



Project Information Document (PID)

Concept Stage | Date Prepared/Updated: 21-Jun-2021 | Report No: PIDC31440

**BASIC INFORMATION****A. Basic Project Data**

Country Morocco	Project ID P175747	Parent Project ID (if any)	Project Name Resilient and Sustainable Water in Agriculture (P175747)
Region MIDDLE EAST AND NORTH AFRICA	Estimated Appraisal Date Jan 12, 2022	Estimated Board Date Mar 31, 2022	Practice Area (Lead) Water
Financing Instrument Investment Project Financing	Borrower(s) Kingdom of Morocco	Implementing Agency Ministry of Agriculture - Directorate of Irrigation	

Proposed Development Objective(s)

The project development objectives (PDO) are to improve: (i) the quality of Irrigation and Advisory services; and (ii) the efficiency of water allocation systems in Project Areas.

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

Total Project Cost	150.00
Total Financing	150.00
of which IBRD/IDA	150.00
Financing Gap	0.00

DETAILS**World Bank Group Financing**

International Bank for Reconstruction and Development (IBRD)	150.00
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Environmental and Social Risk Classification
Substantial

Concept Review Decision
Track II-The review did authorize the preparation to continue



Other Decision (as needed)

B. Introduction and Context

Country Context

1. Like in the rest of the world, the **outbreak of COVID-19 pushed the Moroccan economy into a historic recession**, that is unprecedented in recent history. During the second quarter of 2020, which broadly coincides with the confinement period, a 15.1 percent year-on-year real GDP contraction was registered, the largest on record. Economic activity has recovered some dynamism during the second semester, driven primarily by external demand. However, this partial recovery was insufficient to avoid a comparatively large overall contraction in 2020, real GDP declined by 7.1 percent¹.
2. The crisis resulted in a **temporary increase in poverty and vulnerability**. Indeed, despite significant social and economic progress over the past decade due to large public investments, political, institutional and sector reforms, along with measures to ensure macroeconomic stability, key performance indicators had been impacted due to the COVID crisis : the poverty rate is estimated to have increased from 5.8 percent in 2019 to 7.1 percent in 2020, the unemployment rate spiked to 11.9 percent (9.2 percent in 2019) and a recent HCP survey indicates that 37.5 percent of the firms have reduced their workforce in the second half of 2020 (compared to the same period in 2019), with larger contractions among very small business².
3. **Agriculture is a major driver of economic and social development in Morocco**. It contributes to 12 percent of the GDP and employs nearly 38 percent of total employment. In rural areas, this proportion increases to 68 percent, which positions agriculture at the center of economic and social challenges in rural areas. Agriculture contributes to 23 percent of total exports. At such, performance of the agriculture sector has significant impacts in the country's economic performance³. For instance, between 2018 and 2020, when there was a significant reduction in agriculture production, agriculture GDP contracted by around 13.4 percent (as result of two successive years of drought) and dragged the overall GDP growth from 3.1 percent in 2018 to -7 percent in 2020.
4. **Several shocks had impacted the performance of the agriculture sector** in the last few years, in particular the increasing water scarcity due to climate change, and the COVID pandemic:
 - **Climate change** is putting increased pressure on water and land resources and is likely to have severe negative impacts on agricultural production. Indeed, in term of temperature, Morocco has experienced considerable warming trends, with mean annual temperature increasing 0.9°C since the 1960s, with observed average increases of 0.2°C per decade⁴. As for the precipitation, through the past several decades, observed trends have shown more erratic rainfall and an overall decline in precipitation as well as an increase in the frequency and intensity of extreme events such as droughts and heat waves. This reduced river flows and increased evaporation and siltation of storage dams, which leads to a 20 percent reduction in overall water resources in the last 30 years⁵. In the future, projections show that climate change impacts will increase mean annual temperature by 1.5°C to 3.5°C by 2050, and significantly reduce average annual rainfall across the country from 10 percent

¹ Morocco's Economic Update (April 2021) : The World Bank Group

² Morocco's Economic Update (April 2021) : The World Bank Group

³ Climate Variability, Drought, and Drought Management in Morocco's Agricultural Sector (2018): World Bank Group.

⁴ Climate Risk Profile: Morocco (2021): The World Bank Group

⁵ USAID (2016). Climate Change Risk Profile – Morocco.



to 20 percent to as much as 30 percent decrease in some regions of the country⁶. This said, the climate change impact on agriculture is already seen and will further expand. Indeed, the 2016 winter grain harvest saw harvested yields 70 percent lower than in 2015 due to widespread drought. Besides hotter, drier conditions are expected to increase crops' water requirements by up to 12 percent, increasing demand for irrigation and further stressing limited water resources. Drought also promotes proliferation of the Hessian fly, increasing risk of damage to wheat yields. Rising temperatures are expected to reduce yields by 50–75 percent of rainfed crops during dry years. Erratic precipitation and increased aridity and drought conditions will result in shortened growing seasons, reduced yields and lower productivity⁷.

- The COVID outbreak has also largely impacted the development of agriculture sector in Morocco. Indeed, the strict confinement measures adopted by the Moroccan governments between March and June 2020 to fight the spread of the pandemic led to a significant slowdown of economic activities in the country. Besides, the deep recessions undergone by southern European countries, the most relevant markets for the Kingdom's exports, had impacted the value-added of agriculture in the national economy.
- 5. As consequence to these shocks, the real GDP has contracted by 7.1 percentual points in 2020, but is expected to accelerate to 4 percent in 2021. In this baseline scenario, agricultural output returns to meet historical trends thanks to more favorable weather conditions, the vaccine rollout proceeds according to the government's plans, monetary policy remains accommodative, and maintained fiscal stimulus.

Sectoral and Institutional Context

- 6. **Increasing water scarcity affects both surface waters and aquifers.** Water resources in Morocco are limited and unequally distributed in space and time with 70 percent of them are concentrated in the north of the country, which barely represents 15 percent of the national territory⁸. The availability of water resources has been historically reducing with 22 Billion m³/year in average between 1945 and 1979, but only 15 Billion m³/year in average between 1980 and 2018. Water availability per capita is estimated at 620 m³/year, far below the water poverty level and the country is getting close to the threshold of absolute scarcity (500m³/cp/yr). Indeed, renewable water resources per person have declined by almost 60 percent since 1960 due to non-climate stressors such as population growth in the north, irrigation expansion, and urban, industrial and tourism development. At the same time, rising temperatures and more erratic rainfall have reduced river flows and increased evaporation and siltation of storage dams, leading to a 20 percent reduction in overall water resources in the last 30 years⁹. This water shortage situation led to the overexploitation of renewable groundwater resources by 25 percent¹⁰, this is mainly caused and affected in return largely the water allocation to the agriculture sector.
- 7. The irrigated agriculture in general and the collective irrigation schemes managed by public entities¹¹ in particular, have been **severally hit by water restrictions over the years**, especially in Oum Er Rbia and Tensift river basins. In

⁶ Direction de la Recherche et de la Planification de l'Eau, Changement climatique et ressources en eau au Maroc : Synthèse bibliographique des principaux résultats et conclusions relatifs à l'évolution et changement du climat et leurs impacts sur les ressources en eau au Maroc (2019)

⁷ Climate Risk Profile: Morocco (2021): The World Bank Group

⁸ Ministry of Equipment, Transport, Logistics, and Water --Water Department. Draft National Water Plan 2020–2050. Submitted for review to the Interministerial Water Commission, December 2019.

⁹ USAID, Morocco's Climate Change Risk Profile, December 2016

¹⁰ Ait Kadi M., Ziyad A. (2018) Integrated Water Resources Management in Morocco. In: World Water Council (eds) Global Water Security. Water Resources Development and Management. Springer, Singapore.

¹¹ The ORMVA for Offices Régionaux de Mise en Valeur Agricole.



average, over the last 3 irrigation seasons, only 42 percent of the theoretical water allocation has been actually allocated to the schemes in these two basins¹².

8. Considering this context of increasing water scarcity and the necessity for the agriculture sector to produce more with less water (more crop for drop), the Kingdom of Morocco launched in 2008 **the Green Morocco Plan** (PMV- Plan Maroc Vert) which was accompanied by an ambitious program of on-farm modernization aiming at the increase of water productivity¹³ and improvement of the irrigation delivery services¹⁴: the **National Program for Water Savings in Agriculture** (PNEEI- *Programme National d'Economie d'Eau en Irrigation*). These programs contributed significantly to the efforts led by Morocco in term of Climate Change mitigation and in term of implementation of NDCs in particular through the modernization of the agricultural sector to make it more competitive and through the promotion of natural resources sustainable management¹⁵.
9. **Based on the encouraging results of the PMV and the PNEEI**, His Majesty King Mohamed VI launched the new Green Generation Strategy (GGS) 2020-2030 that aims to create a new generation of agricultural workers and entrepreneurs particularly among young and rural populations including females¹⁶. **Promoting water efficiency use in agriculture is also considered as key issue in water sectoral strategies** namely the National Water Plan and the National Program for Water Supply and Irrigation 2020-2027.
10. The Draft of the **National Water Plan** foresees a significant increase in water demand, mainly in agriculture sector by far Morocco's biggest water user, with a rise of withdrawals expected to 10 percent (from 14.5 billion m³ in 2020 to 16 billion m³/year in 2050)¹⁷. In this regard, the plan builds on the PNEEI expected results, combined to the modernization of irrigation, to reduce water use in agriculture by nearly 1.8 billion m³ per year.
11. The **National Program for Water Supply and Irrigation 2020-2027**¹⁸, set as an emergency program launched in 2020 to accelerate investments in water sector, aims at strengthening the drinking water and irrigation supply to cope with the impact of the severe droughts that country faces from 2015-2017. This program plans also an investment of US\$1.3 billion to support water productivity program in irrigation up to 2027.
12. To support all these efforts, the World Bank carried out a stocktaking exercise in 2020 together with the Ministry of Agriculture after twelve years of implementation and the near end of Phase 1 of the PNEEI¹⁹. The main lessons learned of the first phase of the program are the following: (i) the **uptake of modern on-farm technology (mainly**

¹² For the irrigation schemes of Haouz, Tadla and Doukkala, only 1,165 Mm³ have been allocated between 2017 and 2020, representing 42 percent of the theoretical allocation of the PDAIRE (2,767 Mm³) with extreme rationing in 2019/20 (only 27 percent of volume allocated). These three schemes represent 360,000 ha (more than half the area equipped of the large-scale irrigation in Morocco) benefitting more than 100,000 family farmers. This water rationing is originated by 2 phenomena: (i) the decrease of precipitation ;and (ii) the priority allocation, through inter-basin transfers for urban waters, to Casablanca/Safi/Jadida (300 Mm³/year) and Marrakech (100 Mm³/year). The desalinated plant to be built for Casablanca WSS will alleviate considerably this situation of competition over the resource.

¹³ The program includes funding for: (i) modernization of off-farm hydraulic assets for collective schemes; (ii) subsidies for on-farm equipment (80-100 percent depending the profile of farmers); and (iii) technical assistance.

¹⁴ In the Large-scale irrigation schemes, the shift is from rotational surface irrigation to on-demand service with modernized on-farm technology (drip) and modernization of pressurized systems using sprinkler with individualization of services at the hydrant's level. This change of irrigation delivery service creates the conditions for the farmer to diversify toward cash crops and intensify his production (increase of land use intensity).

¹⁵ UNFCCC, Morocco – Nationally Determined Contribution under the UNFCCC (2016)- For the agriculture sector, the main adaptation objectives for 2030 are : (i) Extension of irrigation to new agricultural areas, over 260,000 hectares for an overall investment of US\$ 3 billion and (ii) Equipping and modernizing irrigation systems over 290,000 hectares for an overall forecasted US\$ 2 billion.

¹⁶ A Pfor cofinanced by the World Bank and the French Development Agency (*Agence Francaise de Developpement* (AFD)) has been approved to support the Green Generation Strategy (P170419) for an amount of US\$ 250 million for WBG and Euros 100 million for AFD.

¹⁷ Ministry of Equipment, Transport, Logistics, and Water --Water Department. 2019. Draft National Water Plan 2020–2050. Submitted for review to the Interministerial Water Commission, December 2019.

¹⁸ Ministry of Equipment, Transport, Logistics, and Water. 2020. *Programme National pour l'Approvisionnement en Eau potable et l'Irrigation*

¹⁹ With the Directorate of Irrigation and development of rural territory (Direction de l'Irrigation et de l'Aménagement de l'Espace Agricole – DIAEA).



drip) has been important for individual farmers reaching 395,000 Ha equipped between 2008 and 2020. Most of these beneficiaries are medium or large farmers irrigating from aquifers (individual wells); (ii) the **adoption of this technology has been slower for small farmers targeted within collective schemes** due to heterogeneity of farmers' interests, administrative delays mainly linked to land issues and delays on works off and on-farm. A World Bank project²⁰ is supporting the Program in Doukkala, Haouz, Tadla and Gharb schemes; (iii) **positive outcomes for the farmers** have been evidenced, in particular the doubling of water productivity (defined as the added value in US\$ created for each cubic meter)²¹. Also, women farmers have been satisfied with the switch to localized irrigation because the new system reduces the arduousness of women's work in the fields (weeding, etc.) as well as working hours²².

13. Nevertheless, most of the time, **the conversion to modern on-farm irrigation equipment did not lead to a reduction in irrigation water consumption at farm level**. This is explained by the fact that the farmer tends to maximize the use of its means of production; equipped with localized irrigation and if not constrained in his water use, the irrigator tends to increase the intensity of cultivation and turned towards crops with higher added value, often consuming more water than previous crops, most of the time contributing to overexploitation of aquifers. This process is well documented worldwide and called the **Jevon's paradox**.
14. **In order to maintain the water withdrawals at a sustainable level**, complementary measures have to be implemented in the addition to the technology upgrade, such as: (i) definition and enforcement of a *water quota*²³ (allocation), defined annually in accordance to water availability. This complementary measure is work on progress, in particular under the WBG project PMGI; and (ii) improvement of the water police enforcement in particular for sustainable aquifer management (collective action for aquifer management such as *Aquifer contract*).
15. Within this context, the **objectives of the proposed project** are three-pronged: i) to support small farmers' livelihoods; ii) to tackle water insecurity and adapting to both climate change and legacy groundwater depletion issues and; iii) improving institutional efficiency, using proven modernization processes while incorporating innovative tools that could be scaled-up in the future to tackle key sustainability issues such as overexploitation of water resources and adaptation to increasing water security.

Relationship to CPF

16. Promoting Inclusive and Resilient Territorial development is a priority for the Bank's engagement in the country (Focus Area C), as reflected in the World Bank Morocco's 2019-2024 **Country Partnership Framework (CPF)**²⁴, discussed by the Board of Executive Directors on February 19, 2019 (Report # 131039-MA). Specifically, the

²⁰ The Large-Scale Irrigation Modernization Project (P150930), called PMGI in French (Projet de Modernisation de la Grande Irrigation), a follow-up project of PROMER (Modernization Of Irrigated Agriculture in the Oum Er Rbia Basin) closed in 2017.

²¹ Positive outcomes include: (a) the doubling of water productivity (from 0.25-0.5 US\$/m³ to 0.5-1.0 US\$/m³); (b) a significant increase of land use intensity (from 90-100 percent to 120-140 percent); (c) the diversification of the crop pattern from cereals towards cash crop; (d) the increase of yield by 30 to 50 percent (Kg/ha), and (e) overall, a notable increase of farmers' income (between 40 and 100 percent), according ICR of WBG and ADB projects as well as results from M&E system of PMGI project.

²² Rapport de capitalisation des acquis du projet pilote d'économie et de valorisation de l'eau d'irrigation dans le périmètre des Doukkala (GCP/MOR/033/SPA)

²³ The aim is to create a system of annually revisable water quotas that allow the farmer to plan its production knowing exactly what would be his quota at the beginning of a season. If the year is dry, the allocation will be below the average and the farmer can elaborate his strategy (reducing the area, changing crop pattern, not cultivating, etc.). If the year is favorable, the quota could be increased to allow the farmer to maximize his revenues as well as the agriculture GDP for the country (and job creation, food security, etc.).

²⁴ The CPF is structured around three strategic focus areas. These are: Focus Area A: Promoting Job Creation by the Private Sector; Focus Area B: Strengthening Human Capital; and Focus Area C: Promoting Inclusive and Resilient Territorial Development. The CPF has Governance and Citizen Engagement as its foundational pillar, as well as two cross-cutting themes: Gender and Digital Technology.



proposed operation is aligned with the CPF's objective 9 namely "Improve of Access to Sustainable Water Resources" and CPF's objective 10 namely "Strengthen adaptation to climate change and resilience to natural disasters". By promoting the improvement of the quality of Irrigation and Drainage services and contributing to the implementation of efficient water allocation systems, this operation aims to support the adaptation of the agriculture sector to climate change and to efficiently address the drought and water scarcity hazards that the country is and will face.

17. Besides, the project will also support the cross-cutting theme of the CPF Gender – Empowering Women and Girls for Shared Prosperity through promoting revenues of women farmers which will contribute to "improving women's mobility, health, and access to services".
18. The proposed project is well-positioned to contribute to the new Middle East and North Africa (MENA) Regional Strategy on Economic and Social Inclusion for Peace and Stability. In particular, it is aligned with (i) Pillar 1 on Renewing the Social Contract as it emphasizes more inclusive economic growth and the protection of natural resources, which are considered public goods to be preserved as part of the intergenerational social contract, and (ii) Pillar 2 on Strengthening Resilience to Shocks, such as climate shocks.
19. Furthermore, the proposed project is aligned with the World Bank's twin goals on ending extreme poverty and promoting shared prosperity. In fact, through promoting water efficiency and developing improved irrigation infrastructure, the operation will significantly enhance agriculture productivity and increase family farmers' revenues.
20. Finally, the project fits perfectly with the MENA Region Resilience, Efficiency, Inclusion and Sustainability (RISE) framework, in the 4 components : (i) Resilience to multiple shocks, (ii) Efficiency in resources management, since the project will support climate change impacts reduction and promote water resources efficiency and preservation; (iii) Inclusion of the family farmers, youth and female producers and (iv) Sustainability for growth and job creation, through increasing and developing sustainable value for small farmers.

C. Proposed Development Objective(s)

21. The project development objectives (PDO) are to improve: (i) the quality of Irrigation and Advisory services; and (ii) the efficiency of water allocation systems in Project Areas.
22. The Project areas refers to the irrigation schemes under the management of the 4 ORMVAs (Tadla, Haouz, Gharb and Doukkala) as well as areas of private irrigation using aquifers (TBC).
23. To achieve the quality improvement of the **irrigation services**, the project supports activities at the level of irrigation managers to enhance the irrigation services provided until the hydrants (off-farm modernization): (i) the conversion of gravity networks to on-demand pressurized networks on areas with natural slopes (without need of energy to pressurize the systems); and (ii) the institutional strengthening of the service providers (ORMVAs) to improve their institutional capacity in the operation and maintenance of the irrigation network. The improved water service is defined as: (i) individual access to water (rather than collective); (ii) on-demand or restricted on-demand (rather than on rotation); and (iii) reliable and equitable (with optimal flow and pressure throughout the irrigation network, rather than having flow and pressure drops in specific areas / time).
24. To achieve **improvement of advisory services**, the project includes enhancement of public and private advisory services, under the leadership of ONCA and ADA, complemented by technical assistance to develop farmers'



access to, knowledge of, and management of improved irrigation technologies, mainly drip irrigation (Component 2).

25. The improvement of the **access of farmers to modern irrigation technologies** is provided through the technical support to design on-farm modernization and prepare the administrative files for the request for subsidies provided by the Moroccan government.
26. To achieve the second part of the PDO (**implementation of efficient and sustainable water allocation systems**), the project will include several activities, including pilot initiatives under Component 3, aiming at implementing efficient allocation/quota systems for surface and underground water (including a platform for tradeable quotas²⁵) and support the aquifer contract implementation in Souss-Massa region (TBC).

Key Results (From PCN)

27. The expected Key results (PDO indicators) are:

- 12,000 small farmers provided with **improved Irrigation and Drainage service delivery**, of which female and youth (40 percent) (TBC). The improved I&D service includes: (i) modernized **off-farm I&D service**- (Component 1) and (ii) **better access to on-farm modern irrigation technologies** – (Component 2).
- 30,000 small farmers (TBC) reached by **improved advisory services**, of which female and youth (40 percent) (TBC), including beneficiaries of previous projects – (Component 2).
- **Volume of water (TBD) traded through the water allocation platform in Tadla scheme**, providing more flexibility in allocation and improved water productivity as well as increasing irrigation manager's revenues contributing to a better O&M cost recovery ratio- (Component 3).

28. Other key results will include:

- **Annual water allocation systems operational** in the intervention areas (LSI) to control water withdrawals - (Component 3).
- **Chtouka Aquifer contract operational**, aiming sustainable control of water withdrawals (with wells equipped with meters), with effective participation in the aquifer governance of the main stakeholders (*Agence de Bassin Hydraulique-ABH* of Souss-Massa, ORMVA of Souss Massa, farmers)- (Component 3). During project preparation, it will be assessed if other area could benefit from this support in different conditions (such as in Tadla or Haouz schemes).

29. The project will give a special attention to **women and youth**. The experience of the past projects showed that women farmers had significantly less access to improved irrigation services than men even though they constitute an important part of the agricultural workforce²⁶. Young farmers and entrepreneurs are a target of the Green

²⁵ Water Expertise Facility (WEF) funds are currently supporting the preparation of a legal analysis (to verify the compatibility of tradeable quotas with Moroccan legal framework) as well as a financial modelling to assess impacts on revenues for the irrigation manager and for the farmers.

²⁶ World Bank 2018 Bank Country Diagnostic. Pg. 76: While 57 percent of the female population participates in agricultural work, their contributions often remain unpaid or underpaid, and they lack access to land, finance and technical advice. About 73 percent of female labor in the primary sector is unpaid, even higher than the 60 percent unpaid labor rate for youth. Women earn 50 percent less for agricultural work than men. This is the largest gender wage gap—for the same job and same qualifications—of any sector in Morocco. Overall, women earn between 30 and 50 percent less than a man depending on the sector.



Generation Strategy. The project will incentivize an increased participation of Women and Youth in the Stakeholders Engagement Plans prepared in the pre-investment phase (before the decision to embark in the modernization process) to ensure an increased participation in the governance structure (especially of Water Users Associations- WUAS) and as direct beneficiaries. The project will coordinate with national and local initiatives to catalyze benefits for this two groups (e.g., coordination with the one-stop shop managed by the *Agence de Développement Agricole (ADA)* and local bureau of agriculture (*Direction Régionale de l'Agriculture*) to provide incentives and advisory services to these groups of beneficiaries).

D. Concept Description

30. The project design is inspired from the successful implementation of the PMGI project using a three components' design and will include innovations and findings from several ASAs such as: the Water Resource Management- Phases 1 and 2 and the Agriculture Sector Advisory Services and Analytics (ASA) Report (P171445).
31. The proposed project will also build synergies with the **Program for Results “Strengthening Agri-food Value chains”** (P158963) as well as the **Program for Results supporting the Green Generation** (P170419), both financed by the World Bank, to catalyze some support (especially those for youth farmers and entrepreneurs, for agribusiness development, promotion of diversification, etc.) to the targeted beneficiaries in order to maximize the project's impact. Details of already identified areas of synergies are described in the section dedicated to the project design.
32. The three components of the project are: (i) Component 1: Modernization of Irrigation and Drainage services provided by the main hydraulic assets within collective schemes (estimated budget at this stage: US\$110 million); (ii) Component 2: Support to farmers to access modern on-farm technologies and advisory services to optimize water use (US\$20 million); and (iii) Component 3: Support to stakeholders (Line Ministries, Irrigation Managers/ORMVA, Water Basin Agencies/ABH, WUAs, etc.) for enhancement of sustainable Water Resource management and project management (US\$ 20 million).
33. Component 1: Modernization of Irrigation and Drainages services provided by the main hydraulic assets within collective schemes. This Component 1 will construct pressurized irrigation networks to replace existing open canal networks (Tadla, Haouz, TBC), and renovate existing pressurized irrigation networks (Doukkala, Gharb, TBC). This component only finances off-farm investments, including hydrants²⁷. Under adequate management, the networks' design will provide farmers with an improved water service, in line with the technical requirements of improved irrigation technologies, aiming at increasing drastically the water productivity as achieved in previous projects.
34. At this stage of the project preparation, the intervention areas are not fully decided as the MAPMDREF is having a series of consultation with regional governments and stakeholders to prioritize the areas. In the 2020 stocktaking study jointly prepared with the Directorate of Irrigation, the **sectors of G4-G11 of Tadla**²⁸ and the sectors **Sahrij, Attaouia and Freita in Tessaout sub-scheme**²⁹ (**Haouz**) were assessed as the best possible areas to modernize. The annex shows the location of these areas for Tadla and Haouz. The potential areas for Doukkala and Gharb are

²⁷ The on-farm equipment is financed by FDA funds as mentioned before; one of the objectives of component 2 is to support the WUA and the farmers to prepare technical studies and request for FDA subsidies for on-farm investments.

²⁸ Technical studies are in an advanced stage for Tadla's sectors (draft tenders document).

²⁹ Feasibility studies are completed for Tessaout's sectors; some of the tender documents are under preparation.



not confirmed. A remote sensing analysis is on-going on the four irrigation schemes to support the characterization of the baseline situation as well as assess the trends in other sectors modernized in the past.

35. Component 1 will include all activities related to the cycle of **physical rehabilitation**: (i) carrying out detailed studies, including topographic works and laboratory tests; (ii) provision of technical assistance for monitoring and control of works; (iii) upgrading main irrigation canals and constructing reservoirs to install flow-regulation systems necessary for on-demand irrigation; (iv) constructing feeder pipes for areas that benefit from gravity pressurization, and modernizing pumping stations for areas that need artificial pressurization; (v) constructing filtration stations; (vi) constructing distribution piped networks to replace existing canals, or modernizing and extending existing distribution piped networks; and (vii) installing outlets and associated devices, including meters, at the block and farm levels, to regulate, measure, and control water delivered to farmers.
36. This component 1 will also include crucial **soft activities** such as the provision of technical assistance to, and acquisition of equipment for the Project Implementing Entities to strengthen **performances in Irrigation and Drainage service delivery**. On the latter, it is proposed that the ORMVAs pilot the use of new approaches and tools developed by the Global Solution Group “Water in Agriculture” of the WBG to better assess and improve the performances of irrigation manager (e.g. approaches developed in the Handbook “Governance in I&D services” published in 2019 and the related tools the main parameters of the services such as the “Irrigation Utilities of the Future Tool” under current development). This component will be executed by the ORMVAs.
37. Component 1 activities will contribute to increase beneficiaries’ climate adaptation and mitigation by modernizing main assets creating conditions for the improvement of irrigation service that has proven in past project that it allows a doubling of water productivity. The modernization towards pressurized system does not increase the consumption of energy as the new networks will have gravity-based pressurization.
38. **Component 2: Support to farmers to access modern on-farm technologies and advisory services to optimize water use.** Component 2 will strengthen farmers’ knowledge and awareness in accessing improved irrigation technologies (mainly drip irrigation), which could be adopted as a result of the improved water service provided by the ORMVAs. It will facilitate access to financing opportunities by supporting Water User Associations (WUAs) in jointly applying to *Fonds de Développement Agricole* subsidy on behalf of farmers. Once the improved irrigation technologies are in place, farmers will develop their capacity to sustainably manage and maintain the irrigation systems and will get access to modern irrigation advisory services that use remote sensing and digital technologies to support on-farm irrigation and field management practices, in particular the system of Alert for Irrigation³⁰ developed under the PMGI.
39. Component 2 activities will include provision of capacity strengthening to *Office National de Conseil Agricole* (ONCA) and complementary technical assistance (from private providers) to the Project Implementing Entities to: (a) support farmers to access and manage improved irrigation technologies (technical studies and preparation of requests for FDA’s subsidies for on-farm equipment); and (b) provide advisory/extension services to support the farmers in the improvement of agricultural production (diversification towards high value crops, support for adding value and marketing, etc.);

³⁰ This systems provide advises to the farmers about when and what quantity of water to applicate, considering the recent weather information and the water needs of the crops. It has been designed to communicate through 3 channels : (i) Daily and personalized individual SMS; (ii) Monthly bulletin and (iii) backboard located near the offices of ORMVA and/or agriculture bureaus. To date, the Alert for Irrigation system is still under finalization but some pilots have been run in Tadla and Gharb with the three channels of communication.



40. The institutional arrangements of this component will be discussed during next stages of project preparation. In previous projects, it was executed under the ORMVAs but the intention is now to fully transfer the tasks related to agricultural advisory services to ONCA, with a participation of the ORMVA and the *Agence de Développement Agricole* (ADA)³¹ to be defined.
41. To the extent possible, the different PIUs will coordinate to target the beneficiaries of this project with additional support aiming at diversification to high value crops with secure market especially from: (i) Result Area 1 (Increased market efficiency and integration); (ii) Result Area 2 (Improved added-value of agri-food products) of the **Program for Results “Strengthening Agri-food Value chains”** (P158963) as well as from: (iii) Result Area 1 (Increased job opportunities and income generation for rural youth) of the **Program for Results supporting the Green Generation** (P170419), both financed by the World Bank. In particular, the project will assess the potentialities to develop Productive Alliances, a mechanism to link farmers to buyers and financial partners (e.g. in organic farming or any other high value crops and potential for marketing), while making available all the new supporting services developed in the sector (e.g., market price information system “Asâr” developed under the first PforR (P158963) or any other new digital tools developed with the second PforR).
42. Component 2 activities contributes to the adaptation and mitigation co-benefits by providing access for the small farmers to modern on-farm technologies and the related advisory services to improve the water productivity at farm level without consuming additional energy. The improvement of surface water will incentivize the farmers to reduce the water withdrawals of underground waters which will also decrease the overall use of energy.
43. **Component 3: Support to stakeholders for enhancement of sustainable Water Resources management and project management.** This component will include capacity strengthening for the main stakeholders involved in the project (ORMVAs, ABH, Ministries in charge of Agriculture and Water Resources Management) such as training and technical assistance, acquisition of computer equipment, software and associated tools, in particular for the ABH as the ORMVA were strengthened in previous projects.
44. It will also support innovative solutions and pilot operations among them : (i) Investments to support the Aquifer contract in Chtouka such as equipment (meter), technical assistance and studies³² (and other TBD); (ii) Design, development and implementation of a suite of scalable water management and Agro-informatics tools³³ building on advancements in remote sensing and data analytics to improve performances of irrigation services, and land & water productivity; (iii) Development of technical-economic tools to improve regulation, cost recovery and create conditions for private sector involvement; and (iv) Enhancement of knowledge to improve WR planning: aquifer balance, contribution of snow melting, quantitative and qualitative modelling, etc. This component will also finance the activities related to Project Management at Central Level and at the regional level.

³¹ In particular, ADA could play a role in ensuring synergies with other national policies (e.g., support to organic farming) as well as mobilizing complementary green finance (e.g., ADA is accredited to the Green Climate Fund).

³² Chtouka’s aquifer is located close to Agadir in Souss-Massa Region and is in a situation of extreme overexploitation, mainly due to expansion of greenhouses producing vegetables for export (sherry tomatoes). The desalinization project (for WSS in Agadir and supply of irrigation water for Chtouka region) is almost concluded and includes a Take or Pay mechanisms for the farmers to use 3,600 m³/ha of desalinized water to alleviate pressure on aquifer. A Decree of Aquifer safeguard was promulgated in 2017. A private consulting company will provide TA to support the implement of the aquifer contract on behalf of ABH and MAPMDREF as well as an observatory (probably managed by University Mohamed VI) to monitor the impacts of the new modalities of water governance.

³³ Development of these tools will be in connection with the proposed digital farmers advisory service and will include applications such as crop monitoring, consumptive water use (ET) monitoring, water accounting, performance benchmarking & monitoring, and yield forecasting



45. Some activities in this component, especially the ones related to digital, will also benefit from **synergies** from the Result Area 3 (Enhanced digitalization of agriculture and adoption of climate-smart practices) of the **Program for Results supporting the Green Generation** (P170419) as well as the activities funded by the Korea World Bank Partnership Facility (KWPF) under the title “Support for Digital and Climate-Smart Agriculture”.
46. Component 3 activities will contribute to adaptation effort by putting in place all the complementary measures, some as pilot initiatives, that will ensure a better governance of water resources to adapt sustainably the irrigated agricultural sector to the increasing water scarcity and competition over the resources. The support to aquifer contract and the implementation of efficient allocation (quota) system will ensure a better use of water available and a control over the total withdrawals, especially for underground resources.
47. *Environment aspects.* The environmental risk rating is considered Substantial because of the nature of construction works. The implementing agencies DIAEA (Central) and ORMVAs (Regional) gained valuable experience in dealing with WBG safeguards during the previous Projects "PROMER" and the ongoing "PMGI". The DIAEA and the four ORMVAs have well-established and staffed PMUs with ES focal points who are managing ES aspects. Besides the risk related to the capacity of certain stakeholders, certain project activities present moderate to substantial environmental risks, it is the installation of pipes for transporting irrigation water on lines of several km which include sections contiguous to very frequent highways, the generation of large volumes of excavation, the management and use of which must be specified in the tender documents. With regard to the risk on water resources, it is considered low because the more reliable access to surface water provided by the ORMVAs which is of lower cost and better quality would reduce the need to tap into the groundwater (as it is the case in sectors covered by PROMER and PMGI projects.). The improved water service, coupled with a better access to improved irrigation technologies would allow farmers to use water more effectively (better responding to the crop requirements in water and nutrients through a more precise irrigation scheduling) and efficiently (reducing evaporation and percolation losses), thus increasing yields, increasing cropping intensity, and/or changing cropping pattern towards higher value crops.
48. *Social aspects.* The Social Risk Rating is Substantial. The social risk is rated Substantial because of the following: (i) some land affectations are expected in off-farm modernization processes as it was the case in predecessor projects for pipes and small reservoirs (PROMER, PMGI..).The process of land acquisition process had been well managed by the ORMVAs (RAPS preparation, PAPS assistance, monitoring of compensations, etc.) which have dedicated staff for these operations. (ii) The implementing agencies have well established and operational GRMs. These GRMs are among the best for Morocco portfolio. All the ORMVAs were very responsive to the beneficiaries' grievances and did a great work to optimize and improve their GRMs. (iii) Stakeholders management: the ORMVAs has experience dealing and working with most of public entities (water department, ABHs...) as well as with civil society organizations and the associations (Water Users Associations -AUEAs, Gender etc. In addition, the ORMVAs have the capacity to manage labor issues and most of national regulations related to child labor and occupational health and safety are integrated into internal procedures and in procurement requirements. Another social risk to also consider is related to discrimination/ and elite capture, with the possibility that larger-irrigation farmers capture project benefits and the exclusion of some categories of poor farmers. However, the use of the ESF will be new for DIAEA and ORMVAs and will request more attention for ESF instruments preparation. In addition, and for the component 3 that include a new player (ABH Souss Massa), capacities, both institutional and technical, need to be assessed regarding ESF requirements for preparation and implementation.
49. At this stage, the areas of project implementation are not known, thus in order to manage negative risks and impacts, DIAEA will develop, consult and disclose an ESMF that will set out the principles, rules, guidelines, and procedures to assess the environmental and social risks and impacts. It will contain measures and plans to reduce,



mitigate and/or offset adverse risks and impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project risks and impacts, including on its capacity to manage environmental and social risks and impacts. The ESMF will include adequate information on the area in which the project is expected to intervene, including any potential environmental and social vulnerabilities of the area; and on the potential impacts that may occur and mitigation measures that might be expected to be used. The ESMF will take into account all the 10 ESS Environmental and Social Standards (ESSs) of the World Bank ESF including the analysis of the safety of the dams on which the proper functioning of the project depends.

The ESMF will present the socio-economic characteristics of the project areas (distribution of farm sizes, types of rotations, income per hectare, number of women farmer / manager and / or working in farms, etc.). It will also present the volumes of water used for irrigation in the initial state and that planned with the implementation of the project, distinguishing between surface and groundwater resources. Based on these data and on the analysis of probable impacts, the ESMF will identify adequate measures for monitoring water resources within the framework of the project.

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No
Summary of Screening of Environmental and Social Risks and Impacts	

Note to Task Teams: This summary section is downloaded from the PCN data sheet and is editable. It should match the text provided by E&S specialist. If it is revised after the initial download the task team must manually update the summary in this section. *Please delete this note when finalizing the document.*

Note: To view the Environmental and Social Risks and Impacts, please refer to the Concept Stage ESRS Document. *Please delete this note when finalizing the document.*

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