Food and Agriculture Organization of the United Nations

GLOBAL SOIL PARTNERSHIP

Regional Implementation Plan for the Asian Soil Partnership

December 2016

Implementation Plan

Prepared with the contribution of the members of the ITPS for Asia and appointed national experts from (in alphabetic order)

Afghanistan
Bangladesh
Bhutan
Cambodia
China
Republic of Korea
India
Indonesia
Japan
Lao PDR
Malaysia
Mongolia
Myanmar
Nepal
Pakistan
Philippines
Republic of Korea
Sri Lanka
Thailand
Vietnam

GSP facilitator: Lucrezia Caon

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EXECUTIVE SUMMARY

Asia is the Earth's largest and most populous continent of the world, located primarily in the eastern and northern hemispheres. With approximately 3.9 billion people, the population density of the region is as high as 1.87 person ha^{-1}, which is much higher than the world average of 0.54 person ha^{-1}. Recognizing the risk for soil degradation in the region, the Bangkok Communique (May 2015) reported that soil degradation due to soil erosion (onsite and offsite effect), soil pollution, soil organic matter and carbon depletion, soil sealing/capping, soil compaction, and soil acidity, salinity and alkalinity, is negatively affecting food production and associated food security, national economies, provision of ecosystem services, adaptation to climate change, and increasing poverty. The situation is being aggravated by climate change and unsustainable soil management practices partially resulting from the rapid economic development and urbanization characterizing some countries in the region.

In order to preserve and increase soil health, and stop and revert soil degradation, the following priorities were identified:

- Promotion of sustainable soil management (SSM) practices at all levels and in all land use types;
- Restoration/rehabilitation of degraded soils with focus on soil erosion, nutrient imbalance, soil acidification, soil salinity and alkalinity, soil pollution, and loss of organic carbon; and
- Enhancement of soil information by using state of the art methods of digital soil mapping and advocating for having national soil information systems.

Addressing these priorities encompasses various aspects falling into the Five Pillars of Action of the Global Soil Partnership (GSP). At this regard, this implementation plan identifies outcomes and activities per each pillar, which are considered priority in this first phase of establishing the Asian Soil Partnership (ASP). It is envisaged that funding for these activities will be secured by capitalizing on existing in-country initiatives and activities, as well as by actively sourcing additional external funding.

Under Pillar 1 (Promote sustainable management of soil resources and improved global governance for soil protection and sustainable productivity), the implementation plan proposes to develop technical tools (manuals, guidelines, equipment and plans) guiding soil and land users toward the selection of the best SSM practices to put in place under different farming systems and land uses. The plan also aims to (a) identify the priority areas for soil fertility management and develop guidelines and tools for decision making support on fertilizer application at the field level, (b) report on barriers preventing SSM application and the recommended technical and political actions, and practices to take at regional and national level, (c) develop a monitoring system to assess soil and land degradation and measure progress of SSM practices and systems implementation, and (d) build capacity at regional level by compiling a database on best SSM practices, establish Soil Management Centers and link ASP countries to international development partners.

Under Pillar 2 (Encourage investment, technical cooperation, policy, education, awareness and extension in soil), the implementation plan aims to (a) engage key political stakeholders on soil preservation and rehabilitation, (b) review, develop and endorse new laws on soil protection and rehabilitation at the national and regional levels, (c) include soil science in the school curricula at all educational levels and support young professionals in building international experience, (d) develop public awareness campaigns and initiatives, (e) increase the amount of sound extension services in the region, and (f) establish partnerships and cooperation agreements through conferences, workshops and the creation of a dedicated platform for information sharing and project proposal writing. Ultimately, the plan for Pillar 2 aims at strengthening the Healthy Soil Facility.

Under Pillar 3 (Promote targeted research and development focusing on identified gaps, priorities, and synergies with related productive, environmental, and social development actions), the implementation plan aims to (a) identify/develop indicators for assessing the economic cost of soil degradation and the value of its rehabilitation also at the purpose of improving policies and regulations on soil, and mobilize financial resources on SSM practices and research, (b) establish the Center of Excellence for Soil Research in Asia (CESRA), (c) promote R&D activities based on identified priorities at the national, regional and global level, and (d) launch collaborative and interdisciplinary R&D projects and initiatives

Under Pillar 4 (Enhance the quantity and quality of soil data and information: data collection [generation], analysis, validation, reporting, monitoring and integration with other disciplines), the implementation plan aims to (a) establish and distribute a common soil database structure and framework, (b) establish a soil status monitoring system, (c) develop national soil information systems, and (d) develop Digital Soil Mapping (DSM) training package.

Under Pillar 5 (Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources), the implementation plan aims to (a) develop a common harmonization concept for soil description and classification at regional level, (b) identify national and regional reference laboratories for training, soil analysis and sample exchange (data can then be exchanged at the regional and international level), (c) harmonize procedures and guidelines on methods of soil description and sampling, (d) develop an internal quality control system using certified soil reference materials, (e) harmonize procedures and guidelines on method of soil survey, soil classification, soil mapping, and soil database management, (f) develop work direction guidelines for extension officers to transfer site-specific nutrient management (SSNM) knowledge to community soil and fertilizer management centers (CSFMCs), (g) harmonize procedures and guidelines on methods of soil survey and mapping throughout the Asian countries, (h) build an ASP laboratory network, (i) invest on capacity building, (l) assess new technologies of soil survey and map multi-purpose soil polygon and raster maps , and (m) develop tools that help facilitate the monitoring of soil indicators.

Outcomes and activities are presented in separate log frames per Pillar, along with the associated budgets and time frames. Since the GSP is a voluntary initiative, it calls for the strong support of national governments, as well as national and regional entities involved in natural resource

management. The list of outputs may be considered optimistic, considering the 5-year timeline, but it is the view of the ASP that these outputs are essential to moving forward towards achieving sustainable soil management in the region over the longer term. The aim of this implementation plan is therefore to solicit buy-in, support and active participation from additional partners to increase collaboration in soil management activities.

I. INTRODUCTION

The Global Soil Partnership (GSP) was established based on the recognition that soil is under pressure and that it is at the basis for food security and the provision of key ecosystem services including climate change adaptation and mitigation. The GSP and its regional partnerships are interactive, responsive and voluntary and are open to governments, institutions and other stakeholders at various levels. The implementation of this Plan envisages the involvement of all its partners. Partners may include any form of international, regional and national institutions/organizations working on soils such as governmental organizations, universities, civil institutions, research centers, soil science societies, United Nations agencies, non-governmental organizations, private companies, farmer associations, donors and more. Default partners to the GSP are the FAO member countries who determine FAO's priorities as laid out in the Strategic Framework and Programme of Work and Budget of the Organization and according to the needs and priorities identified in their countries.

The mission of the GSP is to develop capacities, build on best available science, and facilitate/contribute to the exchange of knowledge and technologies among stakeholders, existing multilateral environmental agreements, and technical and scientific bodies of a similar nature, for sustainable management of soil resources at all levels with a view to enhancing food security, protecting ecosystem services and in this way contributing to poverty alleviation in an era of global demographic growth and unsustainable consumption patterns. In order to achieve its objectives, the GSP should address five pillars of action, which are interlinked as shown in Figure 1:

Pillar 1. Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity.

Pillar 2. Encourage investment, technical cooperation, policy, education, awareness and extension in soils.

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

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

Pillar 5. Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources

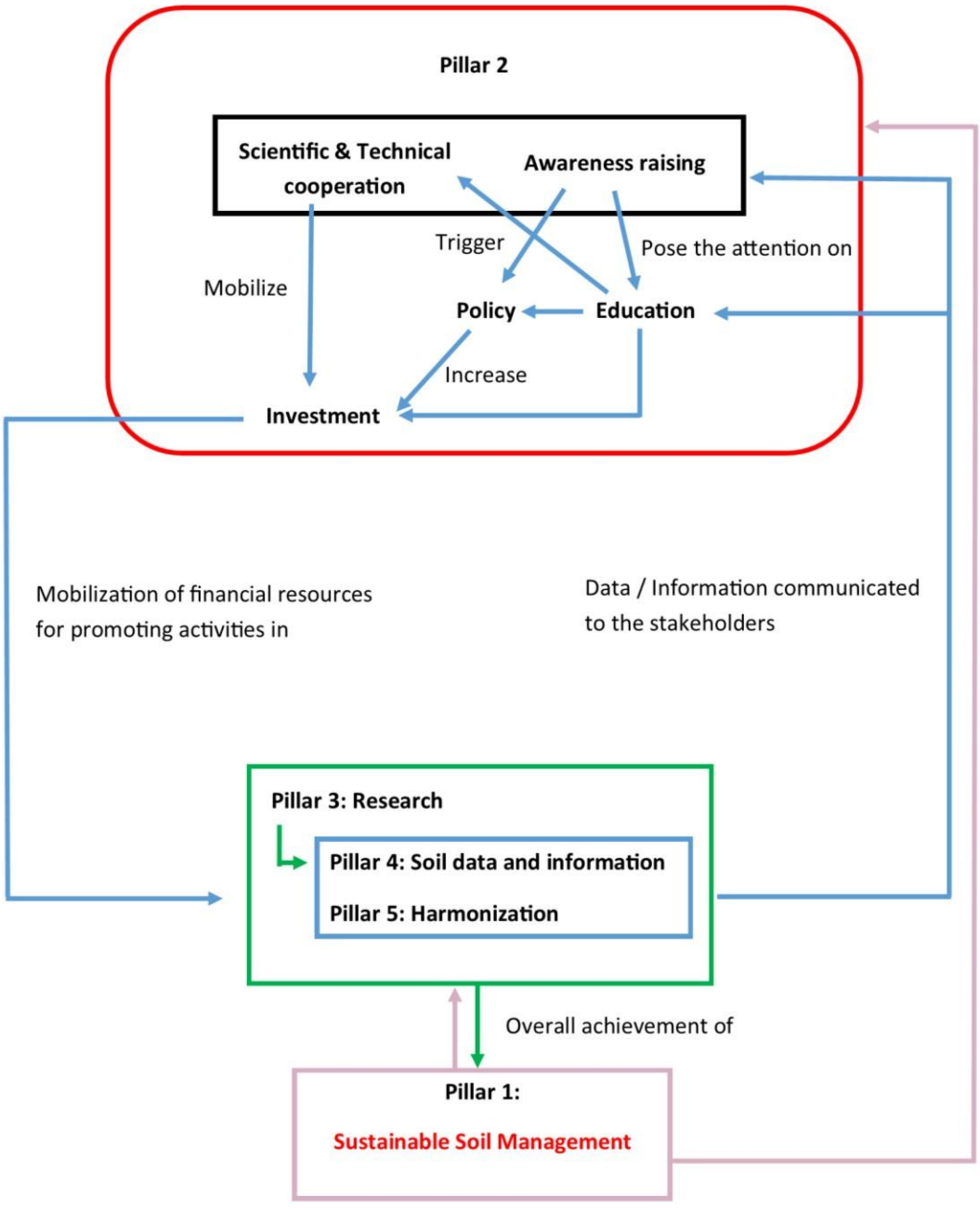

Figure 1. Interlink between the 5 pillars of action of the GSP

Regional Soil Partnerships (RSPs) were established at the purpose of providing guidance on regional goals/priorities and the required implementation mechanisms. In particular, RSPs should facilitate links with national and local soil management programs and activities with a view to strengthening work on soils and to develop synergies with other relevant initiatives and activities. In this framework, the Asian Soil Partnership (ASP) was established through the Nanjing Communiqué in February 2012. The partnership consists of the following countries:

- **East Asia:** China, DPR Korea, Japan, Mongolia and Republic of Korea
- **Southeast Asia:** Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor Leste and Vietnam
- **South Asia:** Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka

Priorities of the partnership were identified to be:

a) Sharing and transferring soil knowledge and new technology within and beyond the region;
b) Providing soil information to all those with an interest in the sustainable use of soil and land resources;
c) Building consistent and updated Asian Soil Information Systems and starting to contribute to the Global Soil Information system through initiatives such as GSM; and
d) Training new generations of experts in soil science and land management.

Asia is the Earth's largest and most populous continent of the world, located primarily in the eastern and northern hemispheres. With approximately 3.9 billion people, the population density of the region is as high as 1.87 person ha^{-1}, which is much higher than the world average of 0.54 person ha^{-1}. Recognizing the risk for soil degradation in the region, the Bangkok Communique (May 2015) reported that soil degradation due to soil erosion (onsite and offsite effect), soil pollution, soil organic matter and carbon depletion, soil sealing/capping, soil compaction, and soil acidity, salinity and alkalinity, is negatively affecting food production and associated food security, national economies, provision of ecosystem services, adaptation to climate change, and increasing poverty. The situation is being aggravated by climate change and unsustainable soil management practices partially resulting from the rapid economic development and urbanization characterizing some countries in the region. In order to preserve and increase soil health, and stop and revert soil degradation, the following priorities were identified:

a) Promotion of sustainable soil management practices at all levels and in all land use types;
b) Restoration/rehabilitation of degraded soils with focus on soil erosion, nutrient imbalance, soil acidification, soil salinity and alkalinity, soil pollution, and loss of organic carbon; and
c) Enhancement of soil information by using state of the art methods of digital soil mapping and advocating for having national soil information systems.

The Bangkok Communique also emphasizes that investments on the promotion of sustainable soil management (SSM) is a pre-condition for achieving sustainable development. Therefore, it is fundamental to increase investments to support the execution of actions under the priorities listed before. It is envisaged that funding for the activities reported in this document will be secured by capitalizing on existing in-country initiatives and activities, as well as by actively sourcing additional external funding. Since the GSP is a voluntary initiative, it calls for the strong support of national governments, as well as national and regional entities involved in natural resource management to contribute to achieving the common goal of improved and sustainable soil management.

Similarly to the other RSPs, the ASP is called to compile a regional implementation plan encompassing the implementation of the five pillars of action in the region. The ASP Implementation Plan sets out the road map for the next five years to achieve SSM over the longer term and is based on regional priorities in terms of the Pillar recommendations in their respective Plans of Action.

This document is the product of a collaborative effort, mostly via email, involving the five working groups of the five pillars of action of the ASP and the national GSP focal points as nominated by the respective country representatives. A draft document was developed from the main challenges and priorities in the region under each Pillar and its respective recommendations. The most urgent priorities were converted into actions to develop a draft Implementation Plan according to the *Guidelines to Develop Regional Implementation Plans (RIPs) by the Regional Soil Partnerships* provided by the GSP Secretariat.

During the ASP Workshop held in Bangkok, Thailand, from 13 to 15 May 2015, participant countries divided into Working Groups per GSP Pillar on a voluntary basis and elected their respective chairs. The role of the Working Groups was to actively work on the Implementation Plan for each Pillar and to ensure its finalization and endorsement at the Asian Soil Partnership workshop in Bangkok, Thailand, in December 2016.

An Asian Soil Partnership Steering Committee and Chair were also elected during the workshop in 2015. The Steering Committee is the highest governance body and provide strategic direction for the ASP and advice the chair in connection with decision-making. The Steering Committee is elected for three years and can have a maximum of two terms. It meets every six months (through Skype or other means) while the ASP meets once in one or two years.

The Working Groups per Pillar and the first Steering Committee members are listed in Annex 1.

II. ASIAN REGIONAL IMPLEMENTATION PLAN – OUTCOMES AND ACTIVITIES FOR THE FIVE GSP PILLARS OF ACTION

Sustainable Soil Management (SSM) is not a standalone concept; it encompasses various aspects that are crucial to its effective implementation and success. This is the main ideology within the Global Soil Partnership which helped the foundation for the five Pillars of Action. Through these five Pillars, the various components of SSM can be addressed and managed to enable a holistic approach to improved soil management for long term protection of the natural resources while simultaneously providing benefits for human livelihoods.

Based on the opinion of national GSP representatives, the order of importance of the GSP Pillars of Action for implementation in Asia are Pillar 1, Pillar 4, Pillar 3, Pillar 2 and Pillar 5.

Pillar 1: **Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity**

Sustainable soil management (SSM), as defined in the World Soil Charter, should be promoted and implemented in all land uses. The development of SSM solutions should not only consider the implementation environment, site specific characteristics and the necessary enabling environment, but also the causes of improper soil management to date in order to develop cause-driven rather than symptom-driven solutions. The main causes of soil degradation in Asia were identified as deforestation, use of low quality water for irrigation, soil erosion and overgrazing. Additionally, soil degradation is fostered by insufficient knowledge and capacity amongst farmers to implement sustainable management practices, and insufficient financial means to acquire external inputs such as fertilizers and improved seeds. From an enabling environment perspective, the insufficient use of soil and water conservation measures is further hampered by inadequate policies and regulations on SSM, insufficient investment and governmental support to implement existing guidelines, limited technical capacity and knowledge amongst farmers and advisors alike on SSM practices, as well as insufficient soil data and maps relevant to SSM decision making and implementation.

Soil protection and sustainable management is especially important in Asia where a large portion of the population, especially the rural population (smallholder farmers), depend on land as the main resource base for their livelihoods. The agricultural sector is challenged especially by the combination of population growth, climate change and land degradation. In order to comply with the increasing demand for feed, food and fiber, the assessment and rehabilitation of degraded soils was also identified as a priority in the region. This also reflects the belief that soils of good quality positively reflects on water and air quality, food security, public health and the productivity of economic sectors. In this context, large political and financial support is required in order to disseminate SSM practices extending also to land management. The diffusion and adoption of the sufficient economy philosophy is also an asset in achieving sustainable soil management. The GSP can bring together partners and existing initiatives to improve global and regional solutions towards improving and increasing sustainable soil management for soil protection, conservation and sustainable productivity.

Activities for the implementation of Pillar 1 in the region are presented in the logical framework under Table 1. Outcomes are identified following the recommendations of the Plan of Action for the pillar, which are:

- Appropriate sustainable soil management practices and systems should be identified for all land uses at regional and national levels using existing knowledge, adapted according to site characteristics and land user needs, considering cost-benefit analyses and social impacts. These practices and systems should be implemented at appropriate scales to restore and maintain soil functions and ecosystem services [**Outcome 1.1**];

- In light of the primary importance of food security, sustainable agricultural production should be supported by balanced soil fertility management using a range of available nutrients and appropriate physical management practices without causing negative environmental impacts [**Outcome 1.2**];

- All barriers preventing the implementation or adoption of sustainable soil management practices and systems should be assessed and policy and technical solutions proposed to create an enabling environment for sustainable soil management [**Outcome 1.3**];

- A monitoring system should be developed to measure the progress of implementation of sustainable soil management practices and systems [**Outcome 1.4**]; and

- The GSP should facilitate the development of a capacity building strategy amongst all stakeholders to promote the adoption of sustainable soil management [**Outcome 1.5**].

Pillar 1: Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity.							
Outcome	**Outcome Description**	**Activity No.**	**Activity Description**	**Priority (1, 2, 3)**	**Execution period (start-end)[1]**	**Stakeholders**	**Funding requirement (USD)**
1.1 Identification of appropriate SSM practices and systems	Develop technical tools (manuals, guidelines, equipment and plans) that guide soil and land users toward the selection of the best SSM practices to put in place in different farming systems and land uses.	1.1.1	Assessment of the soil conditions and identification of the local constraints on the application of SSM practices. Update and promote the soil fertility maps under different land use systems. In coordination with activities in Pillar 4 Identification of priority areas for soil fertility management and causes for soil nutrient imbalance and crop failure. Activity to be run in coordination with Pillars 3 and 4[2].	2	2017-2018	National Soils Institutes, National Soil Science Societies, National government, GSP partners	USD 500 000 + National and regional contributions
		1.1.2	Selection of the best management practices[3] to put in place under different farming systems. The selection will rely on the database compiled within activity	2	2017-2018	National Ministries, National Soils Institutes, National Soil	USD 200 000 + National and regional contributions

[1] Execution periods are estimated, assuming that funding is available for activities to start as indicated.

[2] Activities in coordination with other pillars: (i) large scale soil sampling and analysis; use of the Remote sensing, GIS /GPS to map soil degradation; and (iii) socio-political and economic analysis to identify constraints to SSM at the local scale.

[3]Examples of best management practices in the region are (i) land suitability is to be assessed and classified with respect to specific land uses, (ii) integrated farming systems for hill and mountain agriculture, (iii) crop livestock integration system for hill and mountain agriculture, (iv) integrated management plan for peat swamp forest, and (v) management plan for Matang mangroves to protect coastal forests and soils from degradation. Related activities can be the organization of workshops on (a) crop livestock integration system for oil palm and rubber plantation, (b) integrated management plan for peat swamp forest or ex mined land, and (c) management plan for Matang mangroves to protect coastal forests and soils from degradation. Considering the importance of soil salinity in the region, activities can also include the preparation of a dedicated workshop and guidelines for soil salinity reclamation.

			1.5.1; missing data should be collected in conjunction with Pillar 4. The ASP network should support in sharing best practices information among the governments, academia and the final users.			Science Societies, GSP partners	
		1.1.3	Write local-tailored manuals and guidelines to address specific soil threats, advice on SSM and restore degraded soils[4].	1	2017-2018	National Ministries, National Soils Institutes, National Soil Science Societies, GSP partners	USD 200 000
		1.1.4	Invest in science and technology development[5]. Funding for sponsoring this activity should be obtained through activities in Pillar 2 and proposal writing.	1	2017-2021	National Soils Research Institutes, National Ministries, Agro-chemicals industry, private sector, GSP partners	USD 1 000 000 (to be mobilized through proposals writing) + National and regional contributions
		1.1.5	Compile a database with all the existing indigenous soil water conservation techniques in the region to be	1	2017	National Soils Research Institutes, National	National contributions

[4] Hot-topics for manual development/implementation are (i) the rehabilitation of degraded soil by erosion, nutrient imbalance, acidification, pollution (with attention to bioremediation), loss of organic carbon and salinity, (ii) the management of salt affected soils, (iii) the environmental monitoring of salt-affected soils and ground water consequent upon reclamation through amelioration, (iv) the conservation agriculture on steep slopes, (v) soil protection on grazing lands, (vi) agro-forestry systems, and (vii) the practice of SSM in areas affected by climate change.

[5] Examples of tools to develop are (i) "Managing Acid Soils Through Efficient Rotations" (MASTER) plans to combat soil acidity, (ii) Site Specific Integrated Plant Nutrient Supply (SSIPNS) modules for sustainable productivity, and (iii) explore new terrace designs

			implemented with new technologies and advancements in science[6].			Ministries, GSP partners	
		1.1.6	Provide information/knowledge gaps for research on SSM through literature research, local and regional surveys and outputs from pilot farms. This activity would support Activity 3.2.2	1	2018-2019	National Ministries, National Soils & Agriculture Research Institutes, National Soil Science Societies, GSP partners	USD 300 000 + National and regional contributions
		1.1.7	Implement the Voluntary Guidelines for Sustainable Soil Management	1	2017-2021	All stakeholders	USD 1 000 000
1.2 Production of guidelines and tools for soil fertility management	Identify the priority areas for soil fertility management and develop guidelines and tools for decision making support on fertilizer application at the field level.	1.2.1	Production/update of national guidelines on fertilizer application[7].	1	2017-2018	National Agriculture Ministries, GSP partners, private sector	USD 10 000 per country + National and regional contributions
		1.2.2	Development of tools for decision making on fertilizer application at the field level (in coordination with Pillars 3 and 4): - Promote programmes to enhance intelligent or computer-human interactive soil resource	1	2018-2019	National Agriculture and Information Technology Organizations, Fertilizer Industry, Agrochemicals	USD 600 000 (to be mobilized through proposal writing) +

[6] This activity can be achieved also through the execution of the Soil Doctor Programme in Pillar 2

[7] Guidelines should inform and advise on (i) integrated nutrient management approach and techniques, (ii) fertilizer recommendations systems based on soil test crop response, (iii) development of fertilizer prescription equations for major crops in different agro climatic conditions and land use systems, (iv) nutrient dynamics in different soils, (v) harnessing nutrient interactions for upscaling use efficiency, (vi) enhancing soil organic matter content, (vii) ameliorating soil acidity, (viii) soil-plant-animal continuum to diagnose mineral disorders, and (ix) fertigation.

			management practices such as Interactive Fertilizing (IF)[8]; - Use forecasting models to develop Artificial Neural Networks (ANN) providing recommendations on nutrient management; - Monitor crop growth through remote sensing; - Online soil health card generation system; - Ready Reckoner of lime and fertilizer recommendations for ready access and dissemination of fertilizer schedule for major nutrients; - Software for district wise fertilizer recommendation and dissemination for major crops; - Software for applying acid soil amendment; - Develop GIS based soil fertility assessment; - Develop Soil Spectra based fertilizer recommendations system			Industry, GSP Partners	National contributions

[8] Smallholder farmers in Asia can hardly understand and follow the conventional Optimal Fertilization Recommendation (OFR) suggested by experts, which usually contains one or two fertilizer receipts or just nutrient requirements for main crops. The first reason is that receipts might contain fertilizer resources that are too expensive or not available to farmers. Also essential labors for suggested split fertilizations during crop growing season might not be available. Since fertilizer and labor resources of smallholder farmers vary greatly and there is a lack of extension people in support to farmers at the time of implementing expert suggestions, farmers usually put expert receipts aside. As a result, blind fertilizations leading to nutrient deficiencies or over-use, yield depress, soil fertility decrease as well as heavy water pollution are very common. Interactive Fertilization (IF) is to create an intelligent computer system that can serve farmers to explain experts' recommended crop nutrient or fertilization receipts and to rectify them according to the farmer's fertilizer and labor resources available. In comparison with OFR, IF might not supply the optimized fertilizer resources, application time and nutrient amount for yield or income maximization, but it can rectify farmers' blind fertilization, alleviate crop nutrient deficiencies and unbalances, and improve yield and soil fertility. Additionally, IF is compatible with smallholder farmers' economic, labor and knowledge conditions. No financial subsidies are required for paying extension personnel in the IF fertilization decision flow.

			- Use remote sensing and GIS technology to relate nutrient assessment and recommendations to landscape analysis; and - Promotion of Leaf colour charts				
		1.2.3	On-farm demonstrations on improved soil management practices counting on the application of organic matter, biochar, and organic and inorganic fertilizers. Activity link to 1.1.6.	2	2019-2021	National Soils Institutes, National Soil Science Societies, Local government, Universities	National contributions
		1.2.4	Establish agro-advisory services on weather, soils and crop related information	2	2017-2021	National Meteorology and Agriculture departments, Private sector Agri- industries	National contributions
1.3 Barriers preventing SSM application are assessed and policy and technical solutions are recommended	A report on the barriers preventing SSM application and the recommended technical and political actions, and SSM practices to take at regional and national levels.	1.3.1	Identification and assessment of the social, technical, economic and political barriers and shortcoming preventing the adoption of SSM practices at the national level. The assessment of the policy and its promotion should be done through activities in Pillar 2.	1	2017-2018	Local Ministries	National contributions
1.4 Monitoring system for soil and land	Develop a monitoring system to assess soil and land degradation and measure progress	1.4.1	A multi-stakeholder task team will develop or adopt existing soil and land degradation indicators, as well as SSM and related indicators to be used as	1	2017-2018	Relevant government ministries, national soil	USD 100 000 National Contribution

degradation, as well as SSM implementation	of SSM practices and systems implementation		monitoring proxies. Indicators are to be developed via e-consultation and finalized during a task team workshop. This Activity will be based on the feedback from Activities 3.1.1 and 3.2.2			science societies, research and academic institutions	
		1.4.2	Put in place a systematic programme/campaign for collecting soil data (mobile labs, soil test kits, or other); develop ICT tools for effective data collection and management. Interaction with activities in Pillars 3 and 4.	1	2017-2018	National Soils Institutes, Agrochemicals and Fertilizer industry, Other GSP partners	USD 250 000 National Contribution
		1.4.3	Assess the regional baseline values of the set indicators from which to start measurement and for future monitoring.	1	2017-2018	National soil science societies, research and academic institutions, ASP	USD 100 000 National Contribution
		1.4.4	Establishment of national systems to monitor progresses in implementing SSM practices[9].	2	2017-2018	National government, National Soil Science Societies, research and academic institutions	National Contribution

[9] For example, (i) development, adoption and implementation of simple toolboxes for monitoring and evaluating smallholder farms, for example, MonQi (Monitoring for quality improvement) toolbox; (ii) recruit Field Executives for monitoring projects at field level and guide farmers; (iii) the monitoring team should be composed by all the stakeholders and coordinated by an institution dealing with soils; and (iv) produce a soil health/degradation atlas every 5 years (monitoring).

		1.4.5	Establish a SSM certification system aiming to award farmers and businessmen practicing sustainable soil management and restoring degraded soil.	2	2017-2018	ASP, National Ministries, National Soil Science Societies, Research and academic institutions	USD 50 000 + National and regional contributions
1.5 Development of a capacity building strategy for the promotion of SSM	Build capacity at regional level by compiling a database on best SSM practices, establish Soil Management Centers and link ASP countries to international development partners.	1.5.1	Compilation of a database on best SSM practices to make available to relevant stakeholder online in coordination with activity 2.6.2[10]	1	2018-2021	GSP, ASP, National Soil Science Societies, Universities relevant government ministries, research and academic institutions	National contributions
		1.5.2	Creation of Soil Management Centers (SMC) at regional level for coordinating, implementing and monitoring activities on SSM in support to national initiatives[11].	1	2017-2019	ASP, GSP, National governments	In-kind + National and regional contributions

[10] Countries should be enabled to enter local successful case studies in support to specific SSM practices following unified methodologies for data harmonization.

[11] Centers should:

- Offer trainings on SSM tailored on the profile of the different stakeholders involved (e.g. politicians and agricultural extension staff);
- Coordinate efforts on achieving SSM in the region;
- Cooperate with SMC in other regions (South-South and North-South cooperation);
- Offer trainings on soil testing and laboratory analysis.

			Centers should work in collaboration with the regional soil research centers established under activity 3.2.1.				
Subtotal for Pillar 1							**USD4 329 000**

Pillar 2: Encourage investment, technical cooperation, policy, education, awareness and extension in soil

Pillar 2 of the GSP is composed of six interlinked and interdependent components constituting the backbone of the successful implementation of activities in the partnership: policy, investment, education, extension, public awareness and technical cooperation. Over time, the lack of attention to the study and management of the soil resources resulted in extended soil degradation worldwide and in a shortage of young soil scientists that can follow the implementation of soil related projects, and design, assess and monitor soil protection and management practices. Additionally, gaps in education and extension services also resulted in a lack of awareness on the importance of the soil resources among a wide range of stakeholders (e.g. policy makers, government departments, implementers, land users and the general public). In turns, when education, extension and awareness are missing, technical and scientific cooperation are hampered and very little is done under the political and economic point of view. Additional barriers to SSM at the national level also come from gaps and overlaps in institutional responsibilities, and unclear arrangements to foster co-management and participatory approaches.

In this framework, effort should be put on training the new generations on SSM and in producing extension material for extended awareness raising campaigns on soil. The role of extension services in knowledge sharing and knowledge transfer should not be underestimated especially when aiming for sustainable use for long term benefits. Extension material produced at the regional level should be adapted at national level needs and tailored to the target audience (attention to the terminology). Additionally, it should be used to enhance public debate and create a platform to influence decision makers and politicians in promoting sustainable soil management. The Soil Doctors Programme is recommended for use as extension tool on SSM, especially in areas where extension services are not currently active. Where available, multimedia play an important role in the formulation of the 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. Special attention must be attributed to interactive learning (e.g. simplified games and movies on soil functions), which can substantially contribute to early education of youth to the importance and vital role of the soil in everyday activity and human life.

Technical and scientific cooperation is of critical importance to overcome gaps between research results and farmers and/or outdated technical infrastructure, and weak national research capacities, which hinder the development, adoption and dissemination of best SSM practices. Fostering the North-South and South-South technical and scientific cooperation upgrades the technological base for soil studies and generates new applied research on SSM which influences both public opinion and national policies. However, none of the activities mentioned above can be run without financial support. The development of soil national marketing programs and adoption of incentives to encourage investors and users in soils (legislations, subsidy, credit, markets) plays an important role in the encouragement of SSM. Sustainable soil management action plans should reflect an

integrated investment framework (IIF), and financial support should be secured from existing and new international, regional and national organizations.

Activities for the implementation of Pillar 2 in the region are presented in the logical framework under Table 2. Outcomes are identified following the recommendations of the Plan of Action for the pillar, which are:

- Politicians, policy advisors, decision makers and associated agencies should be informed, through FAO formal channels and GSP partners, to better appreciate the true societal value of soil (e.g. environmental and economic) to their specific sectors in order to encourage the development of enabling frameworks for soil protection or sustainable management in line with the goals of the World Soil Charter [**Outcome 2.1**];

- Policy development should be supported by regular and harmonized assessments of the state of soil, associated pressures, their impacts and trends to prioritize and target interventions (Pillar 4 of the GSP) [**Outcome 2.2**];

- Education on soil should be promoted (a) as a theme into school curricula at all ages in order to boost the understanding of its value and functions; (b) at tertiary level, soil science should be promoted as a key subject or taught as a cross-cutting discipline; (c) to the broader soil user community through diverse communication and learning channels; (d) by updating relevant documentation, tools and training materials – traditional and emerging pedagogic channels should be explored to ensure maximum dissemination of such materials; (e) through cooperation with existing programmes (e.g. UNESCO, FAO, UNCCD, etc.); and (f) by increased support for the participation of young soil scientists from developing countries in international training events [**Outcome 2.3**];

- GSP partners and the broad soil user community should promote strategies to engage with society as a whole and utilise the expertise of professional communicators (including social scientists). This could include the development of public awareness campaigns and initiatives, such as the World Soil Day, which can be adapted to different regions, cultures and scales of implementation. Governments should consider investment and sustained funding to support large scale national outreach programmes [**Outcome 2.4**];

- Extension services should be supported (politically and financially), developed and revitalised to reflect the multi-functional services of soil and expanded beyond the traditional agricultural community to ensure the sustainable use of soil and to reduce degradation across all land uses. Regional priorities need to be determined in terms of the disparities in agricultural extension knowledge-base, expertise, motivation and support, and then professionally and efficiently communicated in order to develop solutions to these challenges and set goals for their implementation [**Outcome 2.5**];

- Scientific and technical cooperation should be promoted and strengthened between partners of the Regional Soil Partnerships and through South-South and North-South cooperation schemes (links to Pillars 1 and 3) [**Outcome 2.6**];

- The GSP should foster investments in soils to benefit society and future generations through inter-alia the "Healthy Soils Facility" to ensure effective implementation of activities under the five plans of action. The return from investments (including cost-benefit analysis) should be assessed to provide funding agencies, soil users and policy makers with evidence based success stories for future investment schemes. Investment strategies should reflect regional and national priorities and stakeholder needs [**Outcome 2.7**].

Pillar 2: Encourage investment, technical cooperation, policy, education, awareness and extension in soil							
Outcome	**Outcome Description**	**Activity No.**	**Activity Description**	**Priority (1, 2, 3)**	**Execution period (start-end)[12]**	**Stakeholders**	**Funding requirement (USD)**
2.1 The awareness of key political stakeholders on soil functions and soil-related ecosystem services increased	Key political stakeholders engaged on soil preservation and rehabilitation	2.1.1	Informing politicians, policy advisors, decision makers and associated agencies about the importance of soils using different tools and channels, including policy briefs, etc.	1	2017-2021	National Soil Institutes, National Agriculture Research Institutes, GSP partners, FAO	USD 75 000
		2.1.2	Promote activities highlighting the link between SSM and the Sustainable Development Goals (including field visits and others)[13].	1	2017-2021	Ministry of Agriculture, National Soil Institute, National Research Institutions	N/A
		2.1.3	Promote the organization of the World Soil Day celebrations(5th December)	1	2017-2021	National Governments, National Soils Institutions, GSP partners	National contributions
2.2 Policy development supported	Review, develop and endorse new laws on soil protection and rehabilitation at the national and regional levels	2.2.1	Promote and advocate for the implementation of the Revised World Soil Charter and the Voluntary Guidelines for Sustainable Soil Management	1	2017-2018	National Soils Institutions, Universities	N/A

[12] Execution periods are estimated, assuming that funding is available for activities to start as indicated.
[13] Activities can also serve to ensure that SSM is present in the National Development Plan; to develop National Soil Conservation Programmes; and to enact a Soil Conservation and Land Use Act or Policy as platforms for entrepreneurship development.

		2.2.2	Provide sufficient (quantity and quality) information to policy makers for policy development.	2	2019	National Soils Institutions, Agriculture Universities, Soil Science societies, GSP Partners	USD 30 000 (for the region) + in-kind and national contributions
		2.2.3	Preparation of reports for policy makers on the state of soil, associated pressures, their impacts and trends to prioritize and target interventions, in line with the Status of the World's Soil Resources report[14].	1	2018-2020	National Soils Institutions	In-kind + National contribution
		2.2.4	Review, update or develop soil legal frameworks to strengthen soil governance.	1	2018-2021	National Institutions, Agriculture Universities, National Soil Science Societies, GSP partners	USD 100 000 + National and regional contributions
		2.2.5	Organize regional and international advocacy events for decision makers.	1	2018-2019	National Institutions, Agriculture Universities, National Soil Science Societies, GSP partners	USD 300 000 + National and regional contributions

[14] The frequency for the submission of Progress Reports would be decided at next ASP Workshop

		2.2.6	Promote the implementation of global guidelines of communication with policy makers which should be nationally adapted. This should be done in collaboration with skilled communicators to assist soil scientists with guidelines on how to communicate technical information to a political audience		2017-2018	National Governments, National Institutions, GSP, ASP	USD 50 000
		2.2.7	Advocate for the implementation of sustainable soil management practices through the use of incentives for the provision of ecosystem services		2017-2018	Ministry of Agriculture/ Rural Development	National contribution

2.3 Education on soil promoted	Soil science included in the school curricula at all educational levels, and young professionals supported in building international experience	2.3.1	Advocate for the inclusion of soil science as a topic in primary and secondary education and the inclusion of soil scientists in the development of relevant school curricula. Soil science as a compulsory cross-cutting discipline. Make use of e-learning to implement the work of teachers in school (MOOCs, Asian Soil Partnership platform, dedicated videos, etc.)[15] Increase the amount of outgoing activities on soil in school. Activities can include for instance the use of soil health diagnostic kits, demonstration plots, etc. Introduce essay competitions for school children, soil photo contests and other interactive events on soil. "Soil for youth" programmes to be run during the summer holidays	1	2017-2021	Ministry of Agriculture, Ministry of Education, Ministry of Rural Development	USD 200 000 + National Contribution

[15] Certificated E-learning course on soils and other related subjects should be promoted and supported to provide an opportunity for ASEAN soil community. FAO-GSP would tryto provide technical and funding support to produce training and awareness materials such as these

		2.3.2	Organize a training programme (sessions and material) for school teachers.	1	2017-2021	Ministry of Agriculture, Ministry of Education, Universities and National Soil Science Societies	USD 100 000 + National Contribution
		2.3.3	Organize a training programme (formal and informal) for young soil experts. 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.	1	2017-2021	Ministry of Education, Agriculture, Environment, Water local authorities, focal points, farmers, research and academic centers	USD 50 000 + National Contribution

		2.3.4	Develop a regional exchange programme for tertiary and post-graduate soil science training, along with an associated bursary scheme. Creation of incentives (e.g. scholarship awards) for students to pursue graduate studies in soil science and related fields and conduct innovative research. National Soil Science Societies and Universities should be invited for nominating young scientists for international programmes. Creation of an Asian Soil Partnership training programme.	1	2017-2021	Ministry of Agriculture, Ministry of Rural Development, Agriculture Universities, Soil Science societies, ASP, GSP	USD 200 000 + National and regional contributions + Private contributions
		2.3.5	Collaborate with other key players on education at the local, regional and global level (e.g. UNESCO) in order to develop joint education programmes and seek financial assistance	2	2017-2021	National Institutions , ASP, GSP	USD 50 000 + in-kind
2.4 Society sensitized on the role of soils for life on Earth	Public awareness raising campaigns and initiatives developed	2.4.1	Support the organization of different awareness raising events such as the Global Soil Week, Soil Conservation Month (June) and the World Day to Combat Desertification (June 17)	1	2017-2021	Ministry of Agriculture, Ministry of Rural Development, Ministry of Environment, Academic institutions	Regional contribution

		2.4.2	Contribute with relevant material and actions related to the SDGs that are relevant to soils.	1	2017-2018	National Institutions, GSP, ASP	In-kind (task undertaken by a leading national soil institute)
		2.4.3	Establishment an ASP Soil Prize in line with the Glinka World Soil Prize	2	2017-2021	Ministries of Agriculture, ASP, GSP	USD 70 000 + National contribution
		2.4.4	Encourage the establishment of National Soil Museums.	2	2017-2018	National Institutions, Universities	National contribution
2.5 Extension services supported, developed and revitalized	Increased amount of sound extension services available in the region	2.5.1	Encourage the establishment or the strengthening of extension services with focus on sustainable soil management Facilitate the establishment of the Voluntary Soil Doctors Program in the region The extension service of the Department in charge of soil related issues, universities and research institutions to jointly establish the Soil Doctors Program with land users as the main target. The implementation of the program should provide inputs for its improvement, which can be used to write guidelines for its effective implementation.	1	2017-2019	Ministry of Agriculture, Universities, National Soils Institutions	USD 500 000 + Regional and national contributions

		2.5.2	Develop material and information to enhance soil extension services at regional level which can be adapted to national level needs. Rely on the production of newsletters, articles, syllabaries to be used in school and games for large scale awareness raising. Additionally, increase the broadcasting of soil information on local radios, televisions and social medias such as Facebook and Twitter.	1	2017-2018	Agriculture Universities, National Research institutes, National Soil Science Societies	In-kind + National contributions
		2.5.3	e-village soil fertility management initiatives for fast and remote dissemination of technologies and information[16]	2	2019-2021	ASP, National Soils Institutes	National contributions
		2.5.4	Implement the open source (MOODLE) Educational Platform developed within the global implementation plan for Pillar 2 at the regional level. The platform will offer online courses for schools and professionals, and will address region-specific soil issues	2	2017-2018	National Soils Institutions	USD 100 000

[16] This activity aims at empowering villages under the technological point of view.

		2.5.5	Operate/update the ASP webpage within the GSP website. The page would serve for information (problems, similarities and priorities in soil research, development, innovation and capacity building) and programmes sharing within the region and between the various Regional Soil Partnerships.	2	2017-2021	National Research Institutions/ Universities/ GSP partners	USD 50 000 (to the ASP Secretary for the managing of the page)
		2.5.6	Establish an Online Soil Counseling Clinic for imparting knowledge on SSM practices, soil information systems, soil characteristics and functions, soil suitability to crops, soil fertility and crops requirements (water and nutrients), and soil resilience to climate change.	2	2017-2021	National Soils Institutions/ Agriculture Science Centers/ GSP partners from both public and Private Sector	USD 150 000
		2.5.7	Develop apps to support decision making on the field[17]. A scientifically recognized institute to take the leadership on the activity.	1	2017-2018	National Soils Institutions, research institutions, private sector, GSP partners	USD 100 000

[17] To be implemented in conjunction with Activities under the Outcome 1.4.5.Each activity has its own budget to cater for the specific deliverables to be developed.

		2.5.8	Develop open source GIS maps to support farmers' decision making	1	2017-2019	National Soils Institutions, Geospatial Centers, GSP partners from both Public & Private Sectors	USD 200 000
2.6 Scientific and technical cooperation promoted and strengthened	Partnerships and cooperation agreements are established through conferences, workshops and the creation of a dedicated platform for information sharing and project proposal writing	2.6.1	Increase the visibility and participation in established platform for technical and scientific cooperation promotion such as: - East and Southeast Asia Federation of Soil Science Societies (ESAFS); - National Soil Science Societies meetings; and - Agricultural Technical Cooperation Working Group (APEC).	1	2017-2021	National Institutions , Ministry of Agriculture, National Soil Science Societies	N/A
		2.6.2	Make use of the ASP webpage to promote cooperation among regions.	1	2017-2018	National Institutions & Councils, Ministry of Agriculture, Regional bodies like SAARC, ASEAN	N/A

		2.6.3	Facilitate the exchange and visits to programmes by soil scientists and key stakeholders at regional and international levels. Programmes should aim at bringing together institutions, organizations and governmental bodies in order to promote the development of new technologies and joint research projects on soil.	1	2017-2021	National Institutions & Councils like ICAR, Bhabha Atomic Research Center (In case of India), ASP, GSP	USD 420 000 + In-kind + national and private contributions
2.7 Investments on soil increased	Healthy Soils Facility strengthened	2.7.1	Advocate for the increase of investment on sustainable soil management by using successful and profitable case studies. Organize a donor's meeting to mobilize resources for the execution of the ASP Implementation Plan.	1	2017-2021	National Ministry of Agriculture	N/A
		2.7.2	Foster increased investment by public and private sectors in sustainable soil management by sensitizing relevant stakeholders on the importance of practicing SSM, and by seeking for political support[18].	1	2017-2021	National Ministries of Agriculture and Rural Development, Agro-Industry partners	N/A
Subtotal							**USD 2 745 000**

[18] To be implemented in conjunction with Activities under the Pillars 1 and 2.

Pillar 3: Promote targeted soil research and development focusing on identified gaps, priorities, and synergies with related productive, environmental, and social development actions

In general, Pillar 3 aims to stimulate the implementation of targeted soil research as a response to emerging demands from the soil users and practitioners who, on a daily basis, face constraints and challenges in implementing sustainable soil management practices and in increasing soil productivity. This should lead to a strategic combination of basic and applied research to generate knowledge for the development of new or improved technologies, for supporting development agendas, economic growth, environmental sustainability, and for social development. The identification of research priorities depends on the assessment of national and regional capacities, gaps and needs to establish research programs and advanced tools including the use of advanced techniques. In order to achieve the research and development (R&D) objectives of the region, it is important to engage all potential actors to develop relevant strategies, invest resources and execute complementary actions to fill the gaps in knowledge, generate or improve technologies to address emerging problems, and support human development. Research results should then be efficiently transferred from the research level to the level of farmers and other end-user communities for implementation.

Soil research in the Asian region can benefit from the results of basic research executed in developed countries, and can combine both basic and applied research to generate knowledge that can develop or adopt new technologies and support development goals. Synergy between advanced international research institutions and local universities and research bodies and private co-funders 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 of soil degradation and soil management, in particular: soil erosion, loss of soil organic carbon, soil salinity/ alkalinity, nutrient imbalance (more efficient use of applied nutrients and better recycling of nutrients from soil pools), soil pollution, soil sealing/land take, soil acidification, and compaction. Finally, research should provide support in strengthening the soil buffering capacity and resilience against variable climatic conditions. In all cases, soil research in the Asian region should focus on soil degradation and onsite and offsite (often neglected) economic loss to current and future generations.

Activities for the implementation of Pillar 3 in the region are presented in the logical framework under Table 3. Outcomes are identified following the recommendations of the Plan of Action for the pillar, which are:

- Compile for all partners evidence of the return of investment in soil research, stressing the importance of soil functions (e.g., economic cost of soil degradation and the value of its rehabilitation) for the provision of services by ecosystems and in reaching the UN Sustainable Development Goals [**Outcome 3.1**];

- Encourage inter- and transdisciplinary R&D to support the five pillars to enhance the development of appropriate sustainable soil management practices and systems, the applicable use of soil information, the harmonization of methods and determination of best indicators, and the dissemination of research results beyond the scientific community, to globally support economic growth, environmental sustainability and social development [**Outcome 3.2**];

- Capitalize on existing R&D initiatives and outputs through meta-analysis and synthesis reviews for all partners, to identify global, regional and local emerging priorities [**Outcome 3.3**];

- Foster synergy and engagement between research and end-user communities, and donor agencies, to facilitate active collaboration in a joint-learning approach that can be effective in broadening the research focus and enhancing its impact [**Outcome 3.4**].

Pillar 3: Promote targeted soil R&D focusing on identified gaps, priorities, and synergies with related productive, environmental, and social development actions.							
Outcome	**Outcome Description**	**Activity No.**	**Activity Description**	**Priority (1, 2, 3)**	**Execution period (start-end)[19]**	**Stakeholders**	**Funding requirement (USD)**
3.1 Prove the return on investment in soil R&D	Indicators for assessing the economic cost of soil degradation and the value of its rehabilitation identified or developed to be used in improving policies and regulations on soil, and mobilize financial resources on SSM practice and research.	3.1.1	Finding knowledge gaps for identifying/developing indicators for assessing the economic cost of soil degradation and the value of its rehabilitation (stocks taking and gaps analysis)[20]. Develop different models specific to the region and convey the results to support decision making and policies on sustainable development. The interdisciplinary working group should also provide technical advice to decision makers during the process of developing/updating regulations and legislations related to land use options and soil conservation practices on land degradation and the provision of soil functions Develop research plan and link with 3.2. (research programme development)	1	2017-2018	National Institutes and Agriculture Universities, interdisciplinary working group for Pillar 3 collaborating with other regions for the achievement of this common goal	In-kind + USD 100 000 The working group should mobilize financial resources through proposal writing

[19]Execution periods are estimated, assuming that funding is available for activities to start as indicated.

[20]Indicators might be developed considering: (i) soil resources within the framework of ecosystem services, particularly soil functions/soil ecological services, (ii) high-value crops productivity (e.g. rice, oil palm, and others), (iii) nutrient use, nutrient uptake, fertilizer nutrient use efficiency, nutrient loss and soil mining, (iv) nutrient content of high-value crops in relation to their yield, (v) quantification of yield losses under various land use systems, (vi) soil biodiversity/the role of soil

3.2Encourage inter- and transdisciplinary research and development	Establish the Center of Excellence for Soil Research in Asia(CESRA)	3.2.1	Facilitate the coordination of regional soil research and policy support. This could be an accredited integrated regional soil research center (subject to availability of financial support) which will be hosted in Thailand. Preparatory tasks: – Analyse the capacity of national and international research institutions active in the region – Conduct a deficit analysis and inclusive consultation process – Develop a concept for improved regional soil research advocating and implementation The center should be responsible for: - Collecting and disseminating information from soil research (supported by the use of the ASP webpage); - promoting awareness and training (link to Pillar 2); - launching research projects of cross-regional interest (link to Pillars 2 and 3);	1	2017-2019	National Ministry of Agriculture, International Organization like UNEP, World Bank, IFAD, ADB, SARC, GSP partners	USD 5 000 000

biota towards soil rehabilitation/restoration, (vii) micro nutrients of the soil and the high-value crops, (viii) the content of heavy metals and other toxic substances in high-value crops, and (ix) established limits in the content of heavy metals and other toxic substances for crops entering international markets.

		3.2.2	Launching target R&D programmes aimed at answering the identified knowledge gaps for indicators development. On this regard, building a regional network of soil research stakeholders[21].	2	2019-2020	National Institutes and Agriculture Universities	USD 500 000 + Regional and national contribution
		3.2.3	Results from the economic assessment of soil degradation should be used to promote R&D on soil management and conservation and mobilize financial resources to restore degraded soils and halt soil degradation	3	2019-2020	National Research Institutions	USD 1 000 000
		3.2.4	Provide policy support to the government and institutions to promote inter-disciplinary participation in soil research.	1	2017-2018	National Ministry of Agriculture, GSP partners	In-kind (also making use of resources mobilized for achieving awareness raising activities under Pillar 2)

[21] The production of rice in relation to water and nutrient use efficiency, water quality and quantity, micronutrients availability, crop residues management, heat tolerance and soil microbial dynamics, was identified as a hot topic for research advances. Additionally, research on adaptive management technologies should be developed and promoted in order to face the impacts of climate change and other soil threats such as soil salinization on yields and to minimize the economic impacts of soil degradation in the region. This also includes the identification of crop varieties suitable to adverse soil conditions. Attention should be paid to the following regional specific topics: (i) assessment of the impact of climate change on hill and mountain soils and evaluation of suitable adaptation strategies, (ii) assess the impacts of climate change on the productive capacity of soils under conservation agriculture (focus on crop rotation), (iii) alternative methods to liming for buffering soil acidity, (iv) impacts of the chemical amelioration of saline and sodic soils on the ecosystem, and soil and groundwater quality, (v) impact of slash and burn cultivation on soil properties, and (vi) physical, economic and social impacts of shifting agriculture on soil.

3.3 Identify global, regional and local emerging priorities	Promotion of R&D activities based on identified priorities at the national, regional and global level	3.3.1	Develop and compile a database with all the R&D initiatives and outputs on soil and land organized by sub-disciplines, in the region (metadata about research projects)[22]. A single institution compiles all the respective data provided by all national Pillar 3 members. The database should be used to explore the applicability of R&D initiatives and outputs to local conditions in the Asian region. The database should also be used for identifying global, regional and local gaps in knowledge, and orienting R&D priorities.	1	2017-2019	National Institutes and Agriculture Universities, GSP partners	USD 150 000 (Budgets for task force meeting: USD40 000 per year)
		3.3.2	Each country should identify national priorities in research, which should then be used to identify priorities at the regional and global level. Priorities at the national and regional level should be aligned with the Sustainable Development Goals (SDGs) and especially to those on soil (SDG 2, 3, 6, 11, 12, 13 and 15).	1	2017-2018	Research and academic institutions, focal points, professional communicators	National contribution

[22] The database should include information on the research methodology and the conditions under which the studies were conducted (e.g. climatic conditions, farming system, soil type, soil status, etc.). It includes also activities by international research institutions and programmes in each country).

		3.3.3	Adapt and translate the scientific message to inform all stakeholders and the larger public.	2	2019-2021	Research and academic institutions, focal points, professional communicators	USD 50 000
3.4 Promote active collaboration between universities, research institutions, extension services, end-user communities and donor agencies	Launch of collaborative and interdisciplinary R&D projects and initiatives	3.4.1	Identification of key stakeholders and potential donors at national, regional and global levels. Identification of key partners and stakeholders for addressing emerging priorities, and establish a network of collaboration. The network should also serve to write joint project proposals and mobilize financial resources.	1	2017-2018	Research and academic institutions, focal points, professional communicators	N/A
		3.4.2	Promote multi-stakeholder discussions aimed at sharing knowledge for launching joint projects and initiatives on soil information, functions, conservation and restoration.	2	2017-2021	Research and academic institutions, focal points, professional communicators	USD 250 000 (Budgets for task force meeting: USD50 000 per year)
		3.4.3	Carry out interdisciplinary soil R&D projects also involving participatory approaches	3	2019-2021	Research and academic institutions, focal points, professional communicators	USD 3 000 000 (Budgets for conducting three years project (USD1 000 000 per year) are needed.)
Subtotal Pillar 3							**USD 10 170 000**

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

Reliable soil information has become fundamental to inform in decision making from land user to research and policy levels to guide soil use and management, especially in the face of the increased need for climate change adaptation and mitigation, sustainable intensification of agriculture and the provision of ecosystem services.23 Implementation and monitoring of SSM further requires reliable soil information to evaluate implementation impact and progress, and to determine how different soils respond to different management practices. In this context, the creation of regional soil databases would enable a collaborative effort to collect and manage soil data and increase data sharing between institutions and countries for research, decision making and monitoring purposes, while still respecting the rights and responsibilities of the data owners and custodians. Therefore, investments in soil data collection and coverage of details on soil data should be prioritized.

Ensuring adequate funding for soil research projects and respecting the roles, responsibilities and rights of soil data providers ensures continuous flow of soil information. At the global level, the GSP established the International Network of Soil Information Institutions (INSII) to support regions in establishing collaboration and sharing information on soil. Additionally, a system, to be referred to as SoilSTAT, is under development to monitor, forecast and periodically report on the status of the global soil resources. In Asia, activities to support SoilSTAT will be implemented in overlap with Pillar 1 (Outcome 1.1 and 1.4).The integration of national soil systems with the global system facilitates the harmonization of soil assessment and mapping methods and supports the production of thematic maps. Additionally, the establishment or reinforcement of national soil information systems will ease the access of use of soil information to different local and national stakeholders.

The current situation in the Asian region is characterized by disaggregated, outdated and missing soil data. Often data are also 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. Even when the soil data exist, they are often not openly available due to intellectual property (IP) rights, privacy issues or the need to pay for the required soil –related data. Much of the existing data are in hard copies of maps, data tables and reports. In many cases, both hard and soft copy soil data are not georeferenced and therefore not suitable for use in mapping. However, 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

[23] Omuto C, Nachtergaele F and Vargas Rojas R. 2013. State of the Art Report on Global and Regional Soil Information: Where are we? Where to go? Global Soil Partnership Technical Report. Food and Agriculture Organization of the United Nations, Rome

various levels (from farmers to policy makers): soil classification and distribution, land suitability for land use planning, soil fertility, and degree of land degradation.

Activities for the implementation of Pillar 4 in the region are presented in the logical framework under Table 4. Outcomes are identified following the recommendations of the Plan of Action and the Implementation Plan for the pillar at the global level, which are summarized as following:

- The global soil information system should be integrated into the much larger effort to build and maintain the Global Earth Observing System of the Systems (GEOSS) and close attention should be given to issues relating to the protection of privacy, intellectual property rights and terms of use [**Outcome 4.1**];

- Implementation of the global soil information system should include a training program to develop a new generation of specialists in mapping, monitoring and forecasting of soil condition, with an emphasis on countries where improved soil knowledge is essential for food security and restoration and maintenance of ecosystem services [**Outcome 4.2**];

- An enduring and authoritative system for monitoring and forecasting the condition of the Earth's soil resources should be established under the auspices of the Global Soil Partnership to meet international and regional needs [**Outcome 4.3**];

- The global soil information system should use soil data primarily from national and within-country systems through a collaborative network and the distributed design should include facilities for incorporating inputs from the new sources of soil data and information [**Outcome 4.4**].

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	**Outcome Description**	**Activity No.**	**Activity Description**	**Priority (1, 2, 3)**	**Execution Period**	**Implementation**	**Funding Requirement**
4.1 Soil information systems of majority of ASP members established and updated (involves Pillar 4 Products: polygon maps, soil profiles, grids, for SoilSTAT see below)	Building consistent and updated soil information systems	4.1.1	All ASP countries establish national soil information systems and representative data bases (legacy data, of possible, continued inventories) Output: National Information Systems of ASP countries established.	1	2017-2020	National soil information institution	If possible in-kind, or, depending on the progress already made, USD 100 000 to 500 000 per country
		4.1.2	Contribute to filling national and global knowledge gaps about the distribution of soil carbon, and its impact on climate change. Output: National Soil Organic Carbon Map based on GSP Guideline on Soil Organic Carbon Mapping).	1	2017-18		In-kind
		4.1.3	Harmonize the various national soil polygon maps of Asia based on GSP agreed classification system. Output: Soil Atlas of Asia	1	2017-2020	Agreed regional soil data consolidator	USD 50 000 per country
4.2 Soil data sharing policy agreed and Asian soil portal established	Sharing and transferring soil knowledge and new technology within and	4.2.1	Adopt the Open Data Policy and Ethics developed by GSP Output: ASP Open Data Policy	1	2017-2018	National soil information institution	In-kind
		4.2.2	ASP members transform their data into web services and provide it as discovery and download services.	2	2018-2020	National soil information institutions	In-kind

	beyond the region	4.2.3	Establish the Asian Soil Partnership Portal. (Output: Asian Soil Partnership Homepage)	2	2017-2020	Voluntary ASP member, or secretariat, or chair	In-kind (effort depends on equipment and software needed), ca. USD 150 000
4.3 Soil status monitoring system conceptualized and initially tested by economically advanced members	Providing soil information to all those with an interest in sustainable land management	4.3.1	Select soil benchmark data for soil description and monitoring purposes, based on proposals for site selection in each ASP member country. (Output: Number of sites established for monitoringi) Basic soil data (4.1.1) are evaluated using pedo-transfer functions or other models, to develop spatial layers for soil indicators (Output: national Indicator data sets for SoilSTAT)	2	2018-2019	National soil information institution in cooperation with other national partners where available (workshop)	In-kind, of such sites do not exist yet, an investment of ca. USD 300 per site is needed (if these sites are equipped for monitoring, further investments are needed)
		4.3.2	Prototype national soil monitoring established with shared processed data (Output: SoilSTAT at Asian Soil Partnership Homepage)	3	2019-2020	National soil information institutions, Agreed regional soil data consolidator	USD 250 000
4.4 Geo-spatial data management capacity enhanced	Training a new generation of experts in soil science and land management	4.4.1	Training on soil survey, classification and mapping for national soil institute without national soil map (e.g. Bhutan) (Output: National Soil Map of Bhutan)	2	2017-2018	All	USD 500 000

		4.4.2	Training on Digital Soil Mapping including soil organic carbon mapping (Output: 1 national staff trained	2	2017-18	All	USD 80 000
Subtotal Pillar 4							**USD 1 980 000**

[i] Issues that need specific consideration in monitoring plans are land degradation, desertification, soil pollution, mine spoils, seawater inundation in productive lands, etc.

Pillar 5: Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources.

Soil degradation has trans-local effect and increasingly becomes an 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. Harmonization of methods and data is therefore necessary to enable data sharing and collation at regional level to support sustainable management and protection of soil resources. Harmonization at a regional level can be somewhat dangerous, because it may lead to the development of several different regional systems poorly harmonized between each other. Thus, at the (sub) regional level the efforts should be aimed at the introduction of universal harmonized approaches rather than to the development of regional systems for scientific communication.

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. Harmonization should be done according to the principles of cooperation and operations to ensure commonality, inclusiveness, efficiency, multi-linguistics, interoperability, extensibility and scalability. For soil analyses, harmonization can be promoted by using ISO certified reference laboratories identified in the region. Standards can be developed by examining existing practices for field sampling, preparation and measurement and considering global standards to be developed under the GSP in order to enable the exchange of data between regions.

Activities for the implementation of Pillar 5 in the region are presented in the logical framework under Table 5. Outcomes are identified following the recommendations of the Plan of Action for the pillar, which are:

- Develop an over-arching system for harmonized soil characterization as the central objective of Pillar 5. The system builds on and merges existing approaches to describe, classify, map, analyse and interpret soils[achieved through the accomplishment of **Outcomes 5.1-5.5**];

- As a mechanism for improving the comparability of soil data, all GSP members should be able to reference their information into the GSP harmonization system which includes legacy data as well as newly collected data. It builds on established harmonization principles as well as on current standardization and harmonization activities [**Outcome 5.1**];

- Reference systems for soil profile description, soil classification and soil mapping need to be developed. For that, the FAO (2006) Guidelines for Soil Description should be reviewed with the aim to develop it further as a new generic field book. References for international soil classification will be the World Reference Base for Soil Resources or USDA Soil Taxonomy until a new standard system is released. The GSP supports the development of the new Universal Soil Classification System [**Outcome 5.2**];

- Review existing practices for field sampling, sample preparation and measurement (including laboratory standardization and QA/QC) and prepare specifications and guidelines for harmonized approaches to the determination of the main functional properties of soils (e.g. chemical, physical and biological) [**Outcome 5.3**];

- To enable the exchange of digital soil-related data, agreement is reached on a global soil information model, vocabulary service and meta-data standards. Implementation of this model driven architecture will be consistent with the aspirations of the global soil information infrastructure (GSP Pillar 4) [**Outcome 5.4**]; and

- Review existing indicator systems and evaluation procedures and develop a harmonized approach based on common criteria, baselines and thresholds with the aim to monitor the state and response of soils under the effect of policies and management [**Outcome 5.5**].

Pillar 5: Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources							
Outcome	**Outcome Description**	**Activity No.**	**Activity Description**	**Priority (1, 2, 3)**	**Execution period (start-end)**[24]	**Stakeholders**	**Funding requirement (USD)**
5.1 Develop reference systems for soil profile description, soil classification and soil mapping	Develop a common harmonization concept for soil description and classification at regional level	5.1.1	GSP/FAO to set up a 6-member committee representing all the sub regions of relevant soil experts to implement activities under Pillar 5 in consultation with Pillar 5 working group. The committee and the working group for Pillar 5 will also coordinate with other regions to develop a globally accepted system for describing, classifying and mapping the soil.	1	2017-2021	ASP Secretariat, Pillar 5 Committee national soil institutions; regional soil classification experts; extension services	USD 400 000 2017: two 5-day meetings (USD 7 0 000 per meeting) 2018-2021: one 5-day meeting per year (USD 65 000 per year)
		5.1.2	Standardize soil test interpretation for site specific nutrient management. Organize a workshop for standardization of soil test interpretation for RSP. Organize regional and international conferences and workshops to promote soil testing and quality control assessment.	2	2017-2021	RSP, LDD, DOA	USD 1 000 000

[24] Execution periods are estimated, assuming that funding is available for activities to start as indicated.

5.2 Reference national soil information systems into the GSP harmonization system	Identify national and regional reference laboratories for training, soil analyses and sample exchange. Data can then be exchanged at the regional and international level	5.2.1	Develop an inventory of facilities and manpower capacities of national laboratories tasked to process soil samples. Identify status of lab equipment, capacity and needs, and current routine methods Based on the global P5IP, derive task for reference labs, and identify potential candidates in the ASP	1	2017	Any stakeholder in need of reliable soil analysis P5WG members to coordinate with representatives of national labs	In-kind
	Harmonize procedures and guidelines on methods of soil description, sampling	5.2.2	- ISO 17025 for soil laboratory Activities: - Introducing the ISO 17025 - Development of ISO 17025 handbook	3	2017 – 2020	TISTR, DOA, LDD	In-kind + USD 500 000

	Internal quality control system by soil certificated reference materials	5.2.3	Certified soil reference materials are prepared and statistically associated with property value and characterized following ISO Guide 34 and ISO Guide 35.	1	2017-2021	DOA	USD 100 000 Funding for workshop of ISO Guide 34 and ISO Guide 35 are expected. USD 1 000 000 + in-kind Funding for laboratory preparation to ISO Guide 34 accreditation is expected.
	Harmonize procedures and guidelines on method of soil survey, soil classification, soil mapping, and soil database management	5.2.4	Soil survey and soil mapping for land use planning - Training workshop in soil survey (methodology), soil classification (laboratory analyses for Taxonomy and WRB soil classification system), soil mapping (to delineate map units) and soil survey interpretation for land use planning	1	2017	TISTR, LDD, FAO	USD 100 000
		5.2.5	Soil database management system - Workshop for soil database development	2	2017		USD 100 000

	Work direction guideline for extension officers to transfer Site-specific nutrient management (SSNM)knowledge to community soil and fertilizer management centers (CSFMCs)	5.2.6	Building on recommendations from stakeholder consultations, create guidelines for extension officers to transfer site-specific nutrient management (SSNM) knowledge, technologies and organizational management practices to community soil and fertilizer management centers (CSFMCs). Providing soil analysis services using a soil testing kit (previously standardized), giving preliminary recommendations for soil and fertilizer management to members and - others in the community. Demonstrating precision management and comparing it to traditional management. Compiling requests for fertilizer and soil amendments from members as recommended, and ordering and distributing them accordingly.	1	2017-2018	DOAE LDD DOA	USD 40 000 for writing the guidelines USD 100 000 for the harmonized development of the soil testing kit + national contributions In-kind for compiling requests for fertilizer and soil amendments

5.3 The Harmonized Asian Soil Database	Harmonize procedures and guidelines on methods of soil survey and mapping throughout the Asian countries	5.3.1	Standardization of soil survey procedure in the partner countries. - Workshop for soil survey techniques or by training the main procedure to soil survey staffs; - The WRB and USDA taxonomy systems will be advised to follow; - Soil mapping units will be considered as the same system being well known, combines existing regional and national updates of soilinformation in Asia. The soil map in a boundary data will be transferred to raster map, linking soil unit of the attribute to soil properties data.	1	2017-2019	TISTR, LDD, FAO	USD 150 000 + in-kind
		5.3.2	A collection of reference soil profile databases will be conducted following the same system. A considerable collection of soil profile information from the partner countries will be assembled. - Soil museum will be organized Training of establishing soil museum in the partner countries will be given	2	2018-2019	LDD, FAO	USD 100 000 + in-kind and national contributions

	Build ASP lab network: Exchange scientific and technical needs on soil testing. interpretation and good laboratory practices Recommend best practices harmonize analytical methods develop and exchange quality assurance mechanisms Scientific and technical cooperation will be promoted and strengthened between partners of the RSP and through South-South and North-South cooperation schemes Proficiency Testing Program and a Proficiency Certification Program for quality control on soil testing results for the GSP and RSP countries	5.3.3	SEALNET25 Harmonized soil test methods and interpretation and quality control to support and guide national initiatives. The activities should consist of: Creating close cooperation and information exchange between laboratories Coordinating efforts for achieving QC for soil testing in the region; for management advice (Pillar 1), improved soil research quality (Pillar 3) and support reliable quality controlled soil information for national soil data bases (Pillar 4) Coordinating efforts on developing a standard manual for harmonizing soil test interpretation Set the 1st draft of Standard Operating Procedure (SOP) for RSP (SOP including with the specs of the responsibility of officers, the work direction, the analytical items and methods, and the formats of records and templates). Cooperating with other regions (South-South and North-South cooperation);	1	2017-2020	Interested soil laboratories from all countries and institutions	USD 300 000 (travel, ring tests, material) Purchase of Certified Soil reference materials(CRM)

[25] The achievement of training course in SEALNET activity will be present in workshop for tangible progress of ASP program.

	Capacity building	5.3.4	Create an e-learning course to implement regional harmonization of soil testing methods and interpretation and quality control (via Asian Soil Partnership platform, dedicated videos, Facebook, You-tube etc.) All analytical demonstration in training program will be recorded for setting the short training clip and posted on YouTube, Facebook to target the next step goal of recording a full training video of ASP or e-learning course.	2	2017-2020	LDD DOAE DOA FAO RAP	Support funding (in-kind + national contributions) for arrangement of the e-learning course from national countries are expected Workshop for creating an e-learning course (USD50 000)
5.4 Modernizing the Asian soil survey and developing indicators and evaluation procedures for soil monitoring	Assessing new technologies of soil survey and mapping soil polygon and raster maps for multi-purpose	5.4.1	Geo-information system (GIS) and remote sensing (RS) application techniques for soil survey - The GIS application will be tested in various terrains for soil mapping - The workshop of using GIS and RS techniques needs to be organized for the working staff The target staff will be trained.	3	2017-2020	LDD, FAO, GISTDA	USD 200 000

		5.4.2	Predictive mapping method will be proposed to operate soil map production instead a conventional soil mapping method - The spatial analysis and non-spatial analysis will be introduced to map soil in both soil class and soil properties maps - The soil map compilations need to be trained to target working staff The soil map report perspective needs to be established	3	2017-2020	LDD, FAO	USD 200 000
		5.4.3	Soil map interpretation - Soil suitability for agricultural management needs to be established and published - Soil suitability for engineering management needs to be established and published The training for target working staff	3	2017-2020	LDD, FAO	USD 100 000
		5.4.4	GIS map and soil information services - GIS web-services need to be accessible online via internet Mobile applications need to be produced and able to be supported by various operating system	3	2017-2020	LDD, FAO	USD 200 000

	Developing tools that help facilitate the monitoring of soil indicators	5.4.5	Developing sensor technology to monitor nutrients in soil	1	2017-2018	TISTR	No
Subtotal Pillar 5							USD **4 740 000**

III. IMPLEMENTATION ARRANGEMENTS AND GOVERNANCE

Implementation of this Plan will be governed within the GSP framework and terms of reference (TOR) with all the major stakeholders. The Guidelines for the establishment and consolidation of Regional Soil Partnerships regulates the interaction of stakeholders, along with the terms of reference for the GSP.

Implementation of this Plan will be coordinated by the ASP Secretariat in close collaboration with the Steering Committee, and with strong support from the GSP Secretariat. All proposals for funding of activities developed by the ASP will be channeled through the Healthy Soils Facility and verified by the GSP Secretariat prior to submission to potential donors.

Successful implementation, however, will further require dedicated action on the part of all regional and national level ASP partners. In the Nanjing Communique, participants of the Asian Soil Partnership launch workshop recognized the benefits to be gained from sharing information and data on soil survey, soil mapping and capacity development. They highlighted the importance of sharing soil information regionally and globally, and with succeeding generations, to achieve food security, carbon sequestration, combating land degradation and to promote climate smart agriculture – the key components of sustainable development and poverty reduction.

Across the region, there is substantial variation in information, capacity, investment and environmental challenges. By working together, individual countries and Asia as a whole will improve soil health and benefit from this new regional cooperation.

Participating regional and national institutions are listed in Annex 3, indicating their potential roles in implementation. However, now official commitments towards implementation have been made by these institutions.

IV. RISK MANAGEMENT

Successful implementation of this Plan assumes that the following is in place:

1. Adequate and sustained funding to support implementation over a 5-year period;
2. Sufficient in-kind and co-funding contributions from regional and national institutions and governments;
3. Active participation by regional and national ASP partners;
4. Political will at government level to make SSM and its enabling environment a priority to be supported by appropriate policies; and
5. Funds for the implementation of this Plan will need to be mobilized in close collaboration with the GSP Secretariat.

The Implementation Plan contains a large number of outputs and actions under the various Pillars and sets optimistic goals for the following 5-year period and it may be that, due to insufficient funding, not all outputs will be achieved. However, it was the view of the ASP that all current priority outputs be listed for implementation in order to increase the variety of outputs to be funded.

This would enable lobbying for funding with a wider donor group who may only fund certain types of activities.

Implementation of activities under the GSP as a voluntary partnership is strongly dependent on national contributions by partners and countries. Since listing of institutions in Annex 3 does not constitute official commitment to contribute financially to implementation, such contributions would have to be secured during the development of project proposals. Since a key feature of the GSP is to ensure synergy between various institutions and activities, the aim is to build on existing networks and implementation activities to assist in securing national contributions.

The ignorance and negligence on the role of the soil as an 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 of resources and absence of interest from decision makers and end users. Only with proper soil education in schools, colleges and universities and with effective communication, using all modern means of social media, can one count on awareness raised for SSM and protection of soil resources.

Strong support from national focal points, the ASP Steering Committee, Secretariat and Working groups, as well as the GSP Secretariat will firstly be essential to the successful implementation of this Plan. In addition, other regional and national level partners and institutions need to be actively involved in the various activities. This would include collaboration in activities based on current projects and initiatives underway that would add to achieving the listed outputs, as well as participation in the development of new projects and the implementation thereof.

The willingness and commitments of governments, represented by all concerned Ministries is the key to successful implementation of the plan, especially at national level where policies and laws on soil and land management are to be revised and updated. A great success of the implementation plan will be achieved if different ministries work together to integrate soil issue within their related activities, particularly, environment, water and agriculture. Capacity building, raising awareness, strong governmental commitment and public-private partnership can assist in mitigating the constraints to develop and implement good national and regional governance in soil management and protection.

V. MONITORING AND EVALUATION

The Plan has an indicative timeframe of five years. It is expected that progress will be reviewed at annual intervals and reported to the GSP Plenary Assembly, to be presented by the Steering Committee Chair. However, a mid-course review may also be possible and the lessons learned would assist with deciding on the way forward. The assessment will be based on the number of activities initiated and progress in their implementation, as well as the number of proposal

submitted to secure funding for implementation. Some assessment periods may also be adjusted depending on the nature of individual indicators and their rate of change.

An independent Final Evaluation will be completed within nine months prior to the actual completion date of the ASP programme. It will aim at identifying project outcomes, their sustainability and actual or potential impacts. It will also have the purpose of indicating the measures needed to ensure continuity of action developed through the projects. The ASP Secretariat, in consultation with project stakeholders, will be responsible for organizing and backstopping this Evaluation, including finalizing the ToR, selecting and backstopping the team and Quality Assurance of the final report.

The evaluation will, inter alia:

- Assess relevance, efficiency and effectiveness of project design and implementation;
- Assess project actual outputs and potential outcomes, impacts and sustainability;
- Assess project performance in gender mainstreaming and achievements on gender equality;
- Identify lessons learned about project design, implementation and management; and
- Highlight achievements and practices worth up-scaling and/or replication.

Progress on the implementation of SSM will be assessed using SMART (Simple, Measureable, Attributable, Reliable and Time bound) indicators to be developed as part of a monitoring and evaluation system under Pillars 4 and 5. For on the ground implementation, monitoring will be based on baseline values of the indicators at the start of implementation. In order to help countries in reporting to the SDGs, the selection and implementation of the indicators in the Asian region will also take advantage of the Indicators and Monitoring Framework for the SDGs.

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 total budget is presented in Table 1, indicating the budget per GSP Pillar as captured in the Pillar log frames (in Section II of this document). The total budget is USD23 964 000 for a five-year period. Although external funding and support will be needed for most activities, it is anticipated that regional, national and local co-funding support will be obtained during implementation.

Table 1. Total budget

Resource envelopes by Pillar	**USD**
Pillar 1: Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity	4 329 000
Pillar 2: Encourage investment, technical cooperation, policy, education, awareness and extension in soils	2 745 000
Pillar 3: Promote targeted soil research and development focusing on identified gaps and priorities and synergies with related productive, environmental and social development actions	10 170 000
Pillar 4: Enhance the quantity and quality of soil data and information: data collection (generation), analysis, validation, reporting, monitoring and integration with other disciplines	1 980 000
Pillar 5: Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources	4 740 000
Grand Total	**23 964 000**

ANNEX 1. Working Groups per Pillar and the first Steering Committee members

Working groups for the five GSP Pillars of Action were established with the composition of individual members nominated by the following countries:

Pillar 1:

Chair: Dhermesh Verma (India)
Members: Bhutan, India, Indonesia, Lao PDR, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Nepal

Pillar 2:

Chair: Milkha Aulakh (India)
Members: Bhutan, India, Indonesia, Lao PDR, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Nepal

Pillar 3:

Chair: Yagi Kazuyuki(Japan)
Members: Bhutan, India, Indonesia, Japan, Lao PDR, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Nepal

Pillar 4:

Chair: Rodelio Carating (Philippines)
Members: Bhutan, India, Indonesia, Japan, Lao PDR, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Nepal

Pillar 5:

Chair: Audthasit Wongmaneeroj (Thailand)
Members: Bhutan, India, Indonesia, Japan, Lao PDR, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Nepal

The Steering Committee is composed as follows:

Chair: Thailand
Members from East Asia: Republic of Korea, Mongolia, (Japan to be confirmed)
Members from Southeast Asia: Cambodia, Thailand, Indonesia
Members from South Asia: India, Pakistan, Sri Lanka

ANNEX 2. Successful implementation activities

This Annex reports the successful experiences of some Asian countries in implementing some of the activities in the implementation plan. Such experiences are seen as strengths for knowledge sharing between countries and can be useful for guiding the region towards the implementation phase of the plan. Additional, activities directly related to the experiences shared such as workshops and field visits are proposed.

This table is thought to be open to editing even after the endorsement of the plan and might be used as basis for forming task forces supporting countries in the region during the implementation phase.

Activity No.	Experience to share / proposed activities
	Pillar 1
1.1.1	**Japan** **Activity 1.** Development and demonstration of brief soil diagnosis techniques, and establishment of criteria to determine appropriate fertilizer application in accordance with soil nutrient status. *Institutions involved :* Ministry of Agriculture, Forestry and Fisheries, Japan **India** **Activity 1. National Mission for Sustainable Agriculture** Distribution of Soil Health Cards to 140 million national farmers with the purpose of evaluating soil quality meant as soil functional characteristics, to water holding capacity, nutrient content and other biological properties in order to suggest corrective measures to improve soil fertility so that the farmer may obtain better yield. *Institutions involved:* Ministry of Agriculture & Farmer Welfare, Govt. of India, ICAR, Soil and Land Use Survey of India, National Centre of Organic Farming, Central Fertilizer Quality Control & Training Institute, Provincial Agriculture Departments. **Nepal** **Activity 1.**

	Nepal Agricultural Research Council is conducting research on revision recommended doses of major crops (N P K B and Zn) *Institutions involved:* Nepal Agricultural Research Council **Pakistan** **Activity 1.** Development and demonstration of brief soil diagnosis techniques, and establishment of criteria to determine appropriate fertilizer application in accordance with soil nutrient status. ***Institutions involved:*** Ministry of National Food Security and Research (MNFSR), Islamabad, the Land Resources Research Program (LRRP) at the National Agriculture Research Center (NARC), Islamabad Pakistan Agricultural established by Research Council (PARC), Islamabad. The following programs are under the Land Resources Research Institute: Soil Fertility and Plant Nutrition Soil Chemistry Soil Biology and Biochemistry Soil Salinity and Saline Agriculture Soil Physics Soil Environment
1.1.2	**Japan** **Activity 1.** Development of sustainable soil management practices in response to soil diagnosis *Institutions involved:* Institute for Agro-Environmental Sciences, NARO (NIAES) **Activity 2.** ***a)*** Support for community-based model project for soil improvement in areas with serious problem of soils such as acidification; ***b)*** Support for soil layer improvement such as subsoil pan-breaking in poor productivity areas; ***c)*** Support for activities to increase carbon stock in agricultural soils such as cover cropping and manuring, combined with reduction of chemical fertilizer and agricultural chemicals by more than 50%. *Institutions involved:* Ministry of Agriculture, Forestry and Fisheries, Japan **Thailand**

Activity 1.
His Majesty the King's philosophy on "Sufficiency Economy" and the "New Theory" on agricultural land management for sufficient economy and sustainable agricultural management. According to the theory, each plot of between 1.6 and 2.4 ha is divided into the balance of four main sections: water reservoir, paddy rice, field crop or orchard, and residential area. The activities include:
- Workshop on "Sufficiency Economy and the New Theory" for sustainable agriculture;
- Site visit to successful agricultural land undergone with the New Theory.
- Establish guidelines of the New Theory application and disseminate to interested partners

Institutions involved : DOAE, KU, LDD, NIDA, ORDPB

Activity 2.
Best practices on land remodeling and integrated soil and water management: "Thung Kula Ronghai". The activities include:
- Workshop on land remodelling and integrated soil and water management based on the suggestions and recommendations on the appropriate methods to solve problems such as droughts, floods, and saline soil reclamation;
- Site visit to the royal study centre and farmland;
- Prepare the guidelines for soil salinity reclamation

Institutions involved: LDD and KKU

Activity 3.
Integrated land development for sustainable agriculture on sloping land in northern Thailand.
- Workshop and site visits for best practices on land development, especially soil and water conservation for sustainable agriculture in the mountainous area;
- Prepare guidelines for land development practices using appropriate technology

Institutions involved: RPF, ORDPB, HRDI, DOA, DOAE, and LDD

Pakistan

Activity 1.
Development of sustainable soil management practices in response to soil diagnosis

Institutions involved: All the Agriculture Universities, and Agriculture Research System of Pakistan.

	Activity 2. a) SSM projects for soil improvement in areas having problems of salinity, alkalinity, wind erosion, soil erosion, and water logging. b) Legume intercropping and green manuring recommended under cereals based cropping system (rice-wheat, and maize-wheat) in Pakistan; c) Support for activities to increase organic matter in agricultural soils such as use of crop residues incorporation and animal manures. d) In Pakistan the integrated use of organic matter along with chemical fertilizers is recommended by all universities and research organizations for SSM under arid and semiarid climates of Pakistan. e) The integrated use of organic and chemical fertilizers are environmental friendly and gave high return to the growers on sustainable basis. f) The Soil Science Society of Pakistan (SSSP) organize national/international conference on SSM every year. *Institutions involved:* Pakistan Science Foundation (PSF), Higher Education Commission (HEC), PARC and MNFSR are involved and provides funds for projects under SSM to faculty of universities and researchers in research institutes in the whole country continuously.
1.1.3	**Japan** **Activity 1.** Establishment of basic policy and guidelines for soil productivity improvement. *Institutions involved:* Ministry of Agriculture, Forestry and Fisheries, Japan **Nepal** **Activity 1.** - Sustainable soil management project completed (15 year project duration) - Technologies generated: Improved Farm Yard Manure, Improved cattle shed, Urine utilization, Biogas production and use of biogas slurry as manure source, Use of green manures, Composting techniques. - A Handbook of sustainable soil management practices and learning (in Nepali) published. *Institutions involved:* Soil Management Directorate and HELVITAS, Nepal **Pakistan** **Activity 1.** Establishment of basic policy and guidelines for soil productivity improvement.

	Institutions involved: Ministry of National Food Security and Research (MNFSR), Islamabad. Higher Education Commission (HEC) of Pakistan.
1.1.4	**Japan** **Activity 1.** a) Development of technologies to reduce greenhouse gas emissions and enhance soil carbon sequestration in agricultural lands; b) Development of technologies to minimize crop uptake of heavy metals from soil; c) Development of technologies to restore soil contamination of radioactive substances *Institutions involved :* Institute for Agro-Environmental Sciences, NARO (NIAES) **Pakistan** **Activity 1.** a) Development of technologies to reduce production cost and enhance soil fertility and crop productivity; b) Development of technologies to reduce salinity and soil pollution with good soil management practices and proper irrigation methods. *Institutions involved :* Ministry of National Food Security and Research (MNFSR), Islamabad. Pakistan Atomic Energy Commission (PAEC). All agriculture Universities in the country. Provincial Research System of each province. Provincial Agriculture Extension System of each province.
1.1.5	**Nepal** **Activity 1.** Rainwater Harvesting techniques successfully completed. These techniques are especially enhancing soil moisture so that farmers can produce offseason vegetables. *Institutions involved:* District Agricultural Development offices, PLAN International and ICIMOD
1.1.6	
1.1.7	
1.2.1	**Nepal**

	Activity 1. - National Chemical Fertilizer control order revised - Organic manure production directives revised *Institutions involved:* Ministry of Agriculture Development
1.2.2	**Japan** **Activity 1.** Development of an effective utilization method of organic agricultural materials such as livestock-manure and green-manure. *Institutions involved :* Ministry of Agriculture, Forestry and Fisheries, Japan **Thailand** **Activity 1.** Precision Agriculture for fertilizer application using sensing technology. - Install soil moisture, soil fertility sensor in demonstration field; - Set up drip irrigation system in demonstration field; - Install computer control system for fertigation; - Workshop and site visits in demonstration field. *Institutions involved: TISTR, KKU, LDD and GISTDA* **Activity 2.** On Farm Computer Program (OCP) created by collaboration in MOAC aims to improve agricultural productivity for promoting long term sustainability. dissemination for the program setting up and the use of program to interested partners: - Workshop on OCP to give the program overviews related to "tailored fertilizer" applications; - Demonstration of OCP for partners to understand the usage and principle for programming *Institutions involved: LDD, DOA and KU* **India** **Activity1.** Development of GIS based soil fertility maps for the regions based on soil samples collected from all agro-climatic zones on grid basis and analyzed.

	Institutions involved: National Bureau of Soil Survey & Land Use Planning, ICAR, Govt. of India **Nepal** **Activity 1.** - Mobile soil testing van and soil testing campaigns - Macro nutrient fertilizer recommendation on the basis of soil lab report (based on routine analysis of soil) *Institutions involved:* Soil Management Directorate **Pakistan** **Activity 1.** Development of effective utilization methods of organic agricultural materials such as livestock-manure and green-manure. *Institutions involved:* Ministry of National Food Security and Research (MNFSR), Islamabad; Pakistan Atomic Energy Commission (PAEC); all agriculture Universities in the country; Provincial Research System of each province; Provincial Agriculture Extension System of each province; Fertilizer companies of Pakistan **Activity 2.** On-Farm Trainings and field trips of researchers in collaboration with agriculture extension department for improvement in agricultural productivity for promoting SSM practices among growers. *Institutions involved:* Ministry of National Food Security and Research (MNFSR), Islamabad; Pakistan Atomic Energy Commission (PAEC); All agriculture Universities in the country; Provincial Research System of each province; Provincial Agriculture Extension System of each province; Fertilizer companies of Pakistan
1.2.3	**Thailand** **Activity 1.** Establishment of the Excellence Innovation Center of Agriculture for Community: Advance Organic-Chemical fertilizer center at Pathumthani for R&D, Lumtakong Technopolis (Nakhon Ratchasima province) to demonstrate on fertilizer management. - Set up the equipment for soil, plant and fertilizer analysis; - Set up Asia soil researcher workshop on standard methods of soil analysis; - Set up Asia soil researcher workshop on innovative fertilizer

	Institution involved: TISTR **Activity 2.** "Klaeng Din (tricking the soil) Project- Acid sulfate Soil Aggravation" is a project to improve acid sulfate soil for agriculture in the central plain, coastal area, and the south of Thailand, especially in the peat swamp land. Where there is no use of soil, Klaeng Din process can be applied with leaching acid from the soil by water, adding nitrogen and phosphorus fertilizer and adding lime on the top soil. These processes relieve soil acidity and make it able to grow crops. The activities can be: - Site visit to one of Klaeng Din project; - Workshop on best practices of acid sulfate soil recovery for agriculture; - Establish guidelines *Institutions involved:* ORDPB, DOA, DOAE, and LDD **Activity 3.** Promoting the "One district one fertilizer" program. Activities: - Prototype plant selection - Site visiting - Training program *Institutions involved:*TISTR, MOAC **Activity 4.** Set up demonstration field at Lumtakong Technopolis (NakhonRatchasima province) to demonstrate on fertilizer management and on-site training *Institution involved :* TISTR **Activity 5.** Exchange visits by extension officers and farmers from Community Soil and Fertilizer Management Centers (See 1.5.2 for description) among ASP countries

	Institutions involved: DOAE, DOA, LDD, OAE and ASP **Nepal** **Activity 1.** - Biochar based fertilizer management technology tested and verified by Nepal Agricultural Research Council - Biochar making low cost kiln developed for the farmers *Institutions involved:* Nepal Agricultural Research Council **Pakistan** **Activity 1.** Establishment of Farmers Schools Training Centers at District Level for farmers, field workers and all: *Institution involved:* Provincial Agriculture Extension System of each province, the agriculture universities are also involved for technical guidance. **Activity 2.** The agriculture extension departments also conduct field plots on farmers' fields and then arrange field trips for farmers on the field. *Institutions involved:* Provincial Agriculture Extension System of each province. **Activity 3.** Promoting soil analysis programs by mobile testing laboratories. *Institutions involved:* Provincial Agriculture Research System of each province, Fertilizers companies. **Activity 4.** The agriculture extension department arrange field trips for farmers and field assistants regarding sustainable crop and soil management. *Institutions involved:* Provincial Agriculture Extension System of each province.

	Activity 5. The fertilizers companies also arrange field trips for farmers regarding nutrients management especially in field crops (wheat, maize, cotton, sugarcane, rice etc.). *Institutions involved:* Fertilizers companies of Pakistan.
1.2.4	**India** **Activity 1. Farmer Advisory System** Farmers' advisory on weather, soil and crop related information through web based portal, radio and television. SMS based advisory is also being provided. *Institutions involved:* National Informatics Centre, Provincial Agriculture Departments, Krishi Vigyan Kendra (Agriculture Science Centres) of ICAR, Private Sector Agri-input companies including seed, fertilizer and plant protection chemicals.
1.3.1	
1.4.1	**India** **Activity 1. Degraded land reclamation Program** Sodicland and Ravenous Land Reclamation Program covering small and marginal farmers through farmers participation, environmental monitoring of reclamation program. *Institutions involved:* Ministry of Agriculture & Farmers Welfare, Govt. of India, Provincial Land Development Departments, The World Bank, Remote Sensing Applications Centres.
1.4.2	**Bangladesh** **Activity 1.** Mobile soil testing laboratories to provide analytical services to farmers *Institutions involved:* **Indonesia** **Activity 1.** Use of soil test kits for balanced fertilization *Institutions involved:* **Korea**

	Activity 1. Soil Testing project (approximately 500 000 samples/year). *Institutions involved:* **Pakistan** **Activity 1.** Mobile soil testing laboratories to provide analytical services to farmers on their field. Free distribution of se of soil test kits for balanced nutrients management in crop production. *Institutions involved:* Provincial Agriculture Research System of each province; Fertilizers companies.
1.4.3	
1.4.4	
1.4.5	**Malaysia** **Activity 1.** Certification of myGAP/myOrganic *Institutions involved:*
1.5.1	**Bhutan** **Activity 1.** The Bhutan soil database (BHUSOD) is being built up and established *Institutions involved:*
1.5.2	**Thailand** **Activity 1.** Establish Community Soil and Fertilizer Management Centers (CSFMCs) for the promotion of SSNM (Site-Specific Nutrient Management). (Thailand currently has a CSFMC in 882 districts (1 CSFMCs=1 district) with 17.640 farmers involved) - Establish workshop and site visits for best practices of CSFMCs on the promotion of SSNM - Create guideline for extension officers to transfer SSNM knowledge, technologies and organizational management practices to CSFMCs *Institutions involved: ASP, DOA, DOAE, LDD, OAE*

	Nepal **Activity 1.** - Nepalese Society of Soil Science revived after 10 years - Nepalese Society of Soil Science entered into regional network of East-Asia pacific regional network of soil science - Nepalese Society of Soil Science entered into International Union of Soil Science *Institutions involved:* Nepalese Society of Soil Science **Pakistan** **Activity 1.** Establishment of Soil and Water testing laboratories at each research centers/institutes/stations at district level for the promotion balanced nutrition to crops and orchards. *Institutions involved:* Provincial Agriculture Research System of each province.
Pillar 2	
2.1.1	**Nepal** **Activity 1.** Prime minister agricultural modernization project started Agricultural Development strategy (20 years vision) executed *Institutions involved:* Ministry of Agriculture Development
2.1.2	**Pakistan** **Activity 2.** The fertilizers companies also arrange field trips for farmers regarding nutrients management especially in field crops (wheat, maize, cotton, sugarcane, rice etc.). *Institutions involved:* Fertilizers companies of Pakistan.
2.1.3	**Nepal**

	Activity 1. Nepal Agricultural Research Council, Soil Management directorate and Nepalese Society of Soil Science planned a budget for World soil day celebration each year. *Institutions involved:* Nepal Agricultural Research Council, Soil Management directorate and Nepalese Society of Soil Science
2.2.1	
2.2.2	
2.2.3	
2.2.4	**Nepal** **Activity 1.** National Land use project is in implementing phase. It is revising the soil map of Nepal at 1:10,000 scale. *Institutions involved:* Ministry of Land Reforms
2.2.5	
2.2.6	
2.2.7	
2.3.1	**Nepal** **Activity 1.** - "Sustainable soil management and agro-ecology" subject included in Grade 9, 10, 11 and 12 courses in 2015. - Soil Science Curriculum of Purwanchal University was updated in 2015. - School gardening was the most successful program in Nepal. Though informal, it is very effective for school students to understand basic gardening techniques with good soil management. A handbook of school gardening was published. *Institutions involved:* Ministry of Education
2.3.2	
2.3.3	
2.3.4	
2.3.5	
2.4.1	**Japan** **Activity 1.** IYS2015 and other awareness raising activities for soils, such as international and national symposium and travelling exhibition of soil monolith. *Institutions involved:* Various stakeholders such as the Science Council of Japan.

	Nepal **Activity 1.** - Celebration of the Global Soil Week - Soil testing campaign by Youth network (Groups of Agriculture and veterinary students) with farmers' participation organized. More than 250 samples tested. *Institutions involved*: Nepalese society of soil science and Groups of Agriculture and Veterinary Students **Pakistan** **Activity 1**. The soil science society of Pakistan (SSSP) arrange national and international conference each year on soil management and other related activities. The soil and environment journal of the SSSP publish articles of soil related research only. *Institutions involved*: SSSP **Activity 2.** IYS2015 and other awareness raising activities for SSM practices, such as international and national symposium on soil. *Institutions involved:* Research System, Universities, Higher Education Commission of Pakistan, MNFSR
2.4.2	
2.4.3	
2.4.4	
2.5.1	**Japan** **Activity 1.** Certified Soil Doctors on soil management *Institutions involved:* Japan Soil Association. **Pakistan** **Activity 1.** Training of progressive farmers on balanced plant nutrition and sustainable soil management practices *Institutions involved:* Agriculture Research System, Agriculture Extension System, Agriculture Universities, Fertilizers companies.

2.5.2	**Japan** **Activity 1.** Create a prefectural code of soil and water conservation to achieve a good balance between conserving environment and promoting agriculture. *Institutions involved:* Kumamoto Prefecture. **Activity 2.** Publication of books on soils for children, students, and school teachers. *Institutions involved:* Academic societies such as the Japanese Society of Soil Science and Plant Nutrition. **Nepal** **Activity 1.** - Nepalese Society of Soil Science and Soil Management directorate rely soil related information through Facebook page - Soil related technologies are often broadcasted from National television program started by CPDD,NARC. *Institutions involved:* Nepalese Society of Soil Science, Soil Management directorate, and CPDD, NARC **Pakistan** **Activity 1.** Publication of text book on soil science at university level. *Institutions involved:* National book foundation (NBF) of Pakistan. **Activity 2.** Soil management studies are published in the form of reports (bachelor degree), thesis (master degree) and dissertation papers (PhD degree) in the University and later published in national and international journals. *Institutions involved:* HEC & Universities link.
2.5.3	**Pakistan** **Activity 1.**

	The agriculture extension departments, Agriculture Development Bank of Pakistan (ADBP), fertilizers companies, and extension departments in universities publish articles in **Urdu** for nutrients management (organic and inorganic) for different field crops and orchards. *Institutions involved:* All agriculture Universities, Provincial Research System, Provincial Agriculture Extension System, Fertilizer companies of Pakistan, ADBP **Activity 2.** There is continuous programs on agriculture/soil on radios and TVs. The newspapers seldom publish articles on agriculture/climate change etc. *Institutions involved:* Radio Pakistan, PTV centers at each province, All agriculture Universities, Provincial Research System, Provincial Agriculture Extension System.P
2.5.4	
2.5.5	
2.5.6	
2.5.7	
2.5.8	
2.6.1	**Nepal** **Activity 1.** Nepalese Society of Soil Science meeting organized at least 6 times a year and General Assembly once a year *Institutions involved:* Nepalese Society of Soil Science
2.6.2	
2.6.3	
2.7.1	
2.7.2	
Pillar 3	
3.1.1	**Pakistan** **Activity 1.** Research on soil management is running in different parts of the country continuously thanks to the interest of donors on the topic. *Institutions involved:* HEC, PSF, PARC, MNFSR, PAEC.

	Activity 2. There are many projects running around the country on soil erosion, salinity, waterlogging etc. such as the Salinity Control & Reclamation Programme (SCARP). UNDP is also working on project: Sustainable Land Management to Combat Desertification in Pakistan, as well as FAO which launched a project on Soil Fertility Management for Sustainable Intensification in Pakistan: Baseline Input Atlas and Promotion of Soil Fertility with Private Sector. *Institutions involved:* Funding agencies, NGOs, Scientists of different organizations, FAO.
3.2.1	
3.2.2	
3.2.3	
3.2.4	
3.3.1	
3.3.2	**Nepal** **Activity 1.** Five Regional Agriculture Technical Working group (RATWG) meeting and one National Agricultural Technical Working group (NATWG) workshop held every year with active participation of soil scientist, development workers and farmers. In this meeting, different regional and national issues of agriculture along with soil discussed and finally published a proceeding of the NATWG workshop. In this workshop issues are identified and prioritized. *Institutions involved:* Department of Agriculture, Nepal Agricultural Research Council, and Farmers' Group
3.3.3	
3.4.1	
3.4.2	
3.4.3	
Pillar 4	
4.1.1	**Japan** **Activity 1.** Collecting longitudinal soil attribution data from fixed point and developing its database *Institutions involved:* Ministry of Agriculture, Forestry and Fisheries, Japan **Pakistan**

	Activity 1. Collecting longitudinal soil attribution data from fixed point and developing its database *Institutions involved:* MNFSR, FAO, Agriculture Extension Department
4.1.2	
4.1.3	**Japan** **Activity 1.** Digitizing national soil map and developing web GIS *Institutions involved:* Ministry of Agriculture, Forestry and Fisheries, Japan **Nepal** **Activity 1.** Soil map of Nepal prepared on the basis of USDA classification system and later revised into WRB classification system *Institutions involved:* Land Resource Mapping Project, Ministry of Land Reforms and Soil Science Division, NARC **Pakistan** **Activity 1.** Soil classification and mapping, and GIS web *Institutions involved:* Pakistan Soil Survey (recently merged in some other department), Pakistan Meteorological Department (PMD), Islamabad.
4.2.1	
4.2.2	
4.2.3	
4.3.1	
4.3.2	
4.4.1	**Pakistan** **Activity 1.** Soil classification of Pakistan into different categories *Institutions involved:* PARC

4.4.2	**Japan** **Activity 1.** Monitoring of soil organic carbon in arable land, surveying the status of soil management practices and developing those database *Institutions involved:* Ministry of Agriculture, Forestry and Fisheries, Japan **Pakistan** **Activity 1.** Establishment of Directorate of Soil Fertility Research Institute, Punjab having a Rapid Soil Fertility Survey & Soil Testing Institute at Thokar Niaz Baig, Lahore. *Institutions involved:* Agriculture Research System Punjab **Activity 2.** Establishment of Institute of Soil & Environmental Sciences at the university of agriculture Faisalabad *Institutions involved:* The University of Agriculture Faisalabad, Punjab **Activity 3.** Pakistan Atomic Energy Commission (PAEC) having very good and well equipped soil labs in different parts of the country e.g. NIFA at Peshawar, NIBGE at Faisalabad & NIA at Sindh etc. *Institutions involved:* PAEC, Pakistan **Activity 4.** Establishment of the Pakistan Council of Scientific and Industrial Research (PCSIR) to promote the cause of Science and Technology in the country. *Institutions involved:* PCSIR, Pakistan
Pillar 5	
5.1.1	
5.1.2	
5.2.1	
5.2.2	

5.2.3	
5.2.4	**Japan** **Activity 1.** a) Developing a capacity building program for soil surveyor. b) Improving soil sampling for monitoring soil organic carbon, heavy metals, and others (measuring and estimating soil organic carbon sequestration and GHG emission, assessing the effect of climate change on soil and ecosystems, monitoring soil environment, improving methods of measuring and assessing the impact of contamination of soil N, P, etc. on water bodies) *Institutions involved:* Institute for Agro-Environmental Sciences, NARO (NIAES) **Nepal** **Activity 1.** Soil survey and soil mapping guidelines and framework developed for National Land Use Planning Project *Institutions involved:* Ministry of Land Reforms **Pakistan** **Activity 1.** a) Human resource development program for soil workers. b) Training on soil sampling and analysis for balanced plant nutrition in agriculture. *Institutions involved:* Provincial Research Institutes, PAEC
5.2.5	
5.2.6	
5.3.1	**Japan** **Activity 1.** Unifying national classification systems for arable and forest lands. Preparation of correspondence table of soil species between national and international soil classification system *Institutions involved:* Institute for Agro-Environmental Sciences, NARO (NIAES)
5.3.2	

5.3.3	**Pakistan** **Activity 2.** Providing lab equipments to all universities and research institutes. However, methods and procedures of equipment's needs harmonization. *Institutions involved:* PARC, PSF and especially HEC.
5.3.4	
5.3.5	
5.4.1	**Nepal** **Activity 1.** GIS unit under soil science division, Nepal Agricultural Research Council is functional and carried out a number of GIS/RS based research. *Institutions involved:* Nepal Agricultural Research Council
5.4.2	
5.4.3	
5.4.4	
5.4.5	

ANNEX 3. Logical Framework for timelines of the RIP for five GSP Pillars in the Asian region

Pillar and activities	2017	2018	2019	2020	2021
Pillar 1: Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity.					
Outcome 1.1: Identification of appropriate SSM practices and systems					
Activity 1.1.1					
Activity 1.1.2					
Activity 1.1.3					
Activity 1.1.4					
Activity 1.1.5					
Activity 1.1.6					
Activity 1.1.7					
Outcome 1.2: Production of guidelines and tools for soil fertility management					
Activity 1.2.1					
Activity 1.2.2					
Activity 1.2.3					
Activity 1.2.4					
Outcome 1.3: Barriers preventing SSM application are assessed and policy and technical solutions are identified					
Activity 1.3.1					
Outcome 1.4: Monitoring system for soil and land degradation, as well as SSM implementation					
Activity 1.4.1					
Activity 1.4.2					
Activity 1.4.3					
Activity 1.4.4					
Activity 1.4.5					
Outcome 1.5: Development of a capacity building strategy for the promotion of SSM					
Activity 1.5.1					
Activity 1.5.2					

Pillar and activities	2017	2018	2019	2020	2021
Pillar 2: Encourage investment, technical cooperation, policy, education, awareness and extension in soil.					
Outcome 2.1: The awareness of key political stakeholders on soil functions and soil-related ecosystem services increased					
Activity 2.1.1					
Activity 2.1.2					
Activity 2.1.3					
Outcome 2.2: Policy development supported					
Activity 2.2.1					
Activity 2.2.2					
Activity 2.2.3					
Activity 2.2.4					
Activity 2.2.5					
Activity 2.2.6					
Activity 2.2.7					
Outcome 2.3: education on soil promoted					
Activity 2.3.1					
Activity 2.3.2					
Activity 2.3.3					
Activity 2.3.4					
Activity 2.3.5					
Outcome 2.4: Society sensitized on the role of soils for life on Earth					
Activity 2.4.1					
Activity 2.4.2					
Activity 2.4.3					
Activity 2.4.4					
Outcome 2.5: Extension services supported, developed and revitalized					
Activity 2.5.1					
Activity 2.5.2					
Activity 2.5.3					
Activity 2.5.4					
Activity 2.5.5					
Activity 2.5.6					
Activity 2.5.7					

Pillar and activities	**2017**	**2018**	**2019**	**2020**	**2021**
Activity 2.5.8					
Outcome 2.6: Scientific and technical cooperation promoted and strengthened					
Activity 2.6.1					
Activity 2.6.2					
Activity 2.6.3					
Outcome 2.7: Investments on soil increased					
Activity 2.7.1					
Activity 2.7.2					

Pillar and activities	2017	2018	2019	2020	2021
Pillar 3: Promote targeted soil research and development focusing on identified gaps, priorities, and synergies with related productive, environmental, and social development actions.					
Outcome3.1: Prove the return on investment in soil R&D					
Activity 3.1.1					
Outcome3.2: Encourage inter- and transdisciplinary research and development					
Activity 3.2.1					
Activity 3.2.2					
Activity 3.2.3					
Activity 3.2.4					
Outcome 3.3: Identify global, regional and local emerging priorities					
Activity 3.3.1					
Activity 3.3.2					
Activity 3.3.3					
Outcome 3.4: Promote active collaboration between universities, research institutions, extension services, end-users communities and donor agencies					
Activity 3.4.1					
Activity 3.4.2					
Activity 3.4.3					

Pillar and activities	**2017**	**2018**	**2019**	**2020**	**2021**
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 4.1: Sharing and transferring soil knowledge and new technology within and beyond the region					
Activity 4.1.1					
Activity 4.1.2					
Activity 4.1.3					
Outcome 4.2: Providing soil information to all those with an interest in the sustainable use of soil and land resources					
Activity 4.2.1					
Activity 4.2.2					
Activity 4.2.3					
Outcome 4.3: Building consistent and updated national Soil Information Systems in Asia and contribute to the Global Soil Information System through various initiatives such as GlobalSoilMap (GSM)					
Activity 4.3.1					
Activity 4.3.2					
Outcome 4.4: Training new generation of experts in soil science and land management					
Activity 4.4.1					
Activity 4.4.2					

Pillar and activities	**2017**	**2018**	**2019**	**2020**	**2021**
Pillar 5: Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources.					
Outcome 5.1: Develop reference systems for soil profile description, soil classification and soil mapping					
Activity 5.1.1					
Activity 5.1.2					
Outcome5.2: Reference national soil information systems into the GSP harmonization system					
Activity 5.2.1					
Activity 5.2.2					
Activity 5.2.3					
Activity 5.2.4					
Activity 5.2.5					
Activity 5.2.6					
Outcome 5.3: The Harmonized Asian Soil Database					
Activity 5.3.1					
Activity 5.3.2					
Activity 5.3.3					
Activity 5.3.4					
Outcome 5.4: Modernizing the Asian soil survey and develop indicators and evaluation procedures for soil monitoring					
Activity 5.4.1					
Activity 5.4.2					
Activity 5.4.3					
Activity 5.4.4					
Activity 5.4.5					

ANNEX 4. Logical Framework for participating countries, partners and main contributions of the RIP for five GSP Pillars in the Asian region

Country	Organization	Associated Staff (specialization and position)	General Contribution to the RSP
Afghanistan	Ministry of Agriculture, Irrigation & Livestock	Nasrullah Bakhtani	National focal point – review of the document
Bangladesh	Ministry of Agriculture-Soil Resource Development Institute, SRDI	Nazmul Hasan	National focal point – review of the document
Bhutan	National Soils Service Center ,NSSC - Department of Agriculture, Ministry of Agriculture and Forests	Karma Dema Dorji	National focal point – review of the document and expert for Pillar 2
Cambodia	Department of Agricultural Land Resources Management, General Directorate of Agriculture, GDA	Koy Ra	National focal point – review of the document
China	Division of Land and Fertilizer Management, Department of Crop Production	Chen Mingquan	National focal point – review of the document
India	Indian Council of Agricultural Research	S. K. Chaudhari	National focal point – review of the document
Indonesia	Ministry of Agriculture	Ir. Haryono	National focal point – review of the document
Japan	International Organizations Division, International Affairs Department, Minister's Secretariat, the Ministry of Agriculture, Forestry and Fisheries	Yoji Matsui	National focal point – review of the document
Lao PDR	Department of Agricultural Land Management, Ministry of Agriculture and Forestry	Nivong Sipaseuth	National focal point – review of the document
Malaysia	Soil Resource Management and Conservation Division, Department of Agriculture Malaysia	As'ari Bin Hassan	National focal point – review of the document and expert for Pillar 4
Mongolia	Agricultural Research and Training Institute ,PSARTI	Tuul Dooshin	National focal point – review of the document
Myanmar	Ministry of Agriculture and Irrigation	Su Su Win	National focal point – review of the document

Myanmar	Department of Agricultural Research, Ministry of Agriculture and Irrigation	Khin Mar	National focal point – review of the document
Nepal	Soil management Directorate	Durga Prasad Dawadi	National focal point – review of the document
Pakistan	Ministry of National Food Security and Research	Syed WaseemUl Hassan	National focal point – review of the document
Philippines	Bureau of Soils and Water Management	Silvino Q. Tejada	National focal point – review of the document
Republic of Korea	National Institute of Agricultural Science and Technology	Jung, Kang-Ho	National focal point – review of the document
Sri Lanka	Natural Resources Management Center	Ajantha de Silva	National focal point – review of the document
Sri Lanka	Natural Resources Management Center	W.M. A. D. B. Wickramasinghe	Former national focal point – review of the document
Thailand	Land Development Department, Ministry of Agriculture and Cooperatives	Pitayakon Limtong	National focal point – review of the document
Vietnam	Soils and Fertilizers Research Institute SFRI Vietnam Academy of Agricultural Sciences	Tran Minh Tien	National focal point – review of the document
India	AgriNet Solutions	Dhermesh Verma	Chair for Pillar 1 and expert for Pillar 4
India	Banda University of Agriculture & Technology	Millkha Aulakh	Chair for Pillar 2
Japan	National Institute for Agro-Environmental Sciences	Kazuyuki Yagy	Chair for Pillar 3
Philippines	Bureau of Soils and Water Management	Rodelio Carating	Chair for Pillar 4
Thailand	Faculty of Agriculture, Department of Soil science	Audthasit Wongmaneeroj	Chair for Pillar 5
Bhutan	NSSC	Tshering Dorji	Expert for Pillar 1
Bhutan	NSSC	Suraj Chetri	Expert for Pillar 3
Bhutan	NSSC	Tsheten Dorji	Expert for Pillar 4
Bhutan	NSSC	Haka Drukpa	Expert for Pillar 5
India	Indian Council of Agricultural Research	S.K. Chaudhari	Expert for Pillar 1, 2, 3, 4 and 5
Indonesia	Indonesian Soil Research Institute/Indonesian Society of Soil Science	Rudy Husnain	Expert for Pillar 1
Indonesia	Bogor Agricultural University	Budi Mulyanto	Expert for Pillar 2
Indonesia	Indonesian Soil Research Institute	Fahmuddin Agus	Expert for Pillar 3

Indonesia	Indonesian Center for Agricultural Land Resources Research and Development	Yiyi Sulaeman	Expert for Pillar 4

Indonesia	Indonesian Society of Soil Science/Bogor Agricultural University	Suwardi	Expert for Pillar 5
Lao PDR	Ministry of Agriculture and forestry (MAF)	Konepany Dounphady	Expert for Pillar 1
Lao PDR	Ministry of Agriculture and forestry (MAF)	Thisadee Chounlamountry	Expert for Pillar 1
Lao PDR	Ministry of Agriculture and forestry (MAF)	Kongkeo Phachomphone	Expert for Pillar 2
Lao PDR	Ministry of Agriculture and forestry (MAF)	Saysongkham Sayavong	Expert for Pillar 3
Lao PDR	National University of Lao PDR	Khamphet Phomphoumy	Expert for Pillar 3
Lao PDR	Ministry of Agriculture and forestry (MAF)	Oloth Sengtaheuanghung	Expert for Pillar 4
Lao PDR	Ministry of Agriculture and forestry (MAF)	Pheng Xengxua	Expert for Pillar 5
Lao PDR	Ministry of Agriculture and forestry (MAF)	Xaysathith Souliyavongsa	Expert for Pillar 5
Malaysia	Universiti Putra Malaysia (UPM)	Radziah Othman	Expert for Pillar 1
Malaysia	Malaysian Agriculture Research and Development Institute (MARDI)	Wan Abdullah Wan Yusoff	Expert for Pillar 1
Malaysia	Universiti Putra Malaysia (UPM)	Che Fauziah Ishak	Expert for Pillar 2
Malaysia	Forest Research Institute of Malaysia (FRIM)	Wan Rashidah Abdul Kadir	Expert for Pillar 3
Malaysia	Malaysian Agriculture Research and Development Institute (MARDI)	Khasifah Muhammad	Expert for Pillar 3
Malaysia	Espek Sdn Bhd (Lab)	Amir Hamzah Yasak	Expert for Pillar 5
Pakistan	Land Resources Research Institute, NARC	Arshad Ali	Expert for Pillars 1 and 2
Pakistan	Land Resources Research Institute, NARC	Mahmoodul Hassan	Expert for Pillar 3
Pakistan	The University of Agriculture Peshawar	Amanullah	Expert for Pillars 4 and 5
Philippines	Bureau of Soils and Water Management	Samuel C. Contreras	Expert for Pillar 1
Philippines	Bureau of Soils and Water Management	Sonia Salguero	Expert for Pillar 2
Philippines	Bureau of Soils and Water Management	Edna Samar	Expert for Pillar 3
Philippines	Bureau of Soils and Water Management	Andrew Flores	Expert for Pillars 4 and 5
Philippines	Bureau of Soils and Water Management	Gina P. Nilo	Expert for Pillar 5
Philippines	Bureau of Soils and Water Management	Edna Lynn C. Floresca	Expert for Pillar 5
Philippines	Bureau of Soils and Water Management	Betty Magno	Expert for Pillar 5
Philippines	Bureau of Soils and Water Management	Dominciano Ramos	Expert for Pillar 5
Sri Lanka	University of Peradeniya	Saman Dharmakeerthi	Expert for Pillar 1
Sri Lanka	University of Peradeniya	Warshi Dandeniya	Expert for Pillar 1
Sri Lanka	Natural Resource Management Centre	Ajantha De Silva	Expert for Pillar 2
Sri Lanka	Rajarata University	Thusitha Amarasekra	Expert for Pillar 2

Sri Lanka	Rice Research and Development Institute	D.N. Sirisena	Expert for Pillar 3
Sri Lanka	Department of Export Agriculture	Aruna Heenkenda	Expert for Pillar 3
Sri Lanka	University of Peradeniya	W.A.U. Vitharana	Expert for Pillar 4
Sri Lanka	University of Peradeniya	R.B. Mapa	Expert for Pillar 4
Sri Lanka	Department of Agriculture	W.M.A.D.B. Wickramasinghe	Expert for Pillar 5
Sri Lanka	University of Peradeniya	Chammi Attanayake	Expert for Pillar 5
Sri Lanka	Department of Agriculture	Priyantha Weerasinghe	Expert for Pillar 5
Thailand	Land Development Department, Ministry of Agriculture and Cooperatives	Nuntapon Nongharnpitak	Expert for Pillar 1
Thailand	Land Development Department, Ministry of Agriculture and Cooperatives	Pramote Yamclee	Expert for Pillar 2
Thailand	Land Development Department, Ministry of Agriculture and Cooperatives	Nisa Meesang	Expert for Pillar 3
Thailand	Land Development Department, Ministry of Agriculture and Cooperatives	Satira Udomsri	Expert for Pillar 4
Thailand	Land Development Department, Ministry of Agriculture and Cooperatives	Nopmanee Suvannang	Expert for Pillar 5
Nepal	Soil Management Directorate	Sunil Pandey	Expert for Pillar 1
Nepal	Tribhuvan University	Keshav Raj Adhikari	Expert for Pillar 2
Nepal	Agricultural Research Council	Shree Prasad Vista	Expert for Pillar 3
Nepal	Agricultural Research Council	Roshan Babu Ojha	Expert for Pillar 4
Nepal	Soil Management Directorate	Balaram Rijal	Expert for Pillar 5
Japan	Institute for Agro-Environmental Sciences, NARO	Toshiaki Ohkura	Expert for Pillar 4
Japan	Institute for Agro-Environmental Sciences, NARO	Yusuke Takata	Expert for Pillar 5
India	ICAR-National Bureau of Soil Survey and Land Use Planning	Jagdish Prasad	Expert for Pillar 4
India	Ambedkar University	Vinay Singh	Expert for Pillar 3
India	G.B. Pant University of Ag. & Tech	A.K. Sharma	Expert for Pillar 5
India	Indian Institute of Rice Research	Brajendra Parmar	Review of the document