

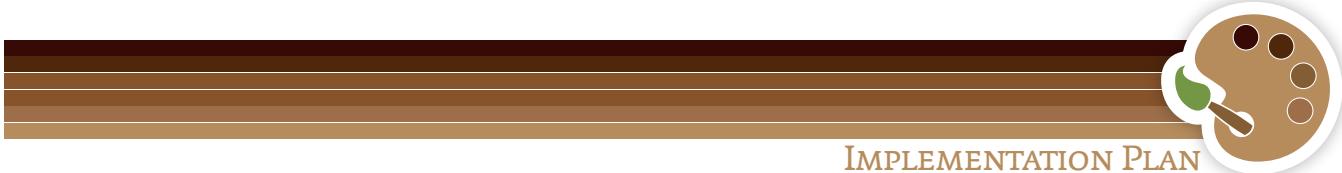


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# REGIONAL IMPLEMENTATION PLAN OF THE NENA SOIL PARTNERSHIP: TOWARDS SUSTAINABLE MANAGEMENT OF SOIL RESOURCES

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This work is the result of the efforts of many international and regional soil experts unified by the FAO Global Soil Partnership (GSP). Experts from Near East North Africa (NENA) region met in Amman Conference (1-3 June 2015) and, with the support of the FAO GSP Secretariat, analyzed the state of soil degradation and soil management in NENA region. They used the endorsed Plans of Actions (PoAs) of the FAO Five Pillars and formulated the Regional Implementation Plan of the NENA Soil Partnership (RSP) showing strong will to protect the soil resources in the region and globally. The report contains the Regional Implementation Plan (RIP) developed in close cooperation with the NENA Five Working Groups formed during the conference and the focal points of GSP from the NENA countries. It includes participatory regional implementation plan defining outcomes, activities, actors and partners, time frame and potential resources partners, partners and implementation risks.



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## I. EXECUTIVE SUMMARY

The NENA region is located in West Asia-North Africa and includes Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, South Sudan, Sudan, Syria, Tunisia, United Arab Emirates and Yemen. The NENA region is diverse in terms of its climatic conditions, soils, flora, fauna, land use, and human activities. Soil degradation is driven by complex variables, including climatic factors, economic factors, institutional, national policies, conflicts and population growth and pressure. Cropland with mismanaged practices and inappropriate use of water resources in irrigation, unplanned urban expansion, land encroachment, overgrazing and infrastructure extension are among the major causative factors of soil degradation and deterioration of land quality.

Resource constraints, weak political will and the low priority often given by national governments to soil degradation, contribute to the forces slowing down progress in its control. Several methods were implemented for the global assessment of soil degradation (GLASOD, LADA/WOCAT) using expert estimation or real data with more focus on the impact of land degradation on soil productivity and functions and mapping of SLM practices. The main objectives of the Global Soil Partnership (GSP) and Regional Soil Partnerships (RSP) are developing global and regional action plans for sustainable management and monitoring of limited soil resources as a key element in sustaining food security and the environmental functions of the soils.

Regional Soil Partnerships (RSPs) were established to activate an interactive consultative process with national soils entities working on soil functions and processes, including cross-cutting dimensions related to desertification, climate change, ecosystem services and biodiversity particularly linked to policies and strategies of major UN conventions (UNCCD, UNFCCC, CBD). RSPs also build on existing regional networks or collaborative processes, linking national and local networks, partners, projects and activities to ensure that the partnership process is country-driven. The RSPs should provide guidance on regional goals/priorities and the required implementation mechanisms and regularly review progress in achieving common objectives and targets.

The regional implementation plans (RIP) for the Regional Soil Partnerships (RSP) are built in harmony with the Plans of Action (POA) for the five Global Soil Partnership (GSP) pillars in a way to enhance synergies among pillars. The RIP is developed following the guidelines suggested by GSP secretariat and considering the specific challenges, gaps and opportunities in the NENA region. The development of the RIP of activities followed the recommendations provided by the soil experts participating in the RSP five working groups formed during the RSP Conference (Amman, 1-3 June 2015) and the focal points nominated for each of the NENA countries.

For Pillar one “Promote sustainable management of soil resources and improved global governance for soil protection and sustainable productivity”, the RIP proposes creating a decision support system (DSS) for each target area for effective assessment and improvement of soil quality, as main element of natural and cultivated capitals, and identification of bright spots and hot spots for immediate conservation and remediation actions. The RIP also suggests the implementation of relevant SSM/SLM, including documentation of best practices and scaling out to similar areas and the monitoring and assessment of the impact of implementation on achieving sustainable soil management.

For Pillar two “Encourage investment, technical cooperation, policy, education, awareness and extension in soils”, the RIP calls to promote investment in rehabilitation and management of degraded soils and to enhance the role of policy and farmers participation in policy making and planning, to support the role of civil societies and soil institutions in the management of degraded soils. The RIP addresses key messages to create awareness campaign to target the civil society and non-soil specialists through public and social media and calls for capacity building in soil related topics and promotion of soil science in education.

For Pillar three “Promote targeted soil research and development focusing on identified gaps, priorities and synergies among economic/productive, environmental and social dimensions”, the RIP prioritizes changing from classical research to integrated research (system approach), which target specific soil challenges within landscapes (agro-ecological zones AEZ) and calls for the adoption of focused soil research. It recommends focused research on the economics of soil management and ecosystem benefits, mapping cultivated and non-cultivated natural capitals with digital link to soil function for improved natural and socio economic capitals, and establishment of center of excellence for soil research in the NENA region.

For Pillar four “Enhance the quality and availability of soil data and information: collection, analysis, validation, reporting, monitoring, integration with other disciplines”, the RIP adopts the establishment of soil information system for the NENA region (GEOSS for NENA), which defines data needs and specifications by different stakeholders and at different scales. As an outcome, the RIP calls for the establishment of soil indicators, monitoring and forecasting systems and creation of tool(s) to help users to create and properly use soil information for various demands and at different levels.

Finally, for Pillar five “Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources” stresses the need for harmonization of methods of sampling and analysis to facilitate data comparability and exchange and harmonization of assessment criteria for soil health (salinity, erosion, degradation). The RIP will explore the possibility to modify and adapt the land degradation assessment and SLM mapping tools developed by LADA/WOCAT and aims at harmonizing land evaluation criteria across the region.

Following the Action Plan Presentation and analysis, a road map for implementation, monitoring and detailed budget are proposed. The logical framework of the activities identifies international, regional and local partners and potential resources partners. The RIP defines the roles of each partner, estimates the timeframe of implementation and identifies soil monitoring indicators and risk of the execution of planned activities.

It is anticipated that the RIP will be considered as a starting point to achieve sustainable soil management that will restore soils and enhance their role in support of the ecosystem services, improve resilience to climate change/variability and improve the livelihoods of those who depend on soil to secure their food and support their lives. The RIP provides a comprehensive and integrated sequence of activities that lead to a common goal of achieving sustainable management of soil resources. Resource partners might choose the activities of interest to support one or more projects. In harmony with other players they can follow integrated approach within the whole

structure, to bring changes to the traditional model of supporting isolated projects that partly meet local priorities and solve specific problems.

## II. Introduction

With less than 0.23 ha of cropland available per person worldwide and even fewer in Near East and North Africa (NENA) region, the limited soil resources constitute the basis for the provision of ecosystem services and food security for a growing population<sup>1</sup>. On the basis of the recommendation of FAO's High-Level External Committee (HLEC) on the Millennium Development Goals (MDG) and the discussions and conclusions from the 22nd Committee on Agriculture (COAG) (Rome, 16 to 19 June 2010), preparatory activities were initiated by FAO in order to explore the possibility of establishing a Global Soil Partnership (GSP). Following the approval of the GSP by FAO Conference in 2012, the Regional Soil Partnerships (RSPs) were established to activate an interactive consultative process with national soils entities working on soil functions and processes, including cross-cutting dimensions related to desertification, climate change and biodiversity particularly linked to policies and strategies of major UN conventions (UNCCD, UNFCCC, CBD).

The NENA Soil Partnership was established during the Inception Workshop on RSP and NENA Soil Information (April 2012, Amman-Jordan). The NENA Regional Soil Partnership also organized the NENA Conference in June 2014, Amman, Jordan, during which the NENA (Amman) Recommendation was formulated by the participants. With the support of FAO, the NENA Soil Partnership started with a first regional activity to develop the NENA Soil Information System including capacity development on soil information. After the endorsement of the global Plans of Action (PoAs) on Soils (five pillars), the next step was the development of the implementation plan for the NENA region. During the **NENA Soil Partnership Conference “Towards a Regional Implementation Plan on Sustainable Management of Soil Resources”**, 1-3 June 2015, Amman, Jordan, thirty-six participants from 20 countries, regional and international institutes discussed the various challenges and gaps toward sustainable soil management. They discussed how to increase awareness of policy makers, land users, research and development community and civil society organizations about the fundamental roles of soils for human life and their prominent contributions to food security, climate change adaptation and mitigation, essential ecosystem services, poverty alleviation and sustainable development. Participants reviewed and prioritized soil related challenges in the region and initiated the development and discussed the execution of the NENA Soil Partnership Implementation Plan based on the endorsed five GSP pillars, which are:

1. Promote sustainable management of soil resources and improved global governance for soil protection and sustainable productivity;
2. Encourage investment, technical cooperation, policy, education, awareness and extension in soils;
3. Promote targeted soil research and development focusing on identified gaps, priorities and synergies among economic/productive, environmental and social dimensions;

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<sup>1</sup>Montanarella, L., R. Vargas, 2012. Global governance of soil resources as a necessary condition for sustainable development. Current Opinion in Environmental Sustainability 2012, 4:1–6.

4. Enhance the quality and availability of soil data and information: collection, analysis, validation, reporting, monitoring, integration with other disciplines;
5. Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources.

The NENA Soil Partnership secretariat was renewed during the NENA Soil Partnership Conference, the Steering Committee to play the major coordinating and leading role of the regional soil activities was formed. Five working groups were established for the five GSP Pillars of Action with the composition of individual members representing countries/institutions that endorsed the five pillars and started the elaboration of the RIP. Eighteen countries in the NENA region officially appointed a GSP Focal point to be part of the formulation of the Regional Implementation Plan.

The conference highlighted the main challenges facing the sustainable use of soil resources in NENA region to be **the increased human pressure on limited soil resources, the extension of the area of degraded soils (such as soil erosion, soil salinization, desertification, loss of biodiversity, decline of organic matter and soil fertility, loss of vegetation by chaotic urban expansion and overgrazing, mismanagement and non-sustainable agricultural practices and weak policies and governance)**. Therefore there is an urgent need to conserve the limited soil resources, develop effective preventive measures based on regional priorities, formulate policy messages about the impact of soil degradation, provide economic analysis (cost-benefit) of soil management, and finally implementation of conservation interventions. It is important to remember that healthy soil is essential to maintain ecosystem services, achieve food security and combat land degradation under climate change environment.

Participants of the five working groups proposed major outcomes and initiated the development of RIP with preliminary listing of regional activities that mainstream the endorsed PoAs of the five GSP Pillars. The identification of specific activities and Regional Implementation Plan (RIP) for the (NENA) region is undertaken in a participatory and inclusive mode. The RIP will have a horizon of five years and describe specific activities to achieve sustainable soil management, enhance the coverage and quality of soil data and support the development of national soil information system and its integration with the regional and global soil information systems. The potential regional and international partners of the NENA RIP such as the League of Arab States, ICARDA, ICBA, CBD, UNCCD, IUCN, GEF, IsDB, IFAD, USAID, GIZ, Italian Cooperation, ACSAD, AOAD, and JICA and their roles and responsibilities are also identified. The role of public and private sectors including the NGOs is also identified. The RIP sets timelines, deliverables and required budget for its execution.

**The main objective of the RSP is to develop the workable at different scales five year regional implementation plan (RIP) for sustainable management of soil resources and implementation of improved regional and national governance to achieve sustainable land productivity and protect the limited soil resources.** The RIP is oriented to enhance funding to support targeted research and technical cooperation which mainstream sustainable soil management policies, development of education at schools and university levels to generate public awareness and socialize soil knowledge. Local and national applied research is crucial for adapting, inventing, testing and out scaling effective soil management practices under the effect of changing climate and recurrent droughts. Identifying the national and regional gaps and

strengths and setting priorities are the prerequisite to adapt the objectives and achieve/develop activities as the basis to mainstream and protect the environmental and social dimensions of soil resources.

The RIP develops regional soil information system based on capacity development for soil data collection and analysis and improved coverage and quality of soil information which is well integrated with other disciplines. To overcome the lack of resources and develop efficient soil management and protection policies the RIP supports the harmonized measurement and monitoring of soil quality. It develops standardized indicators for the assessment and monitoring of limited soil resources as a key element in sustaining the environmental and food security functions of soil resources.

### **III. NENA Regional Implementation Plan – Outcomes and Activities for the five GSP Pillars of Action**

Sustainable land management is achieved through the appraisal and protection of soil resources and good governance in agricultural practices for resilient and sound soil and crop management. Priority is given to the assessment, protection and rehabilitation of degraded soils because a poor soil quality might cause severe deterioration of environmental conditions and threaten food security. Only with healthy soils and adequate natural resources can society cope with increased food and fiber demands. The cost of land degradation is significant for the future generations and the economic and social benefits of healthy ecosystem services applying SSM/SLM practices deserves large political and financial support. Soils of good quality positively affect water and air quality, food security, carbon sequestration, public health and productivity of economic sectors. The RIP of the NENA RSP targets capacity development for SSM/SLM, assessment, protection, monitoring and restoration of degraded lands. Sharing experience on good and bad practices is a tool for joint learning and advancement in combating land degradation to maintain healthy life on earth.

To achieve the results of these activities, the RIP encourages investment and technical cooperation inside each country of NENA region and between countries to draw and implement sustainable national and regional policies for the safeguard of soil resources as part of natural ecosystems. Any damage caused to a soil in a given country, like erosion or salinization, will have negative consequences on soil productivity and other environmental functions not only onsite but also offsite with sediments and pollution carried and diffused on nested lands and watersheds. Although soil was often ignored in approaching some sensitive issues like crop suitability, forestry, biodiversity, food quality; the concept of healthy soils is increasingly integrated into other disciplines and incorporated into public policies, education programs and public awareness.

Targeted research oriented to soil conservation and development of SSM/SLM practices is one of the primary responsibilities of local governments which often don't class the soil issue among its national research priorities. However, the soil is eventually present in every national food program, water quality and hydrological studies as well as biodiversity and reforestation programs. SSM/SLM targets to meet the priorities and windows of international organizations and donors like GEF, GM, IFAD, FAO, UNDP, UNEP, EU, UNFCCD, UNCBD, WB, IDB, USAID, GIZ, Italian Cooperation, and Spanish Agency for international development cooperation (AECID),

British Council. It is also in line with the priorities of NENA regional and national research institutions like ICARDA, ICBA, ACSAD, GCSR (Syria), CNRS and LARI (Lebanon) and others.

Assessing and monitoring land degradation can be integrated with ongoing international programs like Global Soil Mapping, GLASOD<sup>2</sup>, WOCAT international, LADA<sup>3</sup>. Local capacities to assess soil degradation shall mainstream these programs using soil information with enhanced coverage and better quality. This will lead to the harmonization of the soil mapping methods, soil classification, collection and analysis of samples and development of comparable and measurable soil indicators for sustainable use and protection of soil resources.

## **1. Promote sustainable management of soil resources and improved global governance for soil protection and sustainable productivity (Pillar I)**

NENA region possess limited area of productive lands which are subject to drought, increased human pressure and land degradation. Therefore, building a soil decision support system (SDSS) and implementing SSM/SLM practices in the NENA region are prerequisite for the protection of natural and socio-economic capitals, maintenance of good soil quality and provision of food security. The identification, characterization and mapping of vulnerable national agro ecological zones and prevailing land cover and land use (LCLU), based on FAO's Land Cover Classification System (LCCS) are necessary to assess national and local soil degradation problems and to suggest soil rehabilitation measures that are technically and socio-economically sound and acceptable. The standardized LADA/WOCAT categorization system characterizes five major land cover–land use types: Forest land (natural forest, planted forest), crop land (annual crops, perennial fruit trees), grazing land, mixed land use (agroforestry, agro-pastoral, agro-silvopastoral system) and other uses (industrial, mining, settlements, infrastructure network, waterways, drainage, wasteland, recreation areas).

### **1.1. Assessment of soil quality and identification of hot spots to design immediate actions**

Assessing soil quality is the prerequisite to achieve sustainable soil management. For example, mapping eroded and saline soils and analyzing the causative factors including geomorphology, drainage conditions and quality of applied water is the core of soil rehabilitation programs. Soil productivity and suitability for multifunctional use predetermine the category of soil and present the basis for soil conservation, management and related legislations. Good soil quality predetermines the amount and quality of food and preserved water and creates the basis for the development of healthy ecosystems with attractive landscapes and good air quality (Table 1).

To identify hot spots and design oriented actions, it is important to assess and map land degradation (soil salinity, soil erosion, loss of arable lands by chaotic urban expansion, loss of vegetative cover and decline of soil biodiversity). This work can be supported by a review of available soil data in light of land cover and land use change to assess the socio-economic cost of land degradation in

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<sup>2</sup><http://www.isric.org/projects/global-assessment-human-induced-soil-degradation-glasod>

<sup>3</sup>[http://www.fao.org/nr/lada/index.php?option=com\\_content&view=article&id=152&Itemid=168&lang=en](http://www.fao.org/nr/lada/index.php?option=com_content&view=article&id=152&Itemid=168&lang=en)

relation to land capability and suitability use. A synergy with the UNCCD strategic objectives and impact indicators and UNDP supported mapping of living condition is relevant for the assessment of the trend lines.

## **1.2. Implementation of soil rehabilitation programs including documentation of best SSM/SLM practices and scaling out to areas at high risk of soil degradation**

Documenting, showing the economic benefits and sharing SSM options and earned experiences from sustainable land management with end users and policy makers foster the out-scaling of SSM practices. To design and implement soil rehabilitation or restoration programs, the following activities are proposed:

Documenting SSM options considering the economic and environmental benefits and viable comparison with the cost of land degradation and socio economic consequences of the loss of ecosystem services. Sharing the learned lessons between users and building SDSS to convince decision makers with new policy and programs and out-scaling SSM to other national and regional areas promotes the sustainability of land governance.

One of the main activities can be the training and empowerment of local stakeholders including farmers on the SLM practices in irrigated areas, rainfed areas, rangelands and mountain/forest areas for the prevention of land degradation and restoration of degraded ecosystems to maintain land degradation neutrality and support the soil functions.

The RIP of the NENA RSP underlines the importance of commitments from national governments and institutions, regional and international organizations to provide continuous financial and political support to the successful implementation of the soil restoration program which considers preventive measures for bright spots and curative measures for deteriorated sites.

## **1.3. Assessment and monitoring the impact of implementation on achieving sustainable soil management**

To assess the improvement in soil health as a result of SSM, it is necessary to elaborate and adopt the base line of soil indicators related to direct and indirect factors and results of soil degradation. Information can be derived from surveys on the implemented measures of soil conservation, and the participation of decision makers and farmers in the elaboration of land use options and land management practices including their socio economic and environmental returns. Background information can be received from two sources: the produced soil geographical database of Euro-Mediterranean countries at 1:1 Million scale and from the soil database at 1:500,000 managed by the Organization of Agricultural Development of the League of Arab States. To downscale to the national level, the need arises to extend the soil-terrain digital database at 1:200,000 to elaborate and update corresponding national soil indicators in NENA region. Using advanced tools like remote sensing, GIS and isotope techniques can help assessing and monitoring the state and trends of soil degradation and impact of SSM and SLM on soil functions and provided ecosystem services at different levels.

**Table 1. Logical Framework for the implementation of the RIP for Pillar I in NENA region**

Pillar 1: Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity.							
Outcome/ Activity	Product Description	Activity No.	Activity Description	Priority (1, 2, 3)	Execution period (start-end) <sup>4</sup> And Indicators <sup>5</sup>	Stakeholders	Funding requirement (YES/NO and amount USD)
1.1 A Soil Decision Support System (SDSS) is built and soil quality and hot spots are assessed and immediate actions designed	Areas exposed to different types of soil degradation <sup>6</sup> that lead to deterioration of environmental and/or agricultural conditions are identified and necessary actions proposed	1.1.1  1.1.2  1.1.3	Identification of national agro ecological zones / land use systems under major risk of soil degradation  Assessment of the spatial distribution and degree of soil degradation and of the environmental and economic impact of soil deterioration using national soil databases  Analysis of the prevailing socio-economic conditions and policies to identify soil rehabilitation options (packages) at regional and national level supported by land evaluation and participatory land use planning	1  1  1	Dec 2016  Dec 2017  Dec 2016	Governments and specifically relevant Ministries (Agriculture, Water and Environment) Focal points, partners, research and academic institutions <sup>7</sup>  Regional and International organization can assist where applicable <sup>8</sup>	500,000  National contribution  National contribution

<sup>4</sup> The final date of execution shall be agreed upon by the WGs and focal points.

<sup>5</sup> Indicators: 1. number of SDSS established and functional; 2. N of countries identified their agro ecological zones; 3. N of reports/maps published and shared; 4. N of training workshops; 5. % of areas rehabilitated by SLM; E. N of national and local decisions based on Pillar 1.

<sup>6</sup> The following soil challenges facing the NENA region: soil erosion by water and wind, soil sealing by chaotic urban expansion, salinization and alkalization, loss of soil organic matter and fertility decline, desertification, improper soil management practices and soil contamination.

<sup>7</sup> Some activities could be done without external funding and could be achieved through the regular mandate of ministries and soil institutions. Focal points from all countries to take a role in activating the national contribution.

<sup>8</sup> FAO, ACSAD, ICARDA, ICBA, GEF, USAID, ESB, JRC, ISRIC, IDRC, CGIAR, IUCN, IFAD, WB, IDB, GM, GIZ, Italian Cooperation, ESCWA, UNECA, LADA and WOCAT.

1.2 Soil rehabilitation programs including documentation of best SSM/SLM practices and scaling out to areas at high risk of soil degradation implemented	Soil rehabilitation programs implemented to reduce the deterioration of the environmental and agricultural conditions and contribute to economic growth and SDG	1.2.1	Stocktaking and documentation of SSM options within NENA and similar environments. a. Characterize and document SSM options, economically appraise (cost-benefit with linkages to ecosystem services and land degradation) and potential areas for out-scaling at regional and national level identified.  b. Communicate results with decision makers to foster out-scaling of SSM packages.	1	Dec 2016  Dec 2017	Ministries of Agriculture, Water, Planning; Local government and authorities. Soil institutions, Farmers.  Regional and International organization can assist where applicable	600,000  National contribution
		1.2.2	Capacity development program on sustainable soil management and soil restoration, adoption and dissemination of SLM practices - Enhance capacities at national and regional levels on implementing sustainable soil management and on restoring degraded soils, including online training programs on sustainable soil management.	2	Dec 2018		600,000
		1.2.3	Implementation of national and regional soil restoration programs to achieve sustainable soil management. a. The League of Arab States and/or the regional FAO conference endorse NENA Implementation plan to gain support from member countries for financial support and execution.  b. Hold a high level meeting for resources partners to present the NENA Soil Partnership Implementation Plan for resources mobilization.	1	Apr 2016  Feb 2016		National and regional contribution  National contribution
		1.2.4	Implementation of soil restoration program to control the environmental deterioration including:  a. Management of degraded irrigated land: improving soil and water productivity, prevent soil salinization, improve drainage system, manage soil fertility and fertilizers, promote suitable and drought tolerant crops, use of non-conventional waters. b. Management of degraded rainfed land: fine-tune and adopt conservation agriculture, maintain/improve soil fertility and soil health, promote sustainable agronomic practices, improve land and water productivity (supplemental irrigation, use of composted material),	1	Dec 2017  Dec 2018		500,000 + national contribution  500,000 + national contribution

			c Management of degraded rangeland lands: rangeland restoration/rehabilitation and soil conservation (reduce soil erosion by wind and water), water harvesting, grazing management, promote adaptable crops/forages;  d. Mountain and Forests: water harvesting, use of treated wastewater, conserving soil fertility, controlling erosion, assisted natural regeneration, community- and agro-forestry.		Dec 2019  Dec 2019		500,000 + national contribution  500,000 + national contribution
1.3 Impact of implementation on achieving sustainable soil management assessed and monitored	Soil monitoring system established to track improvement in soil and environmental conditions resulted from soil restoration programs and to identify soil degradation risks due to land use and climate change/variability	1.3.1  1.3.2  1.3.3	Establish practical, agreeable and robust indicators to monitor the status of soil resources specific to the NENA region  Design and implement national soil monitoring system using the soil monitoring indicators  Elaboration of the national reporting plans and knowledge exchange across the region linking to the relevant soil and environmental indicators of the SDGs	1  2  3	Dec 2017  Dec 2020  Dec 2017	Related ministries & organizations (Research and academic bodies- Using national budget contribution)	200,000  National contribution  National contribution
Subtotal for Pillar 1							3,900,000

## **2. Encourage investment, technical cooperation, policy, education, awareness and extension in soils (Pillar II)**

The plans of actions with emerging activities and environmental lobbying shall drive the local governments to create or reinforce policies on SSM and protection. The concept no soil-no water and no food shall be implemented in the conscious of young generations and the friendly and careful attitude towards soil must accompany them through all their education phases and during the post university life. Education in soil sciences must go together with the soil extension service which should simplify the results of soil research and present them to stakeholders in digestible way. The dissemination of awareness among schools, universities, decision makers and soil users through improved communications and training materials, different channels, organization of soil days, and cooperation with existing programs shall engage the society in the concern about conserving healthy soils.

### **2.1. Promote investment in soil rehabilitation/restoration and management**

Appropriate investment causes gradual shift from short time investment and real estate's business with high immediate return, but high uncertainty and risks, to long term investment in sustainable soil use and agricultural production to ensure not only national food security but also provide support toward achieving the sustainable development goals. Economic stability reflects positively on political stability and encourages land stewardship and governance. The development of soil national marketing programs and adoption of incentives to encourage investors and users in soils (legislations, subsidy, credit, markets) plays important role in the encouragement of SSM/SLM.

Support can be also secured from international and regional organizations like GEF, GM, FAO, UNDP, UNEP, EU, UNFCCD, UNCBD, WB, Islamic Bank of Development, USAID, GIZ, Italian Cooperation, and Spanish Agency for International Development Cooperation (AECID), British Council, JICA, OPIC and others.

Gaps between research results and farmers and/or outdated technical infrastructure and weak national research capacities hinder the development, adoption and dissemination of best SSM/SLM practices. Fostering the North-South and South-South technical cooperation upgrades the technological base for soil studies and generates new applied research on SSM/SLM which influences both public opinion and national policies.

### **2.2. Enhance the role of policy, civil societies and soil institutions to support soil management**

Soil is in the core of natural ecosystems and a main player in the soil-water-plant interaction. Therefore, soil science is not an isolated and neutral discipline but it is integrated with geology, hydrology and plant production. Knowledge disseminated by soil institutions will promote sustainable agricultural production and support local business. The need to develop new structures and accessory systems creates additional working places in rural areas.

### **2.3. Stimulate soil awareness among the civil society and non-soil specialists**

Multimedia play important role in the formulation of public opinion and can create a lobby to influence decision makers and politicians. Therefore, their role in creating and upgrading public awareness should be considered while designing strategies for the promotion of sustainable use of soil resources. Simplified games and movies on soil functions can substantially contribute to early education of youth to the importance and vital role of the soil in everyday activity and human life. Special attention must be attributed to interactive learning.

### **2.4. Capacity development in soil related topics, promote soil science in education and extension**

The proposed activities aim at promoting the soil science throughout the whole education and production process. It is crucial to assess the available capacities and training needs of local technicians, teachers and stakeholders. Training of teachers to develop soil education in primary schools must complement the training of farmers in the field. In high schools students are more actively involved in reforestation campaigns. Financial resources must be allocated to schools so students can learn the basic principles of soil management and plant production .They can observe and comment the life cycle of annual and perennial crops and plants, follow them during the entire life cycle and grow together to understand the vital role of the soil as anchor for trees and buildings, a source of nutrients, a filter of water and trees as source of greening, oxygen, food and feed. These new concepts and programs are continuously monitored and upgraded.

Many schools and universities have decreased and even converted soil science into optional course. The result is the total shortage of young soil scientists that can follow the implementation of soil related projects, design, assess and monitor soil protection and management practices. The revived soil science courses will certainly provide new generation of soil scientists who shall be secured with attractive and remunerated job opportunity. For example, extension shall focus on the vital role of organic matter content in the soils in the carbon sequestration and adaptation to climate change of the NENA region. Soil carbon also promotes better soil structure and water storage capacity. Compost derived from municipal waste proved to be enriched in essential nutrients (~6% of N and P). It can be used to promote the carbon content in the soil and nutrient supply, and as contribution to reduce gas emission and enhance carbon sequestration to reduce the impact of climate change. Different scholar material (leaflets, movies, reports, posters) can be produced to illustrate and document good practices and share experience and lessons learned among land users and countries.

**Table 2. Logical Framework for the implementation of the RIP for Pillar II in NENA region**

2: Encourage investment, technical cooperation, policy, education, awareness and extension in soils.							
Outcome/ Activity	Product Description	Activit y No.	Activity Description	Priority (1, 2, 3)	Execution period (start-end) <sup>9</sup> And indicators <sup>10</sup> i	Stakeholders	Funding requirement (YES/NO and amount) <sup>ii</sup>
2.1. Investment in soil rehabilitation/resto ration and management promoted	Strategy for the enhancement of financial and political support is designed and implemented, soil is protected and partnership for SSM and food security improved	2.1.1.  2.1.2.  2.1.3.	Foster the endorsement of the RIP and enable funding to improve technical cooperation, food security and enhance carbon sequestration  Analysis of the constraints and opportunities and up scaling of successful rehabilitation measures and sustainable land management practices  Increased investment of public and private sectors in sustainable soil management to support provision of ecosystem services and climate change adaptation/mitigation	1  1  1	Dec 2017  Dec 2017  Dec 2018	Focal points, Government and private sector local programs, relevant ministries and research/academic bodies <sup>11</sup>  Regional and International organization can assist where applicable <sup>12</sup>	National contribution  200,000  National contribution

<sup>9</sup> These dates are indicative and need to be fine tuned and confirmed by the WGs and Focal Points

<sup>10</sup> Indicators: 1. Amount of money mobilized and invested. 2. N of regional agreements signed and implemented. 3. N of laws and regulations adopted and implemented. 4. N of curricula introduced to schools and universities. 5. N of dissemination workshops. 6. Number of stakeholders trained on SLM. 7. N of farmers implementing good practices.

<sup>11</sup> Some activities could be done without external funding and could be achieved through the regular mandate of ministries and soil institutions. Focal points from all countries to take a role in activating the national contribution.

<sup>12</sup> FAO, ACSAD, ICARDA, ICBA, GEF, USAID, ESB, JRC, ISRIC, IDRC, CGIAR, IUCN, IFAD, WB, IDB, GM, GIZ, Italian Cooperation, ESCWA, UNECA, LADA and WOCAT

2.2. The role of policy, civil societies and soil institutions to support soil management enhanced	Technical cooperation for the enhancement of national policy and enabling of civil societies and soil institutions to support and disseminate soil management are promoted	2.2.1.	Support national policy to safeguard the soil as part of the ecosystems, implement and disseminate sustainable soil management practices.	1	Dec 2020	Focal points, Ministry of Agriculture, Environment. Government and private sector, media. Soil institutions.	National contribution
2.3. Key messages to create awareness campaign to target the civil society and non- soil specialists through TV and other media implemented	Awareness of land users, investors and developers on the importance of SSM in the achievement of SDG is promoted	2.3.1.	<p>Increase of public and decision makers awareness to support SSM practices</p> <p>a. Promotion of awareness of land users on soil vulnerability to human pressure and role of SSM in securing land and water resources, reducing gas emission and supporting biodiversity.</p> <p>b. Support land governance and adapted taxation policy to promote SSM and the prevention of land degradation.</p>	1	Dec 2018	<p>Focal points, Ministry of education and Information, media and Ministry of Agriculture and Environment. Private sector.</p> <p>Regional and International organization can assist where applicable</p>	200,000 + National contribution  100,000
2.4. Capacity building in soil related topics, soil science in education and extension promoted	Soil science in the education is promoted and extension programs for the dissemination and adoption of SSM/SLM practices are activated. Role of soil science in achieving better environmental services and resilience to climate change is demonstrated to decision makers and the public.	2.4.1. 2.4.2.	<p>Introduce soil science in the curricula of primary and secondary schools and throughout the whole education and professional process and activate the extension service on SSM/SLM.</p> <p>Linking soil science to other disciplines (natural resources, environment and geospatial sciences) to attract young generation and support the role of soil in these disciplines.</p>	1	Dec 2018	Ministry of Education, Agriculture, Environment, Water local authorities, focal points, farmers, Research and Academic Centers, ESCWA	200,000 + National and International contribution  50,000 + National contribution
Subtotal for Pillar 2							750,000

### **3. Promote targeted soil research and development focusing on identified gaps and priorities and synergies with related productive, environmental and social development actions (Pillar III)**

The targeted soil research and development (RD) programs oriented to the advance of soil management and conservation measures, arising from and meeting the needs of the RSP, must identify the sustainable management of soil resources for agricultural production and environmental functions. For this, it must define socio-economic and societal needs in food, habitat and other environmental services and adopt the priorities set by local community, attract funding and implicate qualified human resources capable of finding relevant solutions to respond to these needs and effectively closing the gap between research and technology adoption notably in vulnerable soil ecosystems.

Products of the soil oriented land research groups can predefine priorities that match the FAO GSP and RSP plans of actions and thus be visible and attain seed money and fund support. Soil research in NENA region can benefit from the results of basic research executed in the developed countries and combine both basic and applied research to generate knowledge that can develop or adapt new technologies and support development goals. Synergy between advanced international research institutions and local universities and research bodies and co-funding from the private sector is promoted to identify strategic gaps, priorities and synergies and develop joint research programs. The regional soil R&D program can be oriented to solve practical issues like how to improve soil productivity, how to sustainably use the soil and water resources, how to achieve more efficient use of applied nutrients and better recycle nutrients from the soil pool and how to achieve higher productivity of applied water, how to increase food production on economic and environmental sound ground, how to support carbon sequestration and strengthen the soil buffering capacity and resilience towards variable climatic conditions and how to improve the soil protection effectiveness regarding the increased use of non-conventional water resources generated by the expanding settlements.

In all cases, soil research in NENA region should focus on soil degradation and onsite and offsite (often neglected) economic loss to current and future generations brought by threats caused by erosion, organic carbon change, nutrient imbalance, salinization and sodification, sealing, loss of biodiversity, contamination, compaction and waterlogging. Improving the soil health to stop the deterioration and improve the state of degraded lands to enhance the development and human wellbeing while enabling soil protection and sustainable use and respecting future societal trends must be in the center of the R&D programs of NENA region. Similarly to the estimates of the cost of land degradation<sup>13</sup>, assessing the financial value of soil-related ecosystem services has been successful and convincing to non-soil experts<sup>14</sup>.

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<sup>13</sup>Sarraf M., Larsen B., and M. Owaygen 2004. Cost of Environmental Degradation-The Case of Lebanon and Tunisia. WB Environmental Economics Series, Paper N 97.

<sup>14</sup>Dominati E, Mackay A, Green S and Patterson M. 2014. A soil-change based methodology for the quantification and evaluation of ecosystem services from agro-ecosystems: A case study of pastoral agriculture in New Zealand. *Ecol. Econ.* 100:119-129.

### **3.1. Establish integrated research-for-development approach targeting soil challenges**

Targeted soil research addresses the current management practices and the identification of the national and regional gaps and needs. Research needs are prioritized and the functions of agro ecological zones/agro ecosystems are identified and characterized to serve multi-disciplinary research programs on SSM to improve soil productivity, maintain soil health and increase the provision of ecosystem services. The priority action to develop regional activities is to establish integrated, multidisciplinary regional research program based on the state of soil resources, environmental problems, knowledge gaps and the economic and environmental value of sustainable soil management. It includes the following activities:

Identification of research priorities and the assessment of national and regional capacities, identification of research gaps and needs to establish research program. Empowerment of research community on the use of remote sensing in the mapping of land use types and monitoring of land use change including annual crops, assessment of spatial land surface temperature, soil moisture, NDVI, vegetation health, evapotranspiration and controlling water input and water productivity.

Enhance more applied soil research in the NENA region and enhance the integration of soil science with other disciplines to cover all aspects of SSM. Soil productivity and health must go together as two concepts leading the application of good practices to maintain soil productivity to satisfy current food needs and conserve soil and land for the benefit of future generations. Assessing the impact of different land uses on the watershed level can prevent the misuse of resources and secures equity of access to healthy soil and water.

The RSP will support the transfer of sustainable soil management practices (knowledge, tools) from the research level to the level of farmers and community. The role of extension services in knowledge sharing and know-how transfer must not be underestimated. The organization of field experiments should not be limited to experimental stations where farmers can be invited to observe and learn good practices, but the participatory approach through establishing demonstration trials on the farmer's plots can bring more benefits to the rural community in SSM. Publication of research results shall not be limited to peer review journals but also cover all available media and newspapers using local language. The development of new tools for social communication facilitate the direct, real time contact with farmers and end users to convey early warning messages and advises regarding the climatic variability and risks of flood, drought, with possible recommendation on main land management to adapt to hydrological drought or heat waves.

### **3.2. Establish focused research on the economics of soil management and benefit to the ecosystem**

Good soil management practices need to be tested, documented and transferred from the research level to the level of farmers and community. The identification of national research policy considers the environmental and socio economic impact at the catchment and agro ecosystems levels and societal benefits and interests. Farmer's practices, including soil and irrigation management, under for example saline conditions and low soil organic matter content assessed and monitored and the best SSM practices disseminated for sustainable ecosystem management (to increase soil organic carbon and prevent soil salinity/mange salt affected soils in affected

areas). The research related to the participatory approach of soil and water management to secure the social and development benefits from SSM can bridge with the outputs and activities of the Economic of Land Degradation (ELD) initiative supported by UNCCD, EU, BMZ, GIZ, Academia and private sector. Research program supports projects on capacity building for advanced basic and applied research on soil behavior and resilience, cost of soil and land degradation and the benefit from the SSM for the support of decision making and policies. The impact of local regulations and legislation related to land use and soil protection is assessed. The development of web based information and sharing of national legacy on SSM improves the adaptation, mitigation and serves the SDGs.

Carrying research on the cost of soil and land degradation and providing evidence on the benefits from the SSM to influence decision making, governance and policies for the sustainable development is of prime importance for the NENA RIP.

Rules and laws need continuous improvement and upgrading to answer new challenges related SSM and arising socio economic issues. Positive and negative experience gained from local governance are documented and disseminated to ensure policy option sharing and to compare outputs.

### **3.3. Establish Centre of Excellence for soil research in the NENA region**

There is an increasing need to build a regional soil research platform, which plays the role of reference accredited centre responsible for supporting research-for-development that focus on achieving sustainable management of soil resources, raising awareness about soil challenges, regional soil data harmonization, handling and sharing. It can be built in cooperation with the league of Arab States, national and international research institutes.

**Table 3. Logical Framework for the implementation of the RIP for Pillar III in NENA region**

Pillar 3: Promote targeted soil research and development focusing on identified gaps and priorities and synergies with related productive, environmental and social development actions							
Outcome/ Activity	Product Description*	Activity No.	Activity Description	Priority (1, 2, 3)	Execution period (start-end) <sup>15</sup> and Indicators <sup>16</sup>	Stakeholders <sup>iii</sup>	Funding requirement (YES/NO and amount per country)
3.1. Integrated research for development approach targeting soil challenges within specific agro-ecosystems or landscape established	Multidisciplinary regional and national research programs for adaptation and up scaling of SSM practices established and the environmental and ecosystem functions of the soil appraised.	3.1.1.  3.1.2  3.1.3.	Identification of the regional and national research gaps and prioritize the national and regional research needs.  Implementation of SSM research and monitoring program to improve soil productivity and maintain soil health in different agro-ecosystems to improve nutrient and water use efficiency and adapt to climate change  Assessment of the economic consequences and environmental impact of current good and bad soil practices and the state of soil resilience to meet the SDG notably to characterize and identify the functions of the agro ecological zones/ agro ecosystems to prevent soil	1  1  1	Dec 2017  Dec 2020  Dec 2017	Focal points, Research Institutes, Universities, Ministries, NGOs, Farmer Associations <sup>17</sup>  Regional and International organization can assist where applicable <sup>18</sup>	300,000 + National contribution  500,000  National contribution

<sup>15</sup> These dates are indicative and need to be fine-tuned and confirmed by the WGs and Focal Points

<sup>16</sup> Indicators: 1. N of research programs developed; 2. N of projects implemented; 3. N of young scientists trained on SLM assessment and monitoring methods; 4. N of scientific conferences held on soil conservation and SLM; 5. N of published articles and reports; 6. % increase in GDP from SLM; F. % increase of farmer's income from SLM.

<sup>17</sup> Some activities could be done without external funding and could be achieved through the regular mandate of ministries and soil institutions. Focal points from all countries to take a role in activating the national contribution.

<sup>18</sup> FAO, ACSAD, ICARDA, ICBA, GEF, USAID, ESB, JRC, ISRIC, IDRC, CGIAR, IUCN, IFAD, WB, IDB, GM, GIZ, Italian Cooperation, ESCWA, UNECA, LADA and WOCAT

		3.1.4	degradation, meet the increasing food demands and protect the ecosystems  Applied research on constraints for adoption and uptake of best practices including non-biophysical factors and options to encourage scaling out.	2	Dec 2019		500,000
3.2. Focused research on the economics of soil management and benefit to the ecosystem established	Sustainable soil research and development policy is formulated to identify priorities, strengths, weaknesses and constraints and to focus research on the social and economic role of soil management in poverty alleviation and food security.	3.2.1.  3.2.2.  3.2.3.	Development of national and regional research including capacity building to assess the cost of land degradation and social benefits of SLM and SSM to influence decision making and raise awareness on the wise use and conservation of limited soil and water resources.  Profit from the outputs of the ELD initiative and convey the results to support decision making and policies on sustainable development.  Assessment of the impact of local regulations and legislation related to land use options and soil conservation practices on land degradation and the provision of soil functions.	1  1  1	Dec 2018  Dec 2020  Dec 2018	Focal Points, Research Institutes and Universities  Focal Points Universities and Research institutes  National contribution	500,000\$  200,000  National contribution
3.3. Centre of Excellence for soil research in NENA region Established	A regional soil research platform in cooperation with the league of Arab States, national and international research institutes is set up and functional	3.3.1.	Establish an accredited integrated regional soil research center/platform (subject to availability of financial support).	1	Dec 2020	LAS, ACSAD, USAID, ICARDA, CIHEAM, IDB, WB, GEF, FAO, UNEP, UNDP, Qatar Foundation, Kuwait Fund for Arab Economic and Development(KFAED), Focal Points, Research and Academic bodies, ministries.	2,000,000 Plus contribution from some countries for hosting and supporting
Subtotal for Pillar 3							4,000,000

#### **4. Enhance the quantity and quality of soil data and information: data collection (generation), analysis, validation, reporting, monitoring and integration with other disciplines (Pillar IV)**

The current situation in NENA region is characterized by old or missing soil data. Even when the soil data exist they are often not shared or have limited availability. Therefore, developing the activities of the RIP contributes to update old soil information, supporting the production of new soil data where missing and upgrading and harmonizing the existing soil information. Upgrading and harmonizing the soil information in the NENA region is essential because we better manage what we measure. Producing and sharing good quality soil information with harmonized minimum data sets optimizes the balance between global and regional mapping and monitoring, improves the production and quality of thematic maps on soil biodiversity, erosion, land use options, and land vulnerability to desertification.

Ensuring adequate funding for soil studies and respecting the roles, responsibilities and rights of soil data providers ensures continuous flow of soil information. The integration of the national soil systems with the global system facilitates the harmonization of soil assessment and mapping methods and supports the production of thematic maps. Updating and sharing soil information helps the elaboration of comparable standards and criteria for land degradation assessment and monitoring and better soil integration with other disciplines.

Soil data are generally old and lacking homogeneity in terms of different classification systems that are used (especially among countries), scale and/or resolution of mapping and the availability of most data in non-electronic formats. In the same time, information about the distribution and types of soils are needed urgently by governments to plan the use of land in order to improve productivity and respond to the increasing demand for food and to sustain the productivity of land by reducing land degradation. More specifically, knowledge of the following soil resources data is critical for decision makers at various levels (from farmers to policy makers): soil classification, and distribution, land suitability for land use planning, soil fertility, and degree of land degradation.

A new cost and time effective soil mapping approach is needed to provide soil data. These data will help in improving natural resources management, formulate agricultural development plans and actions, and improve productivity while preserving natural resources. Information about the potential suitability of soils/land to different land uses is lacking. These are important to guide the decision makers to select and implement the optimum land use and management based on the biophysical potential. Furthermore, the integration of this information with the socio-economic factors in making decisions about land use is very important.

However, an enormous part of the NENA region has little importance from agricultural point of view because the area of productive lands is limited. Therefore investments in soil data collection and coverage of details soil data should be prioritized. The starting point is to set criteria, by local and regional experts, for selecting areas with tentatively high potential. Climate (rainfall and temperature), topography (mainly slope steepness), availability of water resources, accessibility might be used, among other criteria, to identify areas for detailed soil data acquisition.

New tools/approaches of soil mapping, incorporating GIS and remote sensing are needed to establish an up-to-date soil databases. Proper training of national staff in building, maintaining and using these databases is essential to ensure cost effectiveness and sustainability of the investment.

#### **4.1. Identify demands for soil data by different stakeholders and establish soil information system for the NENA region**

The role of soil information institution in NENA region is rarely played by a soil agency as such. It is rather a soil department, if any, incorporated into agricultural research institute with wide scope of interest, general projects and small funding to focus particularly on soil problems. The research done at these institutions is more generic and deals with the soil as much as it is needed to satisfy the requirements of the larger plant or animal research under question. In many cases, the soil factor is ignored or underestimated with the misconception of biotechnology solving soil constraints. Therefore, it is of strategic importance to stress the need of stakeholders in soil knowledge and to revive and create a new concept of soil institutes, establish soil departments in the research and academic centers to collect, standardize and share the soil data. The formed national committees and entities assess the available soil legacy, human resources and infrastructure and the national capacity to collect, update, harmonize and share soil information through web-based services. Most of the soil data in NENA region is based on relatively old soil classification and nomenclature. It is available at small scale and covers the whole country or at large scale focusing on small fragmented areas. Soil scientists are often confronted with poor quality soil information, heterogeneous soil analysis methodology and interpretation approach. Therefore, the need arises for soil information to be integrated into RSP and GSP systems.

The compilation of soil data is complicated by the nature of the sources of information which can be governmental body or private sector with high importance given to property right and privacy of information. Sometimes, soil data sharing is constrained by the policy of the institute who own the data. In many cases, the RSP will rely on old published reports, which are not circulated anymore, and peer reviewed articles to build information on soil conditions and state of changes. In many cases, the National Soil Information Institution where it is available needs to collect new soil data notably for the large scale soil mapping and characterization. Standardization of the available and newly collected soil data and filtering the non-usable information relying on expert judgment is a prerequisite to meet the need of producing good quality soil profile database that can be used at local, national or regional scale for modeling and simulation.

Identify a regional soil body which can lead and coordinate the process of soil data collection, standardization, harmonization and delivery to end users. Like the international community and FAO supported the creation of AQUASTAT it is vital to start the preparation to formulate and create the SOILSTAT. This forum can act as global soil information system which collects, analyzes and share the standardized soil data and information to facilitate the measurements and evidence on progress in sustainable soil management. The detailed concept note for SoilSTAT, which includes the GSP soil information portal with products and services based on an underlying infrastructure for spatial soil data (SDI for soil), will be developed by FAO in the framework of the FAOSTAT family of global status databases and monitoring systems.

Digital soil mapping and the production of thematic maps is facilitated by the use of georeferenced soil data that can be stored in the soil profile database and integrated into raster data and vector

data received from remote sensing and GIS. The spatial component of the soil profile locations can be either the point location (x-y coordinates) in different accuracies (1m, 100m or 1km) or in relation to other soil spatial data sets relevant for this pillar. This is especially true for so-called derived soil profiles, which represent average properties of a spatial unit as in soil maps. The production of simple, thematic maps related to the soil functions, conditions, vulnerability to erosion, salinization, drought, and suitability are powerful tool for decision makers and end users, which orient towards the more sustainable land use based on soil quality, suitability and conservation.

#### **4.2. Establish and adopt indicators to monitor the status of soil health and productivity in line with Sustainable Development Goal**

Build base line of regional soil indicators from the existing soil data to elaborate corresponding national soil indicators. Create a national, regional and international observatory to collect, harmonize, store, update and share the available national soil database. The objective of such a database is to provide access to as many digital profile data sets as possible. This must include metadata describing the data sets (e.g. method of data collection and analytical procedures), so that utility can be assessed and some harmonization steps may be applied. Such database and system can rely on advanced tools and techniques including digital mapping for the assessment and monitoring of soil and land quality.

Regular assessment and monitoring of pilot areas in different agro ecological zones with variable pedoclimatic conditions and land cover and land use provides valuable information to the scientific community and decision making and stakeholders on soil conditions and environmental and human pressure. The accumulated database provides the room for the elaboration of forecasting system to predict the behavior of the soil to given land use and level of human pressure. Observed changes in soil state lead to elaborate and execute, on a participatory basis, a draft management plan for the conservation of success stories and remediation of degraded spots with emerging learned lessons.

Create within the RSP long-term regional soil information storage and retrieval system, feeding the Soil Decision Support System (SDSS), for the monitoring and forecasting the soil conditions answers the needs of the SDG. Soil information can be collected from available national soil data and it can incorporate newly generated soil information from different sources to serve soil monitoring. This system must secure the protection of intellectual rights and terms of use and train and develop a new generation of young soil specialists in soil mapping and monitoring of soil conditions.

#### **4.3. Develop and disseminate tools to provide demand-driven soil information for various applications**

National soil agencies in countries of NENA region are capable of collecting and providing soil data. Where some countries lack the capacity and infrastructure to provide updated soil information and reliable web services for the regional and global system, another leading country or institution can provide this information. In some cases, an expert from leading soil institutes

can be delegated to another country to assist in the updating and harmonization of soil data. Provide facilities to young soil scientists from NENA region to participate in the workshops, conferences and training sessions organized by FAO and leading international and regional soil organizations. Upgrade soil infrastructure and introduce digital soil mapping to reduce the time and cost of traditional field surveys.

A national soil information system collects, analyzes, stores, manipulate, treat and share soil data and information to facilitate the measurements and evidence on progress in sustainable soil management. The national soil information system secures harmonized and verified soil data that can be incorporated into regional and global soil information systems for the ease of use by different local and national stakeholders. Users are trained on how to use the products of the NSIS in cooperation with the International Network for Soil Information Institutes (INSI). A web based delivery and dissemination service ensure easy and direct access to digital soil information and thematic maps with possibility of interaction with the users for specific queries answering their specific local and national needs. Once the NSIS is operational and fully functional, the queries and feedback received from end users help adapting the modules to match more local or national conditions and to improve the diagnostic power of the produced maps. Updating soil data and information can continuously feed the SOILSTAT and update the soil database and associated GIS layers and reflect on the fine-tuning of the system measurement, assessment and monitoring capacity.

The proposed soil information system should not be viewed as a traditional source of soil information which provides whatever soil data available in the system. It should provide user-friendly tools to allow the clients of soil information from different disciplines to derive their own data for the level of detail and area of interest that suit their demands. Associated to this, there should be wide capacity building campaigns that allow the users to implement these tools easily to integrate them with the needed soil information. Capacity development on the use of modern tools on Digital Soil Mapping<sup>19</sup> to enable the national institutions and staff to respond to local and regional demands on soil information. This will open the door for more applications of soil information in environmental related tasks and might change the traditional view of soil information as being a “black box” for non-soil specialists.

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<sup>19</sup> Ziadat, F. M., Dhanesh, Y., Shoemate, D., Srinivasan, R., Narasimhan, B., Tech, J. 2015. Soil-Landscape Estimation and Evaluation Program (SLEEP) to predict spatial distribution of soil attributes for environmental modeling. Int J Agric & Biol Eng; 8(3): 151—165. <https://ijabe.org/index.php/ijabe/article/view/1270/pdf>

**Table 4. Logical Framework for the implementation of the RIP for Pillar IV in NENA region**

Pillar 4: Enhance the quantity and quality of soil data and information: data collection (generation), analysis, validation, reporting, monitoring and integration with other disciplines							
Outcome/Activity	Product Description	Activity No.	Activity Description	Priority (1, 2, 3)	Execution period (start-end) <sup>20</sup> and Indicators <sup>21</sup>	Stakeholders	Funding requirement (YES/NO and amount)
4.1. Soil data needed by different stakeholders defined and soil information system for the NENA region established.	Soil information system for NENA region is established and integrated with GEOSS; data needs, specifications and gaps at different scales are assessed.	4.1.1. 4.1.2. 4.1.3. 4.1.4. 4.1.5. 4.1.6.	Define the needs of different users for soil data and sharing of soil data and soil indicators  Identify areas with high priorities for soil mapping and the needed level of detail to design a focused soil survey programs  Identification of institutions that hold profile data and institutions willing and capable to serve soil data.  Develop functional National Soil Information System (NSIS) and compile soil data for the region. Establish NENA network of soil information institutions.  Concept note including feasibility and design principles for soil monitoring and SoilSTAT adapted to NENA	1 1 2 1 1 1	Dec 2016 Dec 2016 Dec 2016 Dec 2017 Dec 2017 Dec 2020	NENA RSP, National Soil Information Institutions (NSII), FAO, ESB, JRC, ISRIC, CGIAR, ACSAD, ICARDA, SIDA, IDRC, agricultural and academic Centers <sup>22</sup> .	National contribution    400,000  National contribution  100,000

<sup>20</sup> These dates are indicative and need to be fine-tuned and confirmed by the WGs and Focal Points

<sup>21</sup> Indicators: 1. N of national soil information systems established; 2. Number of countries defined gaps in soil information; 3. N of countries having standardized soil database; 4. N of soil scientists trained on the use of RS and GIS in soil and SLM mapping; 5. N of soil assessment, monitoring and forecasting systems established.

<sup>22</sup> Some activities could be done without external funding and could be achieved through the regular mandate of ministries and soil institutions. Focal points from all countries to take a role in activating the national contribution.

			Capacity development to support the use of RS and GIS in soil degradation studies, digital soil mapping and land evaluation/land use planning				
4.2. Indicators to monitor the status of soil health and productivity in line with Sustainable Development Goal established and adopted	Capacities for the assessment and monitoring of land degradation are developed; indicators, monitoring and forecasting systems for SSM practices are established and used.	4.2.1.	Assessment of needed capacities and infrastructure for the: a. assessment, monitoring and reporting of land degradation b. establishment of monitoring and forecasting system for SSM serving the implementation of development strategies and soil integration with other disciplines, to aid the reporting of SDG indicators related to soil and soil management.	1 1	Dec 2016 Dec 2016	NENA RSP, National Soil Information Institutions (NSII), FAO, ESB, JRC, ISRIC, CGIAR, ACSAD, ICARDA, SIDA, IDRC, agr. and acad. Centers	National contribution 300,000
4.3. Tools to provide/derive soil information for various demands and at different levels of detail generated and sustainable soil management supported	Tools and guidelines to create soil information to satisfy the demands of users from different disciplines are established with proper training; the needs to support decision for various demands and at different levels are satisfied.	4.3.1. 4.3.2. 4.3.3.	Develop tools/systems to aid the generation of required soil data to serve specific purposes.  Set up soil Web portal for national and regional public awareness and training  Building national capacities for implementing modern tools and technologies to provide soil information for mutli-disciplines that use soil information	1 2 1	Jun 2017 Dec 2017 Dec 2018	NENA RSP, National Soil Information Institutions (NSII), FAO, ESB, JRC, ISRIC, CGIAR, ACSAD, ICARDA, SIDA, IDRC, agr. and acad. Centers	200,000 200,000 100,000
Subtotal for Pillar 4							1,300,000

## **5. Harmonization of methods and indicators for the sustainable management and protection of soil resources (Pillar V)**

Land degradation and desertification represents global, regional and local challenges that don't stop at the borders. The soil resources are in the core of the land degradation and food security problems. As like many other countries, the member states of the NENA region follow different soil classification systems, soil sampling and analysis procedures which complicate the regional assessment and monitoring of soil related environmental problems. To overcome the trans-boundary issue, the Global and Regional Soil Partnership propose mechanisms for developing and exchanging globally consistent and comparable harmonized soil information. Harmonization, which could be seen as a next step to standardization, provides the ability to describe, sample, classify, and analyze the soil in a way that allows the use of the results for later scientific use.

### **5.1. Harmonization of sampling and analysis procedures to facilitate the exchange of soil indicators**

The adoption of harmonized soil sampling and analyses methods based on internationally accepted standards facilitates deriving indicators of soil productivity and health, supports soil monitoring and contributes to both designing and monitoring SLM. It contributes to the use and communication of information on trans-boundary soil information system and exchange of data between regions and countries.

Soil degradation has trans-local effect and becomes increasingly environmental and socio-economic problem. This increases the need for soil data exchange and free communication to compile and use comparable soil indicators on soil health based on unified methodology of field sampling and laboratory analysis.

### **5.2. Harmonization of assessment criteria for soil health and land degradation across the NENA region linked with UNCCD and SDG**

Once harmonization of methods and training among the NENA region is done, the relevant parameters of each agro-ecological zone is identified and land evaluation is introduced using comparable assessment criteria. Results and recommendations can serve national and local policy to control land degradation and prioritize soil protection.

### **5.3. Harmonization of land evaluation criteria across the region**

Capacity building for the implementation of harmonized land evaluation and land use criteria serves the assessment of soil quality and SSM to maintain the environmental soil functions. The development of standards and harmonized land evaluation methods and identification of relevant parameters to each of the main agro ecological zones require consultation and participatory

approach to be accepted and applied. The organization of SDSS is very effective for governmental and regional accreditation of harmonized methods and tools for land evaluation and SLM.

**Table 5. Logical Framework for the implementation of the RIP for Pillar V in NENA region**

Pillar 5: Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources.							
Outcome/ Activity	Product Description*	Activity No.	Activity Description	Priority (1, 2, 3)	Execution period (start- end) <sup>23</sup> and Indicators <sup>24</sup>	Stakeholders <sup>iv</sup>	Funding requireme nt (YES/NO and amount)
5.1 Methods of soil description, sampling, and analysis harmonized	Harmonize procedures and guidelines on methods of soil description, sampling and analysis	5.1.1  5.1.2.  5.1.3.	Review the different procedures used in the NENA region and adopt a harmonized method of soil description, soil data collection and analysis.  Create regional working group of soil information and harmonization options and website to exchange harmonized soil indicators for the monitoring and dissemination of best practices  Adopt the FAO/WRB framework for soil classification and harmonize/update historical	1	Dec2020  Dec2020  Dec 2016	Experts and scientists Ministries and related NGOs from region countries <sup>25</sup>  Regional and International organization can assist where applicable <sup>26</sup>  National soil experts and scientists. Regional experts can assist	100,000  National and regional contributio n  National contributio n

<sup>23</sup> These dates are indicative and need to be fine tuned and confirmed by the WGs and Focal Points

<sup>24</sup> Indicators: 1. N of harmonized methods and indicators implemented; 2. Amount of soil data shared; 3. N of portals established; 4. N of stakeholders trained on the use of thematic information and maps; 5. Number of laws for incentives and environmental regulation implemented; 6. N of technologies and tools conveyed; 7. N of accredited laboratories

<sup>25</sup> Some activities could be done without external funding and could be achieved through the regular mandate of ministries and soil institutions. Focal points from all countries to take a role in activating the national contribution.

<sup>26</sup> FAO, ACSAD, ICARDA, ICBA, GEF, USAID, ESB, JRC, ISRIC, IDRC, CGIAR, IUCN, IFAD, WB, IDB, GM, GIZ, Italian Cooperation, ESCWA, UNECA, LADA and WOCAT

			soil data from existing systems to the adopted one				
5.2 Assessment criteria for soil health and land degradation (erosion, salinity, fertility etc) harmonized across the NENA region, exchange and linkages with UNCCD and SDG facilitated	Land degradation assessment and soil conservation measures are harmonized and more emphasize on soil to define and monitor best practices is achieved.	5.2.1	Prospect the possible adoption of the new LADA/WOCAT methodology for the: a. assessment of land degradation and suggest best management practices. b. identification and harmonization of soil health indicators	1 1	Dec2016 Dec 2016	International institutions, research and development institutions Soil experts and scientists, Ministries, related NGOs Agriculture cooperatives	Yes 300,000 300,000
5.3 Land evaluation criteria across the region harmonized	Land evaluation and land suitability assessment are standardized and harmonized.	5.3.1	Identify and share harmonized land evaluation methods and practices to support integrated and participatory land use planning	1	Dec2020	Research/ Development institutions and farmers	300,000
5.4 Soil classification and profile description data sheets harmonized.	Harmonized procedures of soil classification and Assessment sheets.	5.4.1	Identify and share profile description data sheets and adopt classification procedure	3	Dec 2018	Regional soil entities and institutions	100000
Subtotal Pillar 5							1,100,000

### **III. Implementation Arrangements and Governance**

In general, to understand the importance of the NENA RSP, it is useful to highlight the common soil related challenges for the NENA region:

1. Unsustainable use and management of soil resources.
2. Wind and water erosion,
3. large urban expansion on arable lands,
4. Limited availability of detailed and updated soil information,
5. Non uniformity of the methods of soil analysis and different level of completeness and variable scale of the soil maps and associated databases.
6. Low investment in scientific research including the soil related projects.
7. Low awareness and stewardship about soil problems and degradation.
8. The need to institutionalize and educate the soil management issue.
9. The need for standardized land evaluation processes leading to implementing participatory land use planning.

The main conclusions of the 2015 Amman RSP Conference pointed to the fact that the soil is not among the high priority issues either at national or regional level. It is usually impeded within other subjects like climate change and productivity. However, soil condition is deteriorating due to different natural and man-induced threats. This calls for the need to conserve the soil, develop effective preventive measures based on regional priorities, formulate policy messages about the impact of soil degradation, and provide economic analysis (cost-benefit) of soil management and finally implementation of preventive and conservation interventions.

The governance of the implementation of the Plan of Action will include the major stakeholders in the frames of GSP. These stakeholders include:

- The Partners represented by the national focal points and delegates of non-government partners;
- The GSP Secretariat;
- The NENA Soil Partnership Steering Committee and NENA Secretariat;
- The chair and members of the Working Groups (WGs) on the five Pillars of Action.

The interaction of stakeholders is regulated by the “Guidelines for the establishment and consolidation of Regional Soil Partnerships”. The Implementation Plan should be prepared by the WGs, revised by the GSP Secretariat, adopted by the Partners and implemented by the NENA Secretariat supervised by the Steering Committee.

The participants of Amman meeting agreed to prepare the functional statement (TOR) of the NENA soil partnership in consultation with the focal points and develop the NENA Soil Partnership Implementation Plan for a horizon of five years. The Secretariat will carry full time leadership supported by a technical team from the Steering Committee and Working Groups. The following implementation arrangement are proposed:

- The ministries of agriculture in each country acts as focal point and formulates national public-private soil taskforce.
- New soil entity, formed from partners with the support of the GSP and RSP and under the supervision of the MoAs and research and academic circles, and in cooperation with relevant Ministries, the civil society organizations (environmental groups, local action groups, non-governmental organizations) and farmer's associations, to support the implementation of the plan.
- The new soil entity carries SWOT analysis to assess national capacities, gaps, weakness and strengths in soil related issues. It provides national recommendations on national policy regarding the implementation of the plan.
- Each entity identifies and categorizes the existing agro-ecological zones in the country, chose representative pilot areas for the assessment of bio-physical and socio-economic factors and consequences of soil degradation and identifies major soil challenges and interventions to support decision making at local, regional and national levels.
- In cooperation with the global potential resource partners and UN organizations undertake thorough analysis of the agricultural practices and state of land degradation and linkages with ecosystem services, water resources, biodiversity, food security and climate change and identify resources mobilization strategies to facilitate the implementation of the Regional Implementation Plan.

## **IV. Risk management**

The establishment of NENA RSP supposes strong commitment from the focal points and active role of the Secretariat and involvement of the members of the steering Committee and Working groups. The design and successful implementation of the activities listed in the RIP suggest the availability of funding and continuous support from international donors and commitment from regional and national institutions including the updating of policies and laws. The SSM/SLM action plan can be successfully executed if end users participate in the identification and dissemination of best practices and evidence of economic and social benefits from SSM and SLM presented to the farmers and policy makers. The willingness and commitments of governments, represented by all concerned Ministries, is the key to successful implementation of the plan, especially at national level. A great success of the implementation plan will be achieved if different ministries work together to integrate soil issues within their related activities, particularly, environment, water and agriculture.

The ignorance and negligence of the role of the soil as essential part in the soil-water-plant-animal-human continuum obstructs the support of soil targeted research and constrains the efforts for improved soil quality information and restricts the updating of old soil information and production

of new one. Building and updating soil databases and the standardization of soil sampling, analytical and classification methods can be hampered by the lack or deficit of resources, administrative constraints and absence of interest from decision makers and end users. Only with proper soil education in schools and universities and with effective communication, using all modern means of social media, can one count on awareness raised for SLM and protection of soil resources.

Capacity building, raising awareness, strong governmental commitment and public-private partnership can assist in mitigating the constraints to build NENA Network on Soil Information and develop and implement good regional governance in soil management and protection.

## **V. Monitoring and Evaluation**

Progress in the SSM and SLM will be assessed using the SMART (Simple, Measureable, Attributable, Reliable and Time bound) indicators. Developing assessment and monitoring indicators shall use base line bio-physical and socio-economic information and involve scientists, farmers and local administrations. The Implementation Plan will take advantage of the Indicators and a Monitoring Framework for the SDGs to guide the selection and implementation of indicators. This will help the countries in their reporting to the SDG indicators.

Proposed indicators must be accepted by the stakeholders to develop, recommend and implement measures based on positive or negative trends. The WOCAT questionnaires on SLM Technologies and Approaches as well as the Mapping questionnaire provide numerous indicators suitable to be used for impact monitoring.

Advanced objective assessment and monitoring tools like remote sensing and GIS can be used together with the results of national published reports and statistics undertaken by public and private sectors on the area of cropped lands, soil productivity, efficiency of applied water and nutrient, farmers income and net return. The RSP can use available platform and cooperate with the taskforce on 'Impact Monitoring' of WOCAT to develop together the new tool for 'participatory impact monitoring' at the local level which is based on the local assessment done using the WOCAT questionnaires.

Monitoring and evaluation indicators are formulated and verified with strong commitment from the government using bilateral and multilateral agreements between administration, academic and research centers, farmers association and other representatives of private sector and civil society.

## **VI. Budget and commitments**

The budget was split into the five pillars with dominant part allocated for the pillar one and pillar three (table 6). Pillar one encompasses all major points of expenditure related to the assessment of soil degradation, mapping of SSM/SLM practices and socio economic conditions and

implementation of restoration/rehabilitation programs in pilot areas representing dominant land use types. The huge budget for pillar three includes the establishment of center of excellence for soil research and development, which was suggested during the soil conference. If establish, the center will play a major role in promoting sustainable soil management as integral part of the national and international efforts to building sustainable environmental systems. The total proposed budget is USD 13,621,100 split into five years. Some activities need external financial support but it is anticipated that all activities will receive national contribution and local/regional co-funding support.

Table 1. Overall budget

	Resource envelopes by Pillar	USD
	Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity (Pillar 1)	3,900,000
	Encourage investment, technical cooperation, policy, education, awareness and extension in soils (Pillar 2)	750,000
	Promote targeted soil research and development focusing on identified gaps and priorities and synergies with related productive, environmental and social development actions (Pillar 3)	4,000,000
	Enhance the quantity and quality of soil data and information: data collection (generation), analysis, validation, reporting, monitoring and integration with other disciplines (Pillar 4)	1,300,000
	Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources (Pillar 5)	1,100,000
	Total Activities	11,050,000
	Technical support services (FAO) ~10%	1,105,000
	TSS to field projects	600,000
	Reporting (standard cost)	10,000
	Evaluation	75,000
	Total value of goods and services	12,840,000
	PSC 7%	898,800
	Entire Facility	13,738,800

## **VII. Annexes:**

### **Annex 1. Abbreviation**

ACSAD	Arab center for the Studies of Arid Zones and Dry lands
AECID	Spanish Agency for International Development Cooperation
AOAD	Arab Organization of Agricultural Development
BMZ	German Federal Ministry for Economic Cooperation and Development
CBD	Convention on Biological Diversity
CNRS	National Center for Remote Sensing
COAG	Committee on Agriculture
ESB	European Soil Bureau
ESCWA	Economic and Social Commission for West Asia
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GCSAR	General Commission for Scientific Agriculture Research
GCSAR	General Commission for Scientific Agricultural Research
GEF	Global Environmental Facility
GEOSS	Global Earth Observation System of Systems
GIS	Geographic Information System
GIZ	German International Cooperation
GLASOD	Global Assessment of Soil Degradation
GM	Global Mechanism
GSP	Global Soil Partnership
HLEC	High-Level External Committee
ICARDA	International Center for Agricultural Research in the Dry Areas
ICBA	International Center for Biosaline Agriculture
IDB	Islamic Development Bank
IDRC	International Development Research Center
INSII	International Network of Soil Information Institutes
ITPS	Intergovernmental Technical Panel on Soils
JRC	Joint Research Center
LADA	Land Degradation Assessment in Dry lands
LARI	Lebanese Agricultural Research Institute
LCCS	Land Cover Classification System
LCLU	Land Cover Land Use
MDG	Millennium Development Goal
NDVI	Normalized Differential Vegetation Index
NENA	Near East North Africa
NGO	Non-governmental Organization
NSIS	NENA Soil Information System
PoA	Plan of Actions
R&D	Research and Development
RS	Remote Sensing
RSP	Regional Soil Partnership

SDG	Sustainable Development Goal
SDSS	Soil Decision Support System
SGDB	Soil Geographical Database of Europe
SLM	Sustainable land management
SSM	Sustainable Soil Management
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WOCAT	World Overview of Conservation Approaches and Technologies
WRB	World Reference Base for Soil Resources

## Annex2: Participating countries, partners and main contributions<sup>27</sup>

Pillar 1: Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity			
Country	Organization	Associated Staff (specialization and position)	General Contribution to the RSP
NENA organizations	Ministry of Agriculture	National soil scientist Land management officers National focal point	Chose representative pilot areas from existing land use types for the assessment and monitoring of SLM. Logistic support and dissemination of results. Provide information and statistics on land use and socio economic conditions. Provide co-funding and in-kind contribution
	Ministry of water resources		Support for providing information on available water resources, water demands and allocation policy. Provide co-funding and in-kind contribution
	Ministry of planning		Support to provide cadastral information on the state of land use planning
	Ministry of finance		Support with international donors for the organization of procedures related to the approval of loans, donations for the SLM project and facilitation of expenditure procedure upon the laws of accounting and transparency
	Ministry of high education		Support and adopt soil related curricula in the schools and universities
	Scientific researches centres and Academia		Carry research related to the remote and on-ground assessment of the state of soil resources in the pilot areas. Support in the creation of soil monitoring system.
International Organizations	FAO	National soil scientist Land management officers National focal point	Capacity building for the creation of soil monitoring system and assessment of land quality, funding, coordination and dissemination of results. Organization of conferences and workshops
	GEF, GM, UNCCD, UNFCCC, CBD, UNDP, UNEP		Funding for the setup of soil monitoring system, assessment of soil quality and best practices.
	USAID, ICARDA, NASA, ESA		Technical support for the SLM, funding, access to satellite images,
International projects	WOCAT		Technical support for the assessment and mapping of SLM.
	LADA		Technical support for the assessment of land degradation
Regional Organizations	ACSAD		Political and technical support to influence policy for SLM at the level of the Arab Ministers of Agriculture, funding
	AOAD		Political and Technical support to influence the implementation of policy for SLM at the level of the Arab Ministries of Agriculture, funding
Civil Society	Farmer's Associations		Adoption and support in learning and co-learning
	NGOs		Support in learning and dissemination. Influence the media, put pressure on the cabinet and parliament to adopt laws for soil conservation

<sup>27</sup> These institution were suggested by the focal points during the NENA soil conference. The list is an indication of activities where these institutions can contribute.

Pillar 2: Encourage investment, technical cooperation, policy, education, awareness and extension in soils			
Country	Organization	Associated Staff (specialization and position)	General Contribution to the RSP
NENA	Ministry of Agriculture	National soil scientist  Land management officers  National focal point	Preparation and dissemination of leaflets, CDs, videos. Activation of extension service. Influence the cabinet and parliaments to adopt laws for soil conservation and SLM. Provide co-funding.
	Ministry of water resources		Invest in irrigation systems and drainage. Promote efficient water use and water productivity. Provide co-funding.
	Ministry of planning		Promote technical cooperation, support of national and local planning project and influence policy making. Provide co-funding.
	Ministry of finance		Provide financial support and control of project execution and implementation
	Ministry of high education		Promote the introduction of SLM and SSM in the education and means of massive information.
	Scientific researches centres and Academia		Technology transfer and knowhow transfer in SLM practices
International Organizations	FAO	National soil scientist  Land management officers  National focal point	Encourage investment. Technical support, international and regional cooperation, support funding of projects and adoption of sustainable policies
	GEF, GM, UNCCD, UNFCCC, CBD, UNDP, UNEP		Promote investment in soil conservation and SLM
	USAID, ICARDA, NASA, ESA		Technical cooperation and extension in soil conservation and SLM, access to satellite images
International Projects	WOCAT		Technical cooperation to produce education, extension and awareness material
	LADA		Technical cooperation to create and strengthen extension services
Regional Organizations	ACSAD		Technical cooperation, co-funding and extension
	AOAD		Technical cooperation, co-funding and extension
Civil Society	Farmer's Associations		Support the organization and implementation of demonstration plots on their farms and knowhow transfer
	NGOs		Support in learning and dissemination. Influence the media, put pressure on the cabinet and parliament to adopt laws for soil conservation

<b>Pillar 3: Promote targeted soil research and development focusing on identified gaps and priorities and synergies with related productive, environmental and social development actions</b>			
<b>Country</b>	<b>Organization</b>	<b>Associated Staff (specialization and position)</b>	<b>General Contribution to the RSP</b>
NENA	Ministry of Agriculture	<b>Soil survey</b> <b>Irrigation Water management,</b> <b>Soil and Water Research Centre</b> <b>Remote sensing/GIS</b> <b>National focal point</b> <b>National soil scientist</b> <b>Land management officers</b>	Focal Point. Coordination and local support to implement the research activities and identification of priorities. Provision of basic and soil information/maps
	Ministry of water resources		Local support to implement research activities
	Ministry of Social Affairs		Provision of funds and information. Support for socio economic surveys
	Ministry of finance		Secure funding for research on soil conservation and SLM
	Ministry of high education		Dissemination of results at the level of education and public awareness. Influence the cabinet and parliaments to adopt laws for funding research on soil conservation and SLM.
	Scientific researches centres and Academia		Carry research oriented to soil conservation and SLM. Transfer of knowledge in simplified system.
International Organizations	FAO		Encourage investment to support research. Technical support, support funding of projects for the technical and socio economic assessment of land degradation, identification and dissemination of SLM practices.
	GEF, GM, UNCCD, UNFCCC, CBD, UNDP, UNEP		Promote investment in soil conservation and SLM
	USAID, ICARDA, NASA, ESA		Technical cooperation and extension in soil conservation and SLM, access to satellite images to support research activities
International Projects	WOCAT		Technical cooperation to produce and disseminate research based education, extension and awareness material
	LADA		Technical cooperation to create and strengthen extension services for the implementation of research results
Regional Organizations	ACSAD		Technical cooperation, co-funding of research programs and extension
	AOAD		Technical cooperation, co-funding and extension
Civil Society	Farmer's Associations		Support the research on their plots and knowhow transfer
	NGOs		Support in learning and dissemination. Influence the media, put pressure on the cabinet and parliament to allocate resources for research activities on soil conservation and SLM

<b>Pillar 4: Enhance the quantity and quality of soil data and information: data collection (generation), analysis, validation, reporting, monitoring and integration with other disciplines</b>			
<b>Country</b>	<b>Organization</b>	<b>Associated Staff (specialization and position)</b>	<b>General Contribution to the RSP</b>
NENA	Ministry of Agriculture	Soil survey Irrigation Water management, Land management officers Remote sensing/GIS National focal point National soil scientist Soil and Water Research Centre	Support soil data collection and use. Conceptualisation, implementation and capacity development for policy and finance support
	Ministry of finance		Exchange data, implementation, concept., financial support
	Scientific researches centres and Academia		Provision of funds and information.
	Ministry of Education		Support collection and monitoring of soil data. Integrate research on soil with other disciplines. Support in soil reporting
International Organizations	FAO	Soil survey Irrigation Water management, Land management officers Remote sensing/GIS National focal point National soil scientist Soil and Water Research Centre	Integrate the soil data with other education disciplines
	GEF, GM, UNCCD, UNFCCC, CBD, UNDP, UNEP		Encourage investment to enhance soil related information. Technical support for standard quality soil data collection and analysis.
	USAID, ICARDA, NASA, ESA, INSII		Promote support in soil data collection and integration of soil conservation into other disciplines.
International Projects	WOCAT	Soil survey Irrigation Water management, Land management officers Remote sensing/GIS National focal point National soil scientist Soil and Water Research Centre	Technical cooperation for advanced soil data collection and validation
	LADA		Technical cooperation to produce and disseminate research based education, extension and awareness material
Regional Organizations	ACSAD	Soil survey Irrigation Water management, Land management officers Remote sensing/GIS National focal point National soil scientist Soil and Water Research Centre	Technical cooperation, co-funding of research data sharing and exchange
	AOAD		Support healthy soil conditions by applying good SLM practices. Support soil monitoring
Civil Society	Farmer's Associations		

<b>Pillar 5: Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources</b>			
<b>Country</b>	<b>Organization</b>	<b>Associated Staff (specialization and position)</b>	<b>General Contribution to the RSP</b>
NENA	Ministry of Agriculture	Soil survey Irrigation Water management, Land management officers Remote sensing/GIS National focal point Soil and Water Research Centre	Support, the harmonization and exchange of soil data. Provision of funds, in find support and information.
	Ministry of finance		Capacity development for policy and finance
	Ministry of Education		Integrate the soil data with other education disciplines
	Scientific researches centres and Academia		Support the harmonization of methods, standardization and monitoring of soil data and indicators
International Organizations	FAO	Soil survey Irrigation Water management, Land management officers Remote sensing/GIS National focal point Soil and Water Research Centre	Encourage investment to enhance harmonization of soil related information. Technical support for harmonized and standardized soil data collection and analysis.
	GEF, GM, UNCCD, UNFCCC, CBD, UNDP, UNEP USAID, ICARDA, NASA, ESA		Promote support in soil data harmonization and integration of soil conservation concept into other disciplines.
International Projects	WOCAT LADA	Soil survey Irrigation Water management, Land management officers Remote sensing/GIS National focal point Soil and Water Research Centre	Technical cooperation for the use of advanced harmonized soil data in assessment and mapping
Regional Organizations	ACSAD AOAD		Technical support in harmonized soil data reporting and dissemination
Civil Society	Farmer's Associations	Soil survey Irrigation Water management, Land management officers Remote sensing/GIS National focal point Soil and Water Research Centre	Support collection of measurements on soil health and mapping of practices affecting SLM.
	NGOs		Support in learning and dissemination. Influence the media, put pressure on the cabinet and parliament to allocate resources to carry and disseminate research activities on soil conservation and SLM

### Annex 3: Timeline proposed to execute the RIP of the RSP

Pillar and activities	Year 1			Year 2			Year 3			Year 4			Year 5		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Pillar 1: Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity.															
Outcome/Activity 1.1 A soil DSS is built and <b>soil quality and hot spots are assessed and immediate actions designed</b>															
1.1.1. Identification of national agro ecological zones / land use areas under major risk of soil degradation															
1.1.2. Assessment of the distribution and level of soil degradation and the environmental and economic impact of soil deterioration using national soil databases															
1.1.3. Analysis of the prevailing socio-economic conditions and policies to identify soil rehabilitation options (packages) at regional and national level supported by land evaluation and participatory land use planning															
Outcome/Activity 1.2 Soil rehabilitation programs including documentation of best SLM practices and scaling out to areas at high risk of soil degradation implemented															
1.2.1. Stocktaking and documentation of SSM options within NENA and similar environments															
a. Characterize and document SSM options, economically appraise (cost-benefit with linkages to ecosystem services and land degradation) and potential areas for out-scaling at regional and national level identified.															
b. Communicate results with decision makers to foster out-scaling of SSM packages															
1.2.2. Capacity development program on sustainable soil management and soil restoration, adoption and dissemination of SLM practices: Enhance capacities at national and regional levels on implementing sustainable soil management and on restoring degraded soils, including online training programs on sustainable soil management.															
1.2.3. Secure financial and political support for the implementation of national and regional soil restoration programs to achieve sustainable soil management.															
a. The League of Arab States and/or the regional FAO conference endorse NENA Implementation plan to gain support from member countries for financial support and execution.															
b. Hold a high level meeting for resources partners to present the NENA Soil Partnership Implementation Plan for resources mobilization.															
1.2.4. Restore the environmental deterioration including:															
a. Management of degraded irrigated land: improving soil and water productivity, prevent soil salinization, improve drainage system, manage soil fertility and fertilizers, promote suitable and drought tolerant crops, use of non-conventional waters.															
b. Management of degraded rangeland and marginal lands: fine-tune and adopt conservation agriculture, maintain/improve soil fertility and soil health, promote sustainable agronomic practices, improve land and water productivity (supplemental irrigation, use of composted material),															

<b>c. Management of degraded rainfed land:</b> rangeland restoration/rehabilitation and soil conservation (reduce soil erosion by wind and water), water harvesting, grazing management, promote adaptable crops/forages;														
<b>d. Mountain and Forests:</b> water harvesting, use of treated wastewater, conserving soil fertility, controlling erosion, assisted natural regeneration, community- and agro-forestry														
<b>Outcome/Activity 1.3 Impact of implementation on achieving sustainable soil management assessed and monitored</b>														
1.3.1. Establish practical, agreeable and robust indicators to monitor the status of soil resources specific to the NENA region														
1.3.2. Design and implement national soil monitoring system using the soil monitoring indicators														
1.3.3. Elaboration of the national reporting plans and knowledge exchange across the region linking to the relevant soil and environmental indicators of the SDGs														

Pillar and activities	Year 1			Year 2			Year 3			Year 4			Year 5		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Pillar 2: Encourage investment, technical cooperation, policy, education awareness and extension in soil.															
<b>Outcome/Activity 2.1: Investment in soil rehabilitation/restoration and management promoted</b>															
2.1.1. Foster the endorsement of the RIP and enable funding to improve technical cooperation, food security and enhance carbon sequestration															
2.1.2. Analysis of the constraints and opportunities and up scaling of successful rehabilitation measures and sustainable land management practices															
2.1.3. Increased investment of public and private sectors in sustainable soil management to support provision of ecosystem services and climate change adaptation/mitigation															
<b>Outcome/Activity 2.2: The role of policy, civil societies and soil institutions to support soil management enhanced</b>															
2.2.1. Support national policy to safeguard the soil as part of the ecosystems, implement and disseminate sustainable soil management practices															
<b>Outcome/Activity 2.3: Key messages to create awareness campaign to target the civil society and non- soil specialists through TV and other media implemented</b>															
2.3.1 Increase of public and decision makers awareness to support SSM practices															
a. Promotion of awareness of land users on soil vulnerability to human pressure and role of SSM in securing water quantity and quality, reducing gas emission and supporting biodiversity.															
b. Support land governance and adapted taxation policy to promote SSM and the prevention of land degradation.															
<b>Outcome/Activity 2.4: Capacity building in soil related topics, soil science in education and extension promoted</b>															
2.4.1. Introduce soil science in the curricula of primary and secondary schools and throughout the whole education and professional process and activate the extension service on SLM.															
2.4.2. Linking soil science to other disciplines (natural resources, environment and geospatial sciences) to attract young generation and support the role of soil in these disciplines.															

<b>Pillar and activities</b>															
	<b>Year 1</b>			<b>Year 2</b>			<b>Year 3</b>			<b>Year 4</b>			<b>Year 5</b>		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Pillar 3: Promote targeted soil research and development focusing on identified gaps and priorities and synergies with related productive, environmental and social development actions															
<b>Outcome/Activity 3.1 Integrated research for development approach targeting soil challenges within specific agro-ecosystems or landscape established</b>															
<b>3.1.1. Identification of the regional and national research gaps and priorities and assessment of the economic and environmental impact of current good and bad soil practices on soil resilience.</b>															
<b>3.1.2. Implementation of SSM research and monitoring program to improve soil productivity and maintain soil health in different agro-ecosystems and at research and farmer's levels to improve nutrient and water use efficiency and adapt to climate change</b>															
<b>3.1.3. Prioritize the national and regional research needs to meet the SDG notably to characterize and identify the functions of the agro ecological zones/ agro ecosystems to prevent soil degradation, meet the increasing food demands and protect the ecosystems</b>															
<b>3.1.4. Applied research on constraints for adoption and uptake of best practices including non-biophysical factors and options to encourage scaling out.</b>															
<b>Outcome/Activity 3.2. Focused research on the economics of soil management and benefit to the ecosystem established</b>															
<b>3.2.1. Development of national and regional research capacity to assess the cost of land degradation and social benefits of SLM and SSM to influence decision making and raise awareness on the wise use and conservation of limited soil and water resources.</b>															
<b>3.2.2. Carry research on the cost of soil and land degradation and the economic and social benefits from SSM/SLM and convey the results to support decision making and policies on sustainable development.</b>															
<b>3.2.3. Mapping cultivated and non-cultivated natural capitals with digital link to soil function and soil management, land cover and land use options.</b>															
<b>3.2.4. Assessment of the impact of local regulations and legislation related to land use options and soil conservation practices on land degradation and the provision of soil functions.</b>															
<b>Outcome/Activity 3.3. Centre of Excellence for soil research in NENA region Established</b>															
<b>3.3.1. Establish an accredited integrated regional soil research platform.</b>															

<b>Pillar and activities</b>	Year 1			Year 2			Year 3			Year 4			Year 5		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Pillar 4:Enhance the quantity and quality of soil data and information: data collection (generation), analysis, validation, reporting, monitoring and integration with other disciplines															
<b>Outcome/Activity 4.1.Soil data needed by different stakeholders defined and soil information system for the NENA region established.</b>															
4.1.1. Identification of institutions that hold profile data and institutions willing and capable to serve soil data.															
4.1.2. Develop functional National Soil Information System (NSIS) and compile soil data for the region. Establish NENA network of soil information institutions.															
4.1.3. Concept note including feasibility and design principles for soil monitoring and SoilSTAT adapted to NENA															
4.1.4. Define the needs of different users in soil data and share of soil data and soil indicators															
4.1.5. Identify areas with high priorities for soil mapping and the needed level of detail to design a focused soil survey programs															
4.1.6 Support the use of RS and GIS in soil degradation studies, digital soil mapping and agro-ecosystem development															
<b>Outcome/Activity 4.2.Indicators to monitor the status of soil health and productivity in line with Sustainable Development Goal established and adopted</b>															
4.2.1 Assessment of needed capacities and infrastructure for the:															
a. assessment, monitoring and reporting of land degradation															
b. establishment of monitoring and forecasting system for SSM serving the implementation of development strategies and soil integration with other disciplines, to aid the reporting of SDG indicators related to soil and soil management.															
<b>Outcome/Activity 4.3. Tools to provide/derive soil information for various demands and at different levels of detail generated and sustainable soil management supported</b>															
4.3.1.Develop tools/systems to aid the generation of required soil data to serve specific purposes															
4.3.2. Set up soil Web portal for national and regional public awareness and training															

<b>4.3.3. Building national capacities for implementing modern tools and technologies to provide soil information for multi-disciplines that use soil information</b>																
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<b>Pillar and activities</b>	<b>Year 1</b>			<b>Year 2</b>			<b>Year 3</b>			<b>Year 4</b>			<b>Year 5</b>			
	<b>1</b>	<b>2</b>	<b>3</b>													
Pillar 5: Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources.																
Outcome/Activity 5.1: Methods of soil description, sampling, and analysis harmonized																
5.1.1. Review the different procedures used in the NENA region and adopt a harmonized method of soil description, soil data collection and analysis.																
5.1.2. Create regional working group of soil information and harmonization options and website to exchange harmonized soil indicators for the monitoring and dissemination of best practices																
5.1.3. Adopt the FAO/WRB framework for soil classification and harmonize/update historical soil data from existing systems to the adopted one.																
Outcome/Activity 5.2: Assessment criteria for soil health and land degradation (erosion, salinity, fertility etc) harmonized across the NENA region, exchange and linkages with UNCCD and SDG facilitated																
5.2.1. Prospect the possible adoption of the new LADA/WOCAT methodology for the: a. assessment of land degradation. b. identification and harmonization of soil health indicators																
Outcome/Activity 5.3: Land evaluation criteria across the region harmonized																
5.3.1. Identify and share harmonized land evaluation methods and practices to support integrated and participatory land use planning																