repair Ain Basha	GIZ Dorsch Consult, VAG	G	0.5	EUR	0.4	Combined PPP project for automated pressure management & active leakage control	Miyahuna	WAJ	Pressure modulation worked well even Under intermittent supply conditions, leak repair and short response periods stabilized low leak leve, real loss reduction of 18%	
2008 - 2011	Introduction of pressure management	JICA	G	0.5	EUR	0.4	Establishment of DZ, reduction of operating pressures through installation of PRV in Fuheis pilot areas	Balqa/ Tafileh	WAJ	NRW % of inflow reduced from 31% to 18%. Successful example, but results not acknowledged by top management nor expanded to other areas	Partly, some PRV's bypassed or not working
2009 - 2012	Water Management Middle Governorates	KfW	L	5.3	EUR	3.8	Identification, procurement and installation of transfer bulk meters; replacement of tertiary networks in Gweireyeh pilot area Zarqa	Zarqa, Madaba and Balqa governorates	WAJ	Most bulk meters out of order, lack of maintenance. Bottom up approach to change worn out tertiary pipes by working back from service connections successful,	Customers still receive good supply in pilot area
2010 - 2011	NRW pilot projects in Amman	USAID	G	0.75	USD	0.5	Three pilot projects to test potential private sector engagement and possibility to expand to other DMA's in Miyahuna	Miyahuna	Miyahuna		Under FARA, 1st PBC contract signed with Jordanian firm
2014	Feasibility Study for NRW Reduction Project Amman	Kubota	G	0.5	JOD	0.5	Implementatation of NRW reduction measures in 4 pilot areas using Japanese technology	Miyahuna	Miyahuna	Reduction of NRW ratio in pilot areas from 34% to 18%	No
2016 - 2018	FASEP	French Govt.	G	0.9	EUR	0.6	Assess NRW in 2 pilot areas & propose PBC options	Irbid Governorate	YWC	Asset management proposal PBC assessment	No follow up by YWC
			Total Value	**89.15**		**63.3**					
Ongoing projects since 2011											
2014 - 2021	FARA Phase I - NRW project modified	USAID	G	60	USD	42.5	Leak detection and mobile maintenance equipment for Amman, Madaba and Zarqa, Comprehensive NRW reduction in 2 distribution zones (DZs) in Amman, Customer meter and bulk meter replacement in Amman, Madaba Zarqa and Aqaba	Miyahuna partly AWC	Miyahuna, AWC	Partiell success, NRW reduced in selected DMA's, but not sustained due to breach of zonal boundaries by operations staff, meter replacement a successful example for appartent loss reduction	Partly

2015 - 2021	WMI Water Management Initiative	USAID	G	35	USD	24.8	Improvement of water supply management in selected areas, devlopment of National masterplan for NRW reduction	All WAJ	MWI	National NRW Masterplan approved, NRW strategy under preparation	Partly
2015 - 2022	Resilience of Water Utilities, Phase I+II	GIZ	G	20.2	EUR	14.3	Improvement of customer management & revenue collection	YWC & Balqa, Karak	Miyahuna, YWC	Limited results due to Corona crisis	Partly
2015 - 2022	Water Supply for Host communities of Syrian Refugees in the Northern Governoates	JICA	G	13.8	JOD		Restructuring of water supply network in Irbid city	YWC (Irbid/ Ramtha)	PMU		No
2015 - 2025	Participatory Resources Management (PRM) to stabilize the situation in host communities	GIZ	G	8	EUR	5.7	Improve water availibility in 14 host communities, pre-water audits, technical design, network rehabilitation post water audit	YWC	WAJ	Reduction of NRW in 9 villages from 51% to 26%, annual water saving 7.3 MCM, payback period 4.6 years	Post evaluation pending
2018 - 2023	FARA Phase II - project	USAID	G	152	USD	107.8	Nation wide Water Metering and Monitorng & Emergency Water Loss Reduction	Miyahuna, AWC, YWC, WAJ	Miyahuna, AWC, YWC, WAJ	In progress, delays due to procurement process and price escalation	
2018 - 2020	Reduction of NRW	GIZ	G	4	EUR	2.8	Supply of leak detection & flow measurement equipment, training of WAJ staff, pressure reduction in selected distribution zones	Balqa governorate	Miyahuna		
2017 - 2024	Improved access to water, water distribution performance & related sewerage disposal for host communities & Syrian refugees in Irbid governorate	AFD/ KFW	G/L	70	EUR	49.6	Component A2 - Rehabilitation/ restructuring of distribution network; NRW reduction in distribution zones	Irbid governorate	WAJ	Design completed, long delays & slow implementation, NRW assessment report delivered	
2017 - 2023	Energy efficiency in the water sector II - Jordan	KfW	L	37	EUR	26.2	Rehabilitation/ restructuring of main distribution network & pumps to reduce energy consumption and NRW	Balqa Governorate	WAJ		
2021 - 2025	Result based financing	KfW	G	28	EUR	19.8	Supporting Operations and commercial management in utilities against agreed performance improvement	All utility companies	WAJ		
2020 - 2026	FARA Phase III - project	USAID	G	152	USD	107.8	Comprehensive NRW reduction measures based on NRW strategy & Masterplan	Miyahuna, AWC, YWC, WAJ	Miyahuna, AWC, YWC, WAJ		
2021 - 2025	Water loss reduction programme	KfW	L	50	EUR	35.4			PMU, WAJ		
			Total Value			**444.7**					
							Planned projects 2022 onwards				
2022 - 2025	Mastaba network rehabilitation	KOICA	G	9	USD	6.4	distribution network replacement	Jerash	WAJ		
2022 - 2025	Deir Alla Water System Improvement	EIB	L	95	EUR	67.3	Complete replacement of water networks	Balqa	WAJ		
2022 -2026	Framework Loan	EIB	L	260	EUR	184.3	NRW measures nationwide + water supply improvements		WAJ		
2023 - 2026	Performance for Results (P4R)	Worldbank	L	300	USD	212.7	Performance based NRW reduction in Amman	Miyahuna, Balqa, Ajloun,Jerash	WAJ		
2022 - 2024	Wastewater treatment, reuse and water supply	GIZ	G	15	EUR	10.6	NRW, Masterplanning, TSM	WAJ, Miyahuna, YWC, AWC	WAJ		
2023 - 2026	Enhancing NRW Management Capacity in Southern Jordan	JICA	G	5	USD	3.5	Capacity building and training on NRW, training centre NRW, improve communication with customers	AWC, Maan Tafileh, Karak	WAJ		
2024 - 2027	Utility support programme	GIZ	G	20	EUR	14.2	Governance, Utility support, NRW	MWI, utility companies	MWI/ WAJ		
2024 ?	PBC Amman	IFC	L	120	USD	85.1	Perfprmance based NRW contract for South Amman				
2024 ?	USAID NRW programme	USAID	G	?	USD		NRW reduction countrywide		MWI		
2025 - 2028	Strong Water Utlities	GIZ	G	20.5	EUR	14.5	Strenghtening water utilities in Jordan		MWI		
			Total Value			**598.7**					
			Applied exchange rates:		1 EUR =	0.7088	JOD				
					1 USD =	0.709	JOD				

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