The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN G6-602
Washington, DC. 20433
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Fax: +1 (202) 522-3240/5
Email: secretariat@adaptation-fund.org

DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
(For Adaptation Fund Board Secretariat Use Only)

ND

PROJECT PROPOSAL

PART I: PROJECT INFORMATION

PROJECT CATEGORY:	**REGULAR**
COUNTRY:	**LEBANON**
TITLE OF PROJECT:	**Climate Smart Agriculture: Enhancing Adaptive Capacity of the Rural Communities in Lebanon (AgriCAL)**
TYPE OF IMPLEMENTING ENTITY:	**MULTILATERAL IMPLEMENTING ENTITY (MIE)**
IMPLEMENTING ENTITY:	**INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT**
EXECUTING ENTITY:	**MINISTRY OF AGRICULTURE**
AMOUNT OF FINANCING REQUESTED:	**USD 7,860,825**

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

Brief description of the problem

Lebanon is located on the eastern coast of the Mediterranean Sea with an east to west span from 36º03' E to 36º 37' E and north to south from 34º 41' N to 33º 02' N, covering an area of 10,452 km^2, with a coastline of 225 km and a maximum width of 80 km. Climate in the east Mediterranean is characterized by mild rainy winters from the westward moving cyclonic activity and long, hot dry summers brought about by persistent atmospheric subsidence influenced by the Asian monsoon. Lebanon's climate is further shaped by its unique topography with the coastal strip, the Lebanon and Anti-Lebanon mountain ranges, and the inland Bekaa plateau. Thus the coastal area and the western side of the Lebanon mountain range exhibit maritime characteristics, while the climate of the eastern side is more continental.

The Mediterranean is considered one of the most receptive hotspots of the Earth‘s climate system and is expected to be affected by the projected global warming and related changes. In particular in the eastern Mediterranean, heat stress is expected to intensify, while the winter precipitation will diminish due to the northward shift of the mid-latitude storm track. In addition to changes in the mean climate, changes in extremes may negatively impact human health, water resources, tourism, agriculture and energy demand, all of which are considered as critical sectors for the socio-economic stability of small countries like Lebanon.

The forces which drive the environment of Lebanon and the project area in particular are natural and/or man-induced, and are namely: climate change, land use and land degradation, insufficient water resources and risk of seasonal drought, inadequate agricultural practices, poverty, as well as weak policies and reduced collaboration among institutions.

The use of water resources in Lebanon is approaching unsustainable levels. This is mainly due to a lack of effective management policies, increased consumption as a result of expansion of irrigated agricultural land, escalating uncontrolled exploitation of groundwater resources, population growth and industrial development. Biodiversity is under extreme pressure in many areas specially the North Bekaa area due to collection by locals for wood and excessive overgrazing.

All that is leading to desertification of arid or semiarid land. Characteristic of this process is the declining of the groundwater table and depletion of surface water supplies, the salinisation of water and topsoil, increasing erosion and decrease of natural vegetation. There is a major loss of water resources in many critical areas because of inadequate water harvesting structures (hill lakes, dams, etc.).

Land degradation is mainly caused by soil loss as a result of water and wind erosion, and deforestation. Based on the UNCCD Desertification Prone Areas (DPA) map, the high-risk areas can be identified as: (i) NorthLebanon, mainly Akkar, Koura and Zgharta; (ii) the Bekaa Plain, mainly Baalbeck-Hermel and partly West Bekaa and Rachaya; and (iii) Southern Lebanon, mainly Saida, Sour, Nabatieh, Bint Jbeil and Marjaayoun. Major threats contributing to land degradation in the project area include: Drought, Wind and water erosion, flash floods, improper water management, overexploitation of groundwater resources, overgrazing, quarrying, unsustainable agricultural practices, unplanned urban sprawl, deforestation, soil erosion, absence of land use planning, pollution, poverty and limited economic opportunities, forest fires, unsustainable charcoal production, excessive fertilizer and pesticide use, etc.

Lebanon's Second National Communication (SNC) to the UNFCCC[1] prepared by the Ministry of Environment in 2011 with the support of GEF and UNDP, developed climate change scenarios with vulnerability and adaptation assessments. Accordingly, and in relation to the present climate, by 2040 temperatures will increase from around 1°C on the coast to 2°C in the mainland, and by 2090 they will be 3.5°C to 5°C higher. Comparison with Lebanese Meteorological Service historical temperature records from the early 20th century indicates that the expected warming has no precedent. Rainfall is also projected to decrease by 10-20% by 2040, and by 25-45% by the year 2090, compared to the present. This combination of significantly less wet and substantially warmer conditions will result in an extended hot and dry climate. Temperature and precipitation extremes will also intensify. The drought periods, over the whole country, will become 9 days longer by 2040 and 18 days longer by 2090.

Agriculture in Lebanon is one of the most vulnerable sectors to climate change due to the limited availability of water and land resources and the pressure exerted by population growth and urbanization. The results of the SNC assessment show that higher temperature, reduced precipitation and higher evapo-transpiration will decrease soil moisture and increase aridity, which will affect the overall agricultural yield of crops. A decrease in productivity is expected for most of the crops and fruit trees. Small ruminants depending on natural grazing areas are vulnerable to climate. Such situation keeps the rural population exposed to poverty, as the production of their herds is dramatically decreased.

Chilling needs for mountainous fruit trees such as cherries and apples will not be met, leading to a risk of failure of blossom pollination and fecundation by up to 50%. Changes in climate will also lead to increased infestation of fungi and bacterial diseases for most of the crops. Irrigated

[1] Lebanon's Second National Communication to the United Nations Framework Convention on Climate Change, Republic of Lebanon, Ministry of Environment, Beirut, February 2011

crops will face water shortages due to increased water demand and decreased water availability for irrigation. Rainfed crops will show either no change or a decrease in their surface area or productivity.

Changes in temperature and rainfall will also affect the grazing period and the quality of the pastures, changing the species composition in favour of woody less palatable plants. Grazing areas in both the Anti-Lebanon and Mount Lebanon chains, namely in the northern part are amongst the most vulnerable zones. However, increase in temperature will lead to an expansion of the coastal plantations such as banana and tomatoes to higher altitudes and herders would benefit from a longer pasture season in the mountains due to the reduced thickness and residence time of snow cover.

Adaptation to climate change is vital not only to support the livelihood of rural populations and to sustain the viability of the agriculture sector, but also to maintain an acceptable level of food security.

The key adaptation measure for climate change is setting and implementing a sustainable agriculture policy. Adaptation measures vary horizontally according to the agricultural sub-sectors and their vulnerability to climate change. These measures vary vertically according to the different actors involved in the development and implementation of this policy.

Based on UNFCCC guidance, adaptation measures for the agriculture sector are divided into two groups: field-level measures and institutional measures.

Prioritization of technologies for climate change adaptation in Lebanon

The UNDP and the Ministry of Environment are conducting a Technology Needs Assessment (TNA) for climate change adaptation for agriculture and water sectors. The project embeds the identification of the most relevant technologies for Lebanon, and the selection of prioritized technologies to be promoted. The process followed a participatory approach involving a consultation workshop with technicians. Criteria of selection for agriculture included: capital and operational cost, importance of economic impact, improvement of resilience to climate, technology capability and suitability for the country, human and information requirement and social suitability for Lebanon. As for the water sector, The criteria of selection included: capacity to increase water supply and water efficient use, extent of use, need for human resources and knowledge, required infrastructure, cost of the technology (capital and operational), and social acceptance. A multi-criteria analysis (MCA) enabled all participants to choose the priority technologies with the highest scores as mentioned in the tables below. Many of these technologies are proposed by the different components of the project. A list of technologies for the adaptation of both agriculture and water sectors is prioritized and listed in the tables below:

MCA results for the technologies related to the agriculture sector:

Technology (Agriculture sector)	MCA score
Conservation Agriculture	7.75
Risk Coping Production Systems	7.275
Integrated Pest Management	6.85
Selection of Adapted Varieties and Rootstocks	7.9
Integrated Production and Protection (greenhouses)	4.9

Early Warning Systems/Information and Communication Technologies	6.8
Index Insurance	5.2

MCA results for the technologies related to the water sector:

Technology (Water sector)	MCA score
Rainwater harvesting from greenhouses	7.375
Rainwater harvesting form roads (and roof tops)	6.90
Water users' association	6.35
Efficient water use irrigation systems	8.95
Rainwater harvesting from hill lakes	5.775
Early warning system for water supply management through snow pack monitoring	5.30
Use of treated wastewater in irrigation	5.45
Soilless agriculture	4.275

Among these technologies water harvesting from roads and greenhouse tops combined with water efficient use are identified. As for agriculture, selection of adapted varieties and rootstocks as well as good agriculture practices (including early warning and integrated pest management) are selected and will be the main technologies that AgriCal project will work on.

National socio-economic and development context

Lebanon is a small mountainous country with a total area of about 10 450 $km^2$and a resident population estimated at 4.1 million in mid-2007. The annual population growth rate is estimated at 1.2% in the period 2001-2007. The Rural population accounts for only 13% of the population with a significant annual decrease, estimated at about minus 3%. The population of Lebanon is unevenly distributed among its six administrative regions (mohafazat). About 50% of the population lives in Beirut and Mount Lebanon whereas about 21 % lives in North Lebanon and 13% in the Bekaa Valley. Lebanon is made up of four major physiographic units running on a north-south parallel to the sea: (i) a narrow, fertile coastal plain; (ii) the Mount Lebanon range, including the country's highest peak at 3 083 m above sea level; (iii) the fertile Bekaa Valley 8to 10 km wide at elevation of about 900-950 m asl; and (iv) the Anti-Lebanon range bordering Syria.

Lebanon is an upper middle-income country. In 2007, the country's Gross Domestic Product (GDP) stood at about USD 24.5 billion with a per capita income of about USD 5800. Remittances accounted for about 25% of the GDP. The national economy is dominated by the service sector (e.g. commerce, tourism and financial services) which in 2007 accounted for 70.1% of the GDP, while agriculture and industry contributed 6.1% and 13%, respectively. By the end of 2007, Lebanon's gross public debt stood at approximately 168%and the fiscal deficit reached approximately 10.16% of GDP. The slow economic and fiscal recovery from the 2006 hostilities and the recent wave of external shocks from high international oil and food prices, the international financial crisis, and regional political and security unrest pose challenges in the medium term macroeconomic outlook. However, despite of all these challenges the conditions have improved somewhat, so far. Growth remains strong, the government debt-to-GDP ratio is on a downward trend to 160% of GDP in 2008, deposit inflows have accelerated, and the Central Bank's foreign reserve position is now much stronger. The top priority, however,

remains further lowering the public debt-to-GDP ratio toward sustainable levels to preserve market confidence and maintain strong deposit inflows, which are needed to satisfy the government's large financing requirements.

According to the World Bank, the resilience of the Lebanese economy has been demonstrated by its ability to recover following the civil war, the recent hostilities and the prolonged political crisis amid continued regional uncertainty. The economy relies on large amounts of short-term capital transfers from abroad. The country's strong entrepreneurial culture is another valuable asset. Policy makers intend to provide the necessary infrastructure—as well as continue funding human resources development—for the private sector to lead the recovery of Lebanon's economy and its re-emergence as a regional hub for trade and services.

Poverty profile

The most recent poverty profile published in October 2007, the UNDP Poverty, Growth and Inequality in Lebanon, indicates the worsening of poverty during the last few years. The study, which accounts for the consumption patterns and prices that exist across regions in the country and the basic needs of different household members, discerned the extreme poverty line and the poverty line at USD 2.4 per capita and USD 4 capita per day respectively. The poverty profile for 2005 gives an overall poverty headcount of 28.5%. Of those, 8% live under conditions of extreme poverty which means that about 300 000 individuals in Lebanon are unable to meet their food and non-food basic needs. National accounts data point out that real per capita private consumption grew at 2.75% in 2005 but the project report indicates that the distribution of this growth was very uneven. Not surprisingly, Beirut had the highest growth rate per capita consumption at 5% and the Nabatieh, Bekaa, and South governorate recorded higher than average rate of growth in consumption expenditure at 4%. The North however witnessed insignificant growth in expenditure at only 0.14%. This is important to put in perspective as the progress in development was severely shocked and taken back by the 2006 war in the following year. The study estimates that extreme poverty has increased by nearly 5% accounting for 8.4% in 2007 as a result of the war.

Despite some improvements in the last decade, poverty remains a serious problem in Lebanon and was further exacerbated by the 2006 war. Poverty is mostly prevalent among agricultural workers and unskilled workers in services, construction and industries. A large proportion of unskilled workers have come from rural areas where lack of job opportunities has forced residents to seek occupations in the large urban centers. Past development efforts in Lebanon have concentrated for the most part on the major urban cities particularly concentrating on the capital, Beirut. There is a huge disparity in the geographic distribution of poverty with a heavy concentration of poverty in rural areas such as the South, Akkar, Hermel and Baalbek which has persisted for decades. This disparity in development has seen many of the rural inhabitants migrate to urban centers and settle in the poor suburbs seeking better opportunities, but for the most part few are able to rise out of poverty. Rural poverty in Lebanon is the intrinsic factor to poverty alleviation in Lebanon.

Agriculture and poverty

Agriculture is a main source of employment and income in rural areas. Recent surveys in some of the poorest rural areas of Lebanon show that agriculture accounts on average for over 50% of total household income (ranging from about 26% to 75%). Especially in the poorest categories of households, total income in these rural areas is positively correlated with the share of agricultural income, whereas the relative share of agricultural income decreases only in the

highest income categories. This suggests that the development of agriculture may be conducive to an overall improvement in income and especially lifting the poor rural households out of poverty.

Although agriculture has a relatively minor contribution to Lebanon's overall economy, it plays an important role in rural areas, especially the poorest ones. The rural population accounts for an estimated 20 to 25% of the active population of Lebanon that has some activity in agriculture (on a full time or part time basis, including seasonal family labour). In many rural areas, agriculture is the main source of employment and income for the resident population. In particular, in many of the villages in the south of Lebanon as well as in Baalbeck and Hermel (Northern Bekaa) and Akkar (North Lebanon), agriculture accounts for up to 80% of the local GDP and represents the major income-earning and employment opportunity. These regions correspond to the poorest areas in the country.

Within agriculture, crop production is estimated to account for about 72% of the total value of agricultural production. Livestock is estimated at around 142 000 heads of large ruminants and 785 000 heads of small ruminants (MOA 2008). The natural pastures in Lebanon are poor, and seed production is low. Livestock nutrition, therefore, relies on expensive imported feeds. In the hilly areas, sheep and goats are kept in extensive and semi-sedentary systems, where productivity is low.

Over the years, agricultural land use in Lebanon has gradually changed from production systems based on cereals to more intensive production of fruits and vegetables. As a result, agricultural value-added per hectare is much higher in Lebanon than in neighboring countries. The annual production data published by MOA indicates that the use of cultivated land is dominated by tree crops and since 2004 fruit trees rank first and occupy 30% of the total cultivated area, followed by cereals (25%), olive trees(21.8%) and root crops (9%). The remaining 18% are distributed among industrial crops, legume and others. The agricultural production contribution per district is the highest for Bekaa with around 39% of the total production followed by North Lebanon with around 28%, South Lebanon including Nabatiyyeh with 22%, and finally Mount Lebanon with only 12% of the total.

Current climate variability

Precipitation

Lebanon is typically characterized by a Mediterranean climate with precipitation mainly occurring between the months of October and March. Lebanon has four dry months – June, July, August and September – during which water availability is limited due to the very low water storage capacity, the difficulty of capturing water close to the sea, and the shortcomings of the existing water delivery systems and networks.

The topography of the Lebanese territories allows for a wide distribution of precipitation. As a result, five distinct agro-climatic zones are present in the coastal strip, low and middle altitudes of Mount Lebanon, west, central and north Bekaa. Records over 50 years from over 105stations, spread throughout the different governorates, registered average yearly precipitation ranging from 700mm in the Bekaa to 1,210 mm over Mount Lebanon, with the lowest and highest levels of precipitation of80 mm and 3,010 mm respectively. Coastal areas experience precipitation ranging from 600 to 1,100mm reaching as high as 1,400 mm on the peaks of Faraya and Becharreh, and as low as 300 to 400 mm recorded inland.

Temperature
Climate in the East Mediterranean is characterized by mild rainy winters from the westward moving cyclonic activity and long, hot dry summers brought about by persistent atmospheric subsidence influenced by the Asian monsoon. Lebanon's climate is further shaped by its unique topography with the coastal strip, the Lebanon and Anti-Lebanon mountain ranges, and the inland Bekaa plateau. Thus the coastal area and the western side of the Lebanon mountain range exhibit maritime characteristics, while the climate of the eastern side is more continental.

The yearly average temperature pattern in Lebanon ranges from 5ºC and 10ºC for the region located above 1,800 m altitude except for a small area in the Bekaa plateau where the 10ºC line extends to a lower altitude near the town of Serghaya. The region located between 1,100 m and 1,200 m enjoys 15ºC yearly average temperature. A slight portion of the littoral benefits from the dampening effect of the sea and has a yearly average temperature above 20ºC.

Water resources
Lebanon faces significant challenges in meeting the country's water demand in terms of quantity and quality. Unsustainable water management practices, water governance shortcomings, and environmental risks including climate change are among the main obstacles facing the sector.

Yearly precipitation results in an average yearly flow of 8,600 million m^3 (Mm^3), giving rise to 40 streams and rivers and over 2,000 springs. About 1,000 Mm^3 of this flow comes from over 2,000 springs with an average unit yield of about 10–15 l/s (FAO, 2008). Since Lebanon is at a higher elevation than its neighbors, it has practically no incoming surface water flow (FAO, 2008).

Amid the absence of consistent information, it is generally accepted that approximately 50% of the average yearly precipitation (8,600 Mm^3) is lost through evapotranspiration, while additional losses include surface water flows to neighboring countries (estimated by the Litani River Authority to represent almost 8%) and groundwater seepage (12%). This leaves around 2,600 $Mm^3$of surface and groundwater that is potentially available, of which around 2,000 Mm^3 is deemed exploitable (MoE,2001) consisting of 1,500 Mm^3 of surface water and 700– 1,165 Mm^3 of groundwater (MED EUWI, 2009).

Further studies have assessed agricultural water withdrawal assessment based on 11,200 m^3/ha/yr from surface water and 8,575 m^3/ha/yr from ground water resources (FAO, 2008). The use of groundwater for irrigation has increased during recent years. This situation has encouraged individual farmers to cope with water shortages by increasingly relying on private wells (Hreiche,2009).

Irrigation is a key requirement for agricultural productivity in most parts of Lebanon, given its prevailing Mediterranean climatic features with scarce precipitation during the main summer growing season. Area under irrigation increased from about40,000 ha in the early 60s to over 104,000 ha currently equipped for irrigation.

Irrigation has been a main factor to enable intensification of cropping patterns through the development of high value-added production (vegetables and fruit). Water scarcity, rather than land resources, is currently limiting the expansion of agricultural production. Nonetheless, water efficiency in most existing irrigation schemes is usually quite low especially in the large to medium scale irrigation schemes built with public funds. At the same time, uncontrolled private well drilling and pumping result in a significant lowering of the water table and increased salinity.

The geographic coverage of the project

In order to better maximize the socio-economic impact of the project through working on strengthening the agricultural sector, it has been agreed to focus the geographic coverage of the project on selected Focus Areas that would stand to have the most impact when targeting the farmer communities and rural poor. The geographic targeting process is based on the agreement on: national coverage of the project; pre-selection criteria; their application, and identification of three Focus Areas. This process was developed and finalized during the design of the IFAD HASAD project and was adopted throughout the design of the AgriCal project.

The following targeting criteria have been identified:
(a) High Density of Poverty Pockets;
(b) Low level of farm household productive potential, measured trough the average number of Farm-Units or "Unité-Explotation";
(c) Importance (and persistence) of War Damages in the Agricultural sector;
(d) Areas Prone to Desertification (APD) and vulnerable to climate change; and
(e) Water harvesting potential and high-value crops potential.

Each of the above mentioned criteria was given the same weight. All the areas selected along one or more of the above criteria were overlaid and their simple weights were summed vertically or geographically using a GIS system. As a subsequent step, each cadastral village was given the average value of the summation process, producing therefore the "Project Focus Areas" selection map.

As a result, three main Focus Areas for possible project-support have been delimited, and analyzed. These are: (i) Akkar-Danniyehh; (ii) North Baalbek and Hermel; and (iii) South Litani below Lake Karaoun. They correspond to areas where project activities would be concentrated and are illustrated in the following figure.

The three Focus Areas have then been analyzed utilizing the concept of ZAH (Homogeneous Agricultural Zones) elaborated by MOA in the framework of the Agricultural Census. Out of a total of 40 ZAHs identified by MOA at national level, the three project Focus Areas cover the totality or the largest part of 16 of them.

Moreover, Outcome 4related to index-based insurance, policy and knowledge management has a national dimension and will contribute towards moving the climate change adaptation agenda forward in Lebanon. In addition some of the project outputs and activities will be implemented at the national level namely:

Output 2.2:	Expanded farmer outreach and ensured financial and management sustainability of the early warning system
Output 2.4:	Guidelines and recommendations on agricultural adaptation techniques for vulnerable areas developed
Output 2.5:	National fodder resource assessment prepared
Output 4.1:	Climate index-based insurance elaborated
Output 4.2	Policy advocacy activities implemented
Output 4.3	Knowledge management system established and knowledge management activities implemented

The project location context

The target group would be comprised of the poor smallholders of various communities of Lebanon living in the three identified focus areas. The project financial resources will thus serve to achieve greater regional equity through targeting project benefits towards the poor. In particular, it has been decided that activities financed by the project will focus on selected rainfed, hilly, poor areas, and will have a demand-driven and participatory nature. There is a relatively important overlapping between areas vulnerable to climate change and prone to desertification and poverty levels to identify the project area as the hilly areas in three zones – Akkar-Dannieh, North Baalbeck and Hermel, South regions and Lower Litani (below lake Karaoun and covering parts of the Mohafazat of Nabatiyeh and South Lebanon) – as the three main (but not exclusive)focus areas for project interventions in view of the high proportion of vulnerable households living in these areas. Geographical targeting is described in the following sections. The project target group will therefore consist of poor and very poor households living in these areas.

Other characteristics of the target group include the following social indicators which are particularly gender unbalanced:

- Unemployment is very important amongst the target group, it reaches 23.5% on average but is 17.1% for men and 36.6% for women. This indicates the lack of opportunities locally for rural labour force.

- Illiteracy reaches 14.5% for men and 24.5% for women, compared to respectively 5.6% and 11.2% at national level.

Access to rural infrastructure varies. Access to drinking water and the network of rural roads is considered good. Although all poor villages are connected to the electricity network, power supply is unstable in the most remote ones where cuts are frequent. Finally, safe sewage networks are almost non-existent in all poverty pockets.

The recent study on livelihoods and gender analysis of the war damage in rural areas of Lebanon, commissioned by IFAD to FAO Investment Centre, collected detailed data on rural incomes in nine of the poorest ZAH (Homogeneous Agricultural Zones) of Lebanon(ZAH with low UE ratios). The study found that in most of these ZAH (eight out of nine),the average income per capita is above the 'lower poverty line'. However, a significant percentage of the households interviewed are below the 'lower poverty line' (about 47% in the zone of Nabatieh, 40% in Akkar and 30% in South Lebanon – against a national average of only 8%), which confirms that rural poverty in remote areas is correlated with a low income potential from agriculture. On average in these nine ZAH, direct income from agriculture accounts for about 52% of total income (ranging from 26% to over 75% depending on the ZAH). Especially in the poorest categories of households, total income is positively correlated with the share of agricultural income, whereas the relative share of agricultural income decreases only in the highest income categories. This suggests that development of agriculture would be conducive to overall improvement in income especially for the poorest rural households and lifting them out of poverty.

The average annual income of the target group is estimated at USD 4,137 on the basis of the livelihood survey, which is close to the line of extreme poverty (USD 4,200per year). Land resources are relatively scarce, with 12.0 dunum (1.1 ha) on average per family, but with only an estimated 2.98 dunum (25% of total as estimated from other sources) which are irrigated. Yet, agriculture constitutes the main source of incomes (54%) and therefore represents the major scope for increasing farm incomes, especially in view of the fact that three quarters of the land are not yet irrigated, which leaves good potential for improvement. A sample of such households have been surveyed and described in the "Livelihoods and gender analysis in poor rural areas in the wake of the 2006 conflict" undertaken by the FAO Investment Centre during 2007 on behalf of IFAD.

Focus Area Poverty and Agriculture Statistics

Descriptions	**3 Project Focus Areas**	**Lebanon**	**3 Project Focus Areas as % of Lebanon**
Total Area (in dunum)	3,178.489	10,452,000	30.4%
Number of Farm Households	59,221	194,828	30.4%
Poverty Incidence:			
Total No of Very Poor Households	7,150	15,586	45.9%
% of Very Poor Households	12.1%	8.0%	150.9%
Total No of Poor Households	16,740	39,940	41.9%
% of Poor Households	28.3%	20.5%	137.9%
Total Number of Poor and very Poor	23,890	55,525	43.0%
% of Poor and Very Poor	40.3%	28.5%	141.5%

Agricultural Area: - Total (in dunum) - per household (in dunum)	 709,346 12.0	 2,479,401 12.7	 28.6% 94.1%
Irrigated Area: - Total (in dunum) - as a % of agricultural area - per household	 176,865 24.9% 2.98	 1,040,084 41.9% 5.34	 17.0% 59.4% 55.9%

The agricultural investments and exploitations in Lebanon are mostly small holders. The average farm size in the coastal zones varies between 0.25 to 0.75ha according to the caza. In Dannieh area and the south, the farm size varies between 0.1 to 0.75ha. Whereas in the Bekaa and Akkar these figures increase with farms with a size if more than 1ha.

The last agriculture census of 1999 provides approximate figures concerning the total number of farmers, the total surface of exploitations, the surface area under greenhouses and tunnels, and the number of heads of sheep and goat, as summarized in the table below:

Region	**Number of Farmers**	**Surface of exploitations (ha)**	**of which Greenhouses in coastal zones (ha)**	**Heads of small ruminants**
AKKAR	22,577	36,251	808 (mostly tunnels)	49,400
DANNIYEH	11,825	8,421	318 (mostly tunnels)	24,400
BCHARRI				8,900
BATROUN				4,800
SOUR	14,065	14,247	85	
BENT JBEIL	7,581	6,097		
MARJAYOUN	7,522	7,747		
HASBAYA	5,570	4,153		
BAALBACK	18,846	55,753		287,000
HERMEL	2,979	8,122		31,000
JBEIL			395	16,400
KESERWAN			212	16,500

(*) Dark and light colors (shades of grey) refer to areas totally or partially covered by the project, respectively.

The farmers' numbers are not sex-aggregated nor classified by type of agriculture activity within each region in any agriculture census or survey. However, a global figure on the national scale shows that females constitute 31% of the family workforce in the agriculture sector, and 18% from the hired permanent labour force. These percentages tend to increase with the size of the exploitation. On the other hand, the percentage of females increases to reach 50% for the seasonal hired labour force.

As for land tenure, most of the small holders exploit their own land, and recruit either permanent of seasonal labour force. While, in large farm exploitations, the land owners usually tend to rent the property to farmers for a determined period of years or on an annual basis. Most greenhouses on the coastal zone and many farms in the Bekaa and Akkar follow this type of land tenure.

It is to note that the Ministry of Agriculture is currently preparing a new National Agricultural Census. Updated data from the census will be used to refine the project monitoring indicators and to prepare the project Annual Work Plans.

Gender issues

Within poverty pockets, the rising numbers of male migrants due to the adverse economic conditions are leading to a progressive "feminization" of the poor rural society. As also indicated by recent surveys, households consisting of widows with children are more likely to be poor, and are over-represented among the poor; and their share is five times their population share and eight times the corresponding share among better-off households.

Even though the educational field has witnessed great progress in relation to gender, unfortunately this has not been translated into the labour domain. Poverty has a gender profile, and it is very much related to the employment level and economic activity of the female population. Whereas 77.3% of the male economically active age groups participate in the labour force, only 21.7% of the female economically active age groups are employed, and this particularly applies to poverty pockets. The main reason for this discrepancy is cultural but it is also directly dependent on the low wages paid to women (50% of men's wages) which render married women economically incompetent to work, and is further aggravated in the workplace.

The study on "Livelihoods and Gender Analysis in poor rural areas in the wake of the 2006 conflict" had special focus regarding the division of labour and access to resources of women. The study revealed that only 3% of women have ownership rights to land. Land owned by women represents 8% of total land. About 25% to 40% of women are employed in the agricultural sector. These percentages are higher in the North compared to the South. Women are proportionately more involved in animal husbandry, cereal/ fodder and tobacco production. Their involvement in horticulture activities and olive orchards increases in the Southern region. At least 20% of the villages have a women's association or cooperative, in comparison to 80% of the villages hosting an association or a cooperative.

Particular attention will be given in the project to the application of a gender balanced approach in project activities. This would start with the final selection stage of beneficiaries, where an adequate number of women headed households corresponding to each local situation should be considered, and will continue during project implementation by checking that activities of present or potential interest to local women are designed and organized in such a way to also address and involve them.

Targeting and participation mechanism

The participatory approach will be a basic programming tool for the short, medium and long term development of the project area. The productive activities will be programmed as priorities to be implemented within the proposed project duration. However, these activities will be designed within a long-term vision in order to ensure that the appropriate institutional and community-based mechanisms are put in place to sustain the projects outputs and results.

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The involvement of all concerned institutional and local stakeholders is essential, not just for project formulation and appraisal but also for implementation, starting from the design and planning of the project activities.

The project will mobilize the local communities of the villages and select the beneficiaries through a transparent participatory process. Through this process the community identifies and plans a number of demand driven activities which enhance living conditions through improved productivity, strengthening gender equity, protecting the environment, and ensuring sustainability. The project will work closely with local representative bodies such as the Municipality Councils and/or Cooperatives. In Lebanon, the only legally recognized form of grouping is the cooperatives, which are under the mandate and supervision of the Cooperative General Directorate of the Ministry of Agriculture (MoA). The cooperative movement is very present in the rural areas of Lebanon. Other informal agricultural groupings exist, such as the water rights users of the irrigation canals created under the Ottoman rulers in the Bekaa Valley (recognized by MOA and the Municipalities), which still play a fundamental role in irrigation water use and distribution. Special mention should also be made to the large number of Women Associations in all regions of Lebanon, often created around agro/food-processing activities promoted with the assistance of specific projects or NGOs.

The Participatory Approach for working with the targeted communities, Municipalities, cooperatives, farmers, and households, follows three steps which include (i) initial identifying and planning of activities (ii) organization/preparation of the beneficiaries; and (iii) implementation and empowerment of beneficiaries. The three steps involves as follows:

• Initial Identifying and Planning of Activities. The Municipalities/Cooperatives and the PMU will identify local committees to work with in the development of the criteria for the targeted farmers and households. Potential beneficiaries that fall under the criteria will submit requests to the PMU. This will be verified by the PMU through participatory rapid appraisal and then a basic and general participatory agreement for development will be agreed on. Following that a socio-economic and technical feasibility study will be prepared for every component.

• Organization and Preparation. This stage would include all activities to prepare both the farmers and the technical team for construction of the works and provision of services. The beneficiary farmers will be brought together and along with the PMU will start organizing and preparing for the implementation of project activities. At the same time the physical infrastructure and design would be agreed upon with the appropriate contractors. Finally the farmer group will screen the design and a participatory agreement for the construction and the maintenance of project activities such as the water harvesting and irrigation schemes will be agreed upon.

• Implementation and Empowerment. This stage would include the construction of the infrastructure works, provision of services and the empowerment of the beneficiaries

(institutions and farmers) to take charge of administrative and management responsibilities to operate and maintain the systems.

The proposed targeting mechanism is an on-going process throughout the course of the project. The project targeting mechanism has initially identified the regions with the highest incidence of rural poverty. The targeting mechanism then elaborates on the various steps and criteria in ensuring adequate group and individual targeting of the beneficiaries. It is designed to be transparent (i.e. based on widely shared and accepted criteria) and participatory: in other words, its implementation (the selection of beneficiaries) should not be imposed from top but negotiated with the communities on the basis of their knowledge and perception. Finally, again based on lessons learnt, its implementation should be carefully monitored throughout its implementation to ensure its adequacy and acceptance.

The MOA, GP and LARI will initiate the detailed design of their respective planned activities in the targeted areas as part of the initiation of the project. Then the PMU will engage in the above-mentioned participatory process at the local level to target specific communities and households. This will be largely undertaken at project start-up (first year), by applying eligibility criteria indicating income and poverty levels among others. In this respect, a major effort will be made within each concentration area to target the poorest villages and households while maintaining an equitable distribution among social groups. The poverty targeting process at community/household level will directly involve and mobilize representatives of institutions/organizations at municipal and local level, such as local authorities, key informants and representatives of the beneficiaries, organized in a local selection committee.

Poverty Screening Criteria: In this final poverty targeting phase, every effort will be made so that all project investments will be allocated to project beneficiary households based on participatory rural appraisal process that will be coordinated by the PMU with the direct involvement of the municipalities, local authorities, and local communities. The local communities will be responsible for establishing the criteria for identifying the targeted vulnerable households based on the following:

- extent of poverty and vulnerability (income and alternative means of income);
- livelihood dependency on agriculture (agricultural income, residency in rural village, land size); and
- the vulnerability to climate change (direct and indirect material losses).

The PMU will ensure transparency and accountability in the process and selection. Based on the results of these screening criteria, the final list of beneficiary households will be finalized and validated by the local authorities after verifying their compliance (or willingness to comply) with the following eligibility conditions:

- availability of or accessibility to individual or collective cadastral land titles, land use certificates (issued by Mayors or Mukhtars) or leasing arrangements;
- commitment to participate in the feasibility studies of the site location and design works to be adopted;
- agree with the agreed cost-sharing arrangements of the Green Plan.

This approach is essential for ensuring transparency of the process with all concerned stakeholders, and is expected to contribute to control the risk of being undermined by local interests.

PROJECT OBJECTIVES:

The overall goal of the project is to increase community resilience and adaptive capacity to climate change in Lebanon. The objective is to support the implementation of climate change adaptation measures in the agriculture sector in three highly vulnerable focus areas.

The programme will deliver this objective through four outcomes:

Outcome 1: Increased water availability and efficient use through water harvesting and irrigation technologies
Outcome 2: Increased adaptation to climate change for crop production
Outcome 3: Increased resilience of shepherds and small ruminants to climate change through sustainable rangeland management
Outcome 4: Climate index insurance initiated, policy influenced and lessons learned and shared through a knowledge management system

PROJECT COMPONENTS AND FINANCING:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.

Project components relate to the four main outcomes, and the outputs identified to achieve them. The outcomes deliver the programme objective, while the outputs are the deliverables produced by the activities. Details of outputs and activities and their rationale are provided in Part II, Section A, and the specific output budgets, summarized below. The results framework is presented in Part III, Section D.

PROJECT COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US$)
1. Water Management	Output 1.1: Rainwater harvested from greenhouse roof tops Output 1.2: Rainwater harvested from roads Output 1.3: Water efficient irrigation systems deployed	Increased water availability and efficient use through water harvesting and irrigation technologies	1,626,800

2. Adaptation Techniques Roll-out	Output 2.1: Enhanced early warning system to farmers through improved existing system Output 2.2:Expanded farmer outreach and ensured financial and management sustainability of the warning system Output 2.3: Capacity building on adaptation techniques for vulnerable field crops enhanced Output 2.4:Guidelines and recommendations on agricultural adaptation techniques for vulnerable areas developed Output 2.5: National fodder resource assessment prepared	Increased adaptation to climate change for rangeland and crop production	1,800,000
3. Rangeland Management	Output 3.1: Community-based sustainable rangeland management plan prepared Output 3.2: Restored degraded rangeland areas and reduced flood risks	Increased resilience of shepherds and small ruminants to climate change through sustainable rangeland management	2,550,000
4. Climate index-based insurance, Policy and Knowledge Management	Output 4.1 Climate index-based insurance initiated Output 4.2 Policy and advocacy activities implemented Output 4.3 Knowledge management system established and knowledge management activities implemented	Climate index insurance initiated in Lebanon Policy influenced and lessons learned and shared through a knowledge management system	580,000
5. Project/Programme Execution cost			688,200
6. Total Project/Programme Cost			7,245,000
7. Project Cycle Management Fee charged by the Implementing Entity (8.5%)			615,825
Amount of Financing Requested			**7,860,825**

Breakdown of Project Execution Cost

Item	Unit Cost (USD)	Units	Total (USD)
Office Rent	-	-	In-kind contribution
Project Coordinator	4200	48	201600
Administrative Officer	1500	40	60000
Monitoring and evaluation and communication Officer	2200	24	52800
Technical Expert (Green Plan)	3000	42	126000
Technical Expert (LARI)	3000	42	126000
Mid-term Evaluation	1	22000	22000
Final Evaluation	1	22000	22000
IT equipment	1	10000	10000
Stationary and supplies	250	46	11500
Travel to project field sites	500	46	23000
International Travel	2000	4	8000
Car	25300	1	25300
Total			**688200**

Project Cycle Management Fee charged by the Implementing Entity (8.5%) 615,825

Project Cycle Management Fee over 4y	% of 615,825	Amount
1. Development and Preparation	20%	123 165
2. Overall Coordination and Management	30%	184 747.5
3. Financial Management and Legal support	20%	123 165
4. Evaluation and Knowledge Management support including Reporting	20%	123 165
5. Overall Administration and support costs	10%	61 582.5
TOTAL	**100%**	**615,825**

Break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function.

IE Fees Breakdown of M&E Supervision	Responsibility	Budget (USD)	Time Frame
Field Visits of Programme Monitoring Specialists	IFAD	18,000	bi-annually
Training workshops on M&E	IFAD	17,000	2013
Thematic Evaluations	IFAD	15,000	annually
Mid Term Evaluation	IFAD	30,000	2015
Final Evaluation	IFAD	30,000	2017

Knowledge management activities and publications	IFAD	13,165	bi-annually
Total Indicative Cost		**123,165**	**4 years**

DISBURSEMENT MATRIX

	1st disbursement - Upon agreement signature	2nd disbursement	3rd disbursement	4th disbursement	Total
Scheduled Date	30 Dec 12	15 April 13	15 April 14	15 April 15	**4 years**
Project Funds (USD)	1,464,700	2,231,100	2,002,100	1,547,100	**7,245,000**
Implementing Entity Fee (USD)	124,500	189,643	170,178	131,504	**615,825**

PROJECTED CALENDAR:
Indicate the dates of the following milestones for the proposed project/programme

MILESTONES	EXPECTED DATES
Start of Project Implementation	April 2013
Mid-term Review	March 2015
Project Closing	March 2017
Terminal Evaluation	September 2017

PART II: PROJECT JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

OUTCOME 1: INCREASED WATER AVAILABILITY AND EFFICIENT USE THROUGH WATER HARVESTING AND IRRIGATION TECHNOLOGIES

Adaptation of the water sector to climate change involves technologies that tackle both increasing water availability and reducing the consumption through efficient water use. AgriCal project will provide the technical support needed for implementing proposed outputs. The first 2 outputs are related to water harvesting new technologies, namely designing and executing new agricultural roads and greenhouses that allow harvesting rain water and using it for irrigation purposes. These outputs are applicable in areas where precipitation is significant, greenhouses

present and where topography enables designing water harvesting systems from agricultural roads (i.e. Danniyeh, medium-higher Akkar and southern Litani areas). The project will provide new single-span greenhouses that are designed to accommodate for the adverse impacts of climate change and enhance the crops' quality and productivity, and will also provide the system to harvest and collect rain water from the greenhouses. Farmers who benefit from the activities will be able to approach the Green Plan to support the construction and procurement of the reservoirs to store the harvested water.

The third output of Outcome 1 will support the deployment of new water efficient irrigation systems at the farm level. In addition, the project will provide technical support to monitor crop water needs for all vulnerable crops in the selected project areas.

The Green Plan (GP) is the responsible entity to implement this outcome, given its historical expertise in the construction of hill or earth lakes and water storage and distribution systems as well as the implementation of agriculture roads. This outcome will widen the expertise of the Green Plan through the introduction of new technologies for water harvesting that can be deployed in different areas of Lebanon.

The project will follow the system of the Green Plan to implement the activities planned under outcome 1. The GP provides its support services on a demand driven basis with direct contribution from the benefiting farmers based on agreed upon selection criteria as well as standard financial rules and regulations. The GP funding mechanism requests the direct contribution of beneficiaries based on the following percentages:

Service/Product	**Green Plan Contribution**	**Beneficiary Contribution**
Greenhouses	75%	25%
Water storage reservoirs	Up to 50USD/m3 of water	The remaining cost
Irrigation systems	65%	35%

The GP requires first the receipt of the contribution of the beneficiary before deploying its services or delivering its products. The GP can either provide in-kind contributions by providing its services (road and water storage units design and construction) or in cash (for the installation of irrigation systems).

This approach has been implemented by the GP for decades and has proved to be functioning in an efficient way with wide acceptance from farmers and local communities. Funding from AgriCal project will be delivered through this mechanism as part of GP contributions to the targeted communities. This modality will ensure the active participation of the farmers as they are committing their own resources and thus will enhance its sustainability. In addition, the cost-effectiveness of the project will increase.

The fourth output which deals with training farmers on programming their irrigation schedule and quantifying their water needs requires the involvement of other parties like ICARDA, LARI and the extension service of the Ministry of Agriculture.

Output 1.1: Rainwater harvested from greenhouse roof tops (Qasmiyeh plain)

Greenhouses, mostly located on the coastal areas do not usually benefit from traditional water harvesting techniques. Rainwater harvesting from greenhouse tops is a cost-effective technology that enables farmers to reduce their pumping from underground water and hence,

reduce the risk of sea intrusion and consequently avoid the salinity and depletion of groundwater and soil. Then energy saving from pumping will decrease GHG emissions and hence enable the contribution of this technology in mitigation efforts. This problem is mostly significant in late summer and autumn, where the water table is at its lower levels. This phenomenon is expected to amplify under future climate conditions. The use of collected water from greenhouse tops during that period will not only improve groundwater quality, but also enable the farmers to keep producing vegetables in autumn, under more expected drought conditions.

The greenhouses provided by the project will be the new Single Span Greenhouses (SSG). The SSG is highly recommended worldwide for the advantages it has compared to arched tunnel greenhouse, especially regarding the Integrated Production and Protection (IPP) and Integrated Pest Management (IPM). These advantages lead to a better protection of the environment and natural resources, as well as to a safer food production system. In Lebanon, and with the recent climatic changes, green houses farmers are suffering from the *Tuta Absoluta* disease that is affecting the quality and yield of tomatoes that is a crucial crop for the livelihoods of the local communities. The greenhouses will be equipped with collection system to harvest rain water. Farmers with the support of the GP will procure and construct the reservoirs to store the harvested water. The water storage reservoirs could be a hill lake, a cement reservoir or ready-made tanks.

The Green Plan who will adopt this technology will upscale its use for greenhouse producers in Lebanon, and consequently increase the number of beneficiaries to reach more than 1000 on the coastal and mountain areas.

Activities:

- Assessing potential greenhouses for rain harvesting in southern Litani area (Qasmiyeh plain)
- Promoting the technique to farmers and ensuring their involvement in the project
- Preparing the design and BOQs (for 5ha)
- Procuring the greenhouses and installation in farms
- Training farmers on maintaining their system

Output 1.2: Rainwater harvested from roads

Roads designed and implemented by the Green Plan on a demand driven basis for farmers are also an opportunity to introduce the possibility of harvesting water through an adapted design with drainage, decantation, storage and distribution systems. Farmers who benefit from the road would also have a share from the collected water. This technology which is suitable to mountain areas is recommended for the western chain of Mount Lebanon, including Danniyeh, Akkar and south Lebanon where several villages are facing water shortage for fruit orchards in summer. As the demand for water is higher in summer by the augmented local population as well as by plants, increased water availability will have a positive impact on the resilience of farmers to climate change. The technology is widely welcomed by different stakeholders, including the Council of Development and Reconstruction, Environmental Fund for Lebanon and the Ministry of Energy and Water. These institutions as well as the Green Plan are willing to adopt this technology and upscale its use.

Activities:

- Assessing the potential roads implemented by GP namely in Akkar, Danniyeh heights and south Lebanon or any other potential road in Mount Lebanon chain.
- Selecting roads, preparing design and BOQ
- Promoting the technique to farmers and ensuring their involvement in the project
- Creating a water user association to ensure equitable distribution of water
- Procuring and installation of drainage, storage and distribution system
- Training farmers on managing and maintaining their system

Output 1.3: Water efficient irrigation systems deployed

Increasing water availability through different technologies is also an opportunity to improve water efficient use through the deployment of suitable irrigation systems. As most of the initiatives are in areas where farmers grow fruit trees and vegetables, drip irrigation system and its variances is the most appropriate to introduce. Shifting from surface irrigation to drip irrigation where water is directly delivered to the root zone reduces drastically evaporation and percolation losses. This system reduces also energy and labour needed for soil preparation and weed control. The increased stored water from earth lakes or other techniques through AgriCal project would enable the deployment of drip irrigation system for about 150ha of vegetables and fruit orchards. The deployment of drip irrigation system *per se* is not enough to ensure maximal water efficient use. Farmers will be trained by MOA extension service on maintaining their water harvesting and distribution network as well as their irrigation systems. The training will also enable them linking water consumption to plant requirement and climate demand. The programming of irrigation and its quantities will consequently amplify the plant resilience and farmers readiness to climate variability. The reduction of plowing activities for land preparation and weed control will contribute to mitigation efforts as less GHG emissions are expected.

Activities:

- Assessing the BOQ according to the number of beneficiaries, cropping patterns and irrigated area
- Promoting the technique to farmers and ensuring their involvement in the project
- Procuring the equipment, and installation (for 150ha)[2]
- Training farmers on programming and planning their irrigation schedules and quantities and on maintenance of the irrigation system

OUTCOME 2: INCREASED ADAPTATION TO CLIMATE CHANGE FOR CROP PRODUCTION

Readiness to climate change embeds an increased knowledge on the impact variability under climate uncertainty. It is enhanced by acquiring multiple tools that enables assessing vulnerability, evaluating the foreseen impact and providing adaptation means. This outcome has five outputs that deliver several techniques including early warning systems, integrated production and protection of the crops, introducing adapted crop varieties to future climate conditions, introducing risk-coping agriculture techniques, as well as assessing the carrying capacity of rangeland in order to increase their resilience to climate change. Selected vulnerable areas depending on rangeland and crop types will be defined for pilot demonstration

[2] 150ha are expected to be irrigated from the HASAD hill lakes.

plots. This outcome will be implemented by the Lebanese Agriculture Research Institute (LARI) given its expertise in the suggested technologies.

Output 2.1: Enhanced early warning system to farmers through improved existing system

The early warning system based at LARI relies on the 48 deployed weather stations into different parts over the country. Additional weather stations are needed to complete the coverage of the project area as follows: Baalbeck-Hermel: 3 stations; Akkar: 1; and Southern Litani: 3 stations.

LARI is currently providing early warning system service (EWS) to more than 2750 farmers, mostly in the Bekaa and Akkar regions. Following the forecast provided by the different weather stations of the institute, the generated data analysis by LARI researchers enables sending short text messages to all subscribed farmers. Two models for assessing the risk of potato late blight in Akkar plain and apple scab in Akkar heights are already functional. Farmers are notified through text messages, and through the existing extension service and technicians of LARI, the Ministry of Agriculture and NGOs present in the area. These messages include:

- Weather forecast for the coming week
- Specific recommendations for growers (of concerned crops) for irrigation monitoring (i.e. wheat growers are urged to irrigate their fields next week).
- Specific recommendations for growers in a defined area to conduct a preventive or curative spraying against a certain pest, suggesting the active ingredients to be used (i.e. table grape growers in Bednayel-Baalbek should spray next week against grape worms).
- Recommendations about eventual other field practices to be performed (tillage, pruning, plantation) whenever linked with climatic conditions and weather forecast.
- Information about eventual distribution of a certain pesticide for farmers at LARI stations.

Most farmers usually appreciate these messages, and follow them. An increasing demand for this service is noticed among farmers. AgriCal project will support LARI in expanding this service to reach more farmers in the target areas and enhance the analysis of climate information to provide better guidance.

This output aims at replicating this exercise to a maximum number of pest outbreaks that are linked to climate variability (fire blight, mildew, wheat rust...) as well as water demand estimation according to climate demand and cropping pattern and enlarging the number of beneficiaries and covered area (Akkar, Danniyeh, Hermel, Baalbeck, and southern Lebanon which are amongst the most vulnerable to climate change are prioritized). Early warning system delivering timely recommendations for an integrated pest management will reduce the number of sprays, and consequently not only reduce the cost of production, but also ensure better quality of production with less GHG emissions. The target crops will be wheat, barley, potato, tomato, cucumber, apple, pear, peach, cherry, apricot, grapevine, olive, banana and almond which are widely produced in the focus areas.

Activities:

- Assessing the needs and gaps in the existing system, according to cropping pattern and diseases in the targeted areas (Akkar, Danniyeh, Hermel, Baalbeck, and southern Lebanon)

- Procuring and installing 2-4 weather stations and linkage with network
- Installing the software and modeling programmes to enhance existing early warning system
- Linking early warning system to irrigation practices and cropping patterns, as well as integrated pest management.

Output 2.2: Expanded farmer outreach and ensured financial and management sustainability of the warning system

This output will ensure the sustainability of the service through proposing the most appropriate financial mechanism to the warning system. It involves different parties including public and private sector actors. The financial sustainability of the system will enable up-scaling it to all farmers nationwide.

Activities:

- Assessing the managerial and technical capacity needs of LARI to operate and maintain the early warning system and provide the technical support needed to LARI staff.
- Developing financing mechanism that includes the private sector to ensure sustainability of the system.
- Identifying communication needs and upgrade existing information dissemination system and feedback response from farmers.

Output 2.3: Capacity building on adaptation techniques for vulnerable field crops enhanced

Rain fed field crops (*wheat, barley, chickpeas, lentils, etc.)* are amongst the most vulnerable crops to climate change. Several technologies are harnessed to risk coping, including the introduction of adapted selected varieties, supplementary irrigation and irrigation management, integrated pest management, no-till and crop rotation practices and so forth. Since LARI is already studying these techniques, and reproducing new cultivars of legumes and cereals for dissemination to farmers, it is important to increase farmers' capacity on how to grow new varieties under climate uncertainty. This outcome will increase the resilience of farmers, namely in the major producing areas for cereals and legumes, through the creation of demonstration plots where all the adaptation techniques are realized in one package. This approach will amplify the adaptation mechanism and increase farmers' acceptance to the introduced technologies. Targeted areas are those producing cereals and legumes: Bekaa, Marjayoun and Akkar regions. The adoption of adaptation techniques simultaneously will have a positive impact on the reduction of energy for plowing and spraying, and consequently enhance mitigation by reducing CO_2 emissions. The approach of demonstration plots for MOA and NGOs technicians, as well as farmers will be the most appropriate tool to promote the up-scaling of the use of these technologies for cereal and legume growers.

Activities:

- Preparing the capacity building programme, including on-site demonstration and farming equipment, to harness LARI concerned departments with the potential farmers for the implementation of demonstration plots.

- Selecting the demonstration plots within the three focus areas.
- Implementing activities within the plots including the proposed adaptation measures: the introduction of adapted cultivars, no-till practices, crop rotation, supplementary irrigation techniques, soil fertility management and integrated pest management.
- Disseminating and promoting the results through on-site observation and demonstration, field trips, etc.

Output 2.4: Guidelines and recommendations on agricultural adaptation techniques for vulnerable areas developed

In output 2.3 all the adaptation techniques are delivered in one package in every demonstration plot only on cereal and fodder crops. In this output, adaptation measures are applied only when necessary, depending on the crop vulnerability in every agro-climatic zone, and the type of climate change impact on this crop. Several irrigated or rainfed crops are vulnerable to climate change. Nevertheless, the impact of climate is not only due to lack of precipitation or water for irrigation. Some crops will experience a lack in chilling hours, while others will suffer from excessive heat or a reduction in the vegetative season. Many crops will be indirectly affected by the increase of pest and disease outbreaks due to increased variability in climate or the decrease in water availability for irrigation. The amplitude of climate impact will also vary from one region to another. Hence, according to the crop and the type of impact an adaptation measure a series of measures are recommended. According to the cropping pattern within each agro-climatic zone in the country and to the expected impact under uncertainty, adaptation techniques will be proposed and disseminated to technicians(including the MOA extension service, NGOs, etc.) and key farmers (those who usually are pioneer in developing new practices in their exploitations).Since these techniques are in most cases easy to deploy, the farmers will adopt them spontaneously when aware. Moreover, the MOA and NGOs will promote these techniques by providing them in kind to the farmers (i.e. new varieties adapted to climate variability), or through specific projects, enabling the up-scaling of their use (Conservation agriculture, IPM, etc.). Some of the techniques, like Integrated Pest Management, good agriculture practices and no-till are also means for mitigation, as less GHG emissions will result from their application.

Activities:

- Assessing impact type according to the cropping pattern in each agro-climatic zone in the three focus areas.
- Identifying the most suitable adaptation techniques targeting vulnerable crops in the in the focus areas to improve productivity.
- Implementing the techniques in demonstration plots distributed within the three focus areas.
- Preparing technical guidelines and recommendations and disseminating them to technicians and key farmers.

Output 2.5: National fodder resource assessment prepared

Rangelands in Mediterranean ecosystems include natural seasonal pastures, abandoned or post-harvest agriculture land, forests and scrublands. Hence their nutritional value and consequently carrying capacity are variable. To be able to conduct a sustainable rangeland

management plan under current or future climate conditions, it is important to assess the distribution, abundance and nutritional value of fodder species into the different types of rangeland. For this purpose a national fodder resources assessment (NFRA) is needed. A first initiative on agro-biodiversity has been implemented by LARI. The collaboration of LARI with Kew Garden, ICARDA and ACSAD increases its assets in driving in the necessary expertise to conduct this assessment. Since the inventory of fodder species is a national necessity, sampling design representing all types of rangeland is needed. Laboratory analysis is required to evaluate the crude protein, crude fiber, digestible fiber, ash and other components in order to evaluate the nutritional value of forage, and consequently the carrying capacity of the rangeland. Field surveys to better understand herds movement, range access and land tenure as well as shepherds livelihood will be also conducted. Mapping rangeland, their characteristics and their vulnerability to climate change will be the end result of this output. This output will be an essential step towards the implementation of outcome 3 related to rangeland management. This output is conducted all over the country, which accounts to about 50% of its total rangeland area.

Activities:

- Forming of a multi-disciplinary team
- Preparing the methodology, the sampling design and field manual
- Procurement of maps and materials.
- Preparing and completing field questionnaires.
- Training of the staff implicated.
- Implementing field survey of vegetation, impact of grazing and ground truthing of satellite data.
- Compiling rangeland survey maps (GIS based) and vegetation data sets
- Analysis of rangeland data and recommendations for the pasture management plan.
- Producing and disseminating NFRA report with analysis of the results.
- Developing a web-based information system

OUTCOME 3: INCREASED RESILIENCE OF SHEPHERDS AND SMALL RUMINANTS TO CLIMATE CHANGE THROUGH SUSTAINABLE RANGELAND MANAGEMENT

Herds of goat and sheep move into the different types of rangeland and graze almost all year round. Therefore, they depend quasi-totally on natural ecosystems and are vulnerable to climate change. The direct impact would be severe reduction in both milk and meat production. Mountain tops in both Mount Lebanon and Anti-Lebanon chains as well as the northern Bekaa valley are particularly exposed. The harsh degradation of vegetation cover into these arid and semi-arid zones increased the occurrence of flash floods in the area, with severe damage to farmers. Rangeland resources, which in most cases are communal or public properties, are crucial for the livelihood of the rural communities.

This outcome will ensure the technical support needed for implementing a pilot management plan within the mentioned area, along with two outputs enabling sustainable management of rangeland, increasing the resilience of shepherds with their families and herds to climate extremes, protecting the watersheds from further degradation and reducing flash floods in selected valleys in Baalback-Hermel areas. Communities relying on rangeland production in the three focus areas will be the main beneficiaries. The dissemination of the results of this output

will ensure the adoption of appropriate management plans for rangelands which account 50% of the surface of the country, and ensure fodder for more than 800000 ruminants. Sustainable management of communal rangeland will provide stable revenues for municipalities and increase consequently the resilience of local communities to climate change.

The restoration of 2 degraded watersheds through plantation of forest and fodder species will not only reduce the impact of erosion and flash floods, but also improve rangeland and involve the local communities in watershed management.

Output 3.1: Community-based sustainable rangeland management plan prepared

The selection of the pilot area will be a result of the national fodder resources assessment. During the consultative process among the different parties, a large area including mountain tops of northern Mount Lebanon (Akkar, Danniyeh, Bcharri, Batroun, Jbeil and Keserwan heights) and Anti-Lebanon, with the Bekaa valley (Baalback, Hermel, West Bekaa and Rachaya) is suggested. The surface area is about 3000Km^2 and represents 30% of the total area of the country. Activities will include the assessment of livestock status, animal husbandry and milk storage practices and the needs to improve the current situation towards a more resilient status. Furthermore, an administrative managerial scheme is suggested to the responsible department on rangeland within MoA, namely, the Directorate of Rural Development and Natural Resources (DRDNR), to ensure legislative coherence as well as convergence between the targeted shepherds and the rangeland owners (municipalities, etc.). The technical staff of the DRDNR will be trained to implement sustainable rangeland management plans. The managerial scheme will be elaborated in the light of ensuring the involvement of the local communities in the rangeland management plans, which should result from community-based decisions..

The project will implement in the selected area activities related to enriching pastures with native forage species, capacity building for herders to undertake animal husbandry good practices, monitor herd transhumance and distribution, empower women to produce different dairy products and better milk storage, increase the product added-value and marketing opportunities, and consequently increase the resilience of rural women and households. Such activities would compensate herders for not accessing protected/degraded pastures and would enable monitoring milk production (as an optimal indicator for range and livelihood improvement and assess the impact of climate change). The adoption of a managerial mechanism by DRDNR as well as the local communities, the size of the pilot area and the presence of key actors including the largest livestock of the country and the largest communal rangelands will facilitate up-scaling this output. The recovery of pastures in these rangelands will contribute to carbon sequestration and consequently increase mitigation.

Activities:

- Assessing and selecting the project targeted areas.
- Designing and undertaking a participatory approach with the local users of rangelands and production of local management plans
- Developing rangeland use maps per selected area
- Training local communities and DRDNR staff on the implementation and monitoring of the rangeland management plans.
- Enhancing the capacity of herders and women groups within the selected pilot area on sustainable rangeland management practices.

- Providing on-the-job training on animal husbandry good practices.
- Providing on-the-job training for women on dairy processing and provision of needed equipment (cheese presses, milk storage units, etc.).
- Supporting income diversification for small livestock holders to reduce pressure on rangeland
- Facilitating linkages between local producers and the relevant distribution and market facilities to support the implementation of the rangeland management plans.

Output 3.2: Restored degraded rangeland areas and reduced flood risks (Faara and Nahle valleys)

Degraded rangeland areas on the mountain slopes of watersheds leading to the Bekaa valley have been historically suffering from flash floods. More attention has been given to watersheds in Ras Baalback and Aarssal. Nevertheless, there are 14 remaining valleys which necessitate management of streams to reduce the impact of floods. This output will focus on the rehabilitation of two watersheds (i.e. Faara and Nahle) covering 166 km^2. Activities are not only meant to reduce the impact of floods, but rather restore the vegetation of the degraded upper water-catchments in order to increase water infiltration and reduce surface runoff. This would buffer the adverse effects of climate extremes and enhance coping of the rangeland ecosystem to climate change. A special focus will be given to the multiplication and plantation of native fodder species, including trees, shrubs and annual plants and rehabilitating 2 stations for the production of fodder species (Deir el Ahmar for shrubs and trees and Kfar Dan for annuals). Once the nurseries are producing, plantation efforts within 3 years on at least 2300ha (2000ha restored with fodder species and 300ha with forest species) of degraded rangelands in the selected pilot area will reduce further deterioration of vegetation cover and prevent erosion.
The restoration of vegetation cover, the enrichment with native fodder species, shrubs and trees will enhance carbon sequestration and thus add mitigation to adaptation measures. Since the two nurseries will be rehabilitated, sustained production of seeds and seedlings will enable up-scaling rangeland restoration to larger surface areas.

Activities:

- Elaborating site specific implementation plans, design and BOQ for rangeland restoration and flood risk reduction
- Installation in Faara and Nahle watersheds of 4 hafeers (115,000 m^3), stone check dams (9600 m^3), and gabions (1300 m^3)
- Designing and rehabilitating 2 MoA nurseries (Deir el Ahmar and Kfar Dan) for the production of fodder species.
- Training concerned staff for fodder species identification, harvesting seeds, and multiplication and plantation techniques.
- Harvesting of fodder species seeds for further multiplication in LARI/MoA experimental units and nurseries.
- Protecting degraded rangeland through the issuance of laws and regulations and law enforcement with measures addressing alternative grazing areas for shepherds, following the rangeland management plan resulting from output 3.1
- Reseeding with fodder species (examine the possibility of using medicago, salsola, atriplex, etc) at least 2000 ha for water and soil conservation in the 2 watersheds

- Plantation of tree species (Cupressus sempervirens, Pinus brutia, Quercus calliprinos, Pistacia palaestina)) over at least 1500 ha

OUTCOME 4: Climate index-based insurance initiated, policy influenced and lessons learned and shared through a knowledge management system

This component will support the national ongoing process to initiate climate-based insurance to agriculture in Lebanon led by MoA, influence policy through advocacy activities, and .implement a knowledge management system to capture and disseminate lessons learned throughout the project implementation phase.

Weather stations should enable assessing the risk of the occurrences of extreme adverse climate conditions. The project will pilot climate index-based insurance by undertaking a pre-feasibility assessment, piloting and implementing the system, and supporting its up-scaling at the national level.

The Government of Lebanon is actively preparing a number of national and sectoral policies and strategies aiming at reaching sustainable development and achieving the Millennium Development Goals. Environmental management, including adaptation to climate change, is of high relevance to several strategies and policies.

The project will design tailored awareness and advocacy activities using multiple media and routes to reach out to the different stakeholders. The activities will be targeted to farmers, extension workers, relevant private sector entities, decision makers and public institutions at the national and local levels across Lebanon.

Since Agrical is the first project focusing merely on adaptation to climate change in Lebanon, it is fundamental to ensure proper compilation and dissemination of lessons learned, experiences gained in the field, and knowledge acquired.

Access to good information and knowledge is paramount to the success of processes at the national and local levels. Supporting learning, innovation, and application of what is already known, is fundamental to progress towards more sustainable management of the agricultural sector and climate change adaptation.

The project will design and implement a knowledge management system tied to organizational objectives and is intended to achieve the planned outcomes. The knowledge base comprises: (i) expertise, skills, and research results; (ii) facts and information, reports on project impacts and activities, and other data; (iii) awareness or familiarity gained by experience of a fact or situation acquired through the project.

Output 4.1 Climate index-based insurance initiated

Through this output, Agrical project will be the first to support MoA in initiating and piloting climate index-based insurance in Lebanon. The project will implement this output in very close cooperation with the Ministry of Finance and the private sector including insurance and re-insurance companies. Based on the results of the pre-feasibility study, the project will pilot the system for one index and accordingly will support MoA in up-scaling the system at the national level.

Activities:

- Performing a preliminary assessment of the context and potential to implement climate index-based insurance in Lebanon.
- Undertaking in-field pre-feasibility assessment.
- Performing risk mapping for crop vulnerability.
- Piloting weather index-based insurance.
- Designing and validating weather index-based insurance contracts.
- Developing programme implementation materials and train relevant public institutions and retailers.
- Designing marketing and education for clients and end-users.

Output 4.2 Policy advocacy activities implemented

This output will extend over the life time of the project and will highlight the impact of climate change on natural resources and agricultural development in Lebanon, and the responsibility of the different actors in adapting to climate change impacts through the issuance and implementation of relevant polices, plans, and programmes.

Activities:

- Conducting regular policy advocacy activities throughout the life of the programme, including at relevant national and regional events.
- Organizing a national forum to review and integrate climate risk reduction strategies and measures in the relevant national and regional development plans.
- Supporting mainstreaming of climate risk reduction measures into the policies, regulations and annual regional and national capital budgets.
- Providing technical support to the climate change unit at the Ministry of Environment.

Output 4.3 Knowledge management system established and knowledge management activities implemented

This output focuses on establishing the knowledge management system and ensuring that all the requirements for its effective functioning are put in place.

Activities:

- Designing and establishing a knowledge management system for the project.
- Developing appropriate knowledge products, including photo stories, presentations and briefing notes, etc. for use in policy advocacy activities.
- Disseminating knowledge products, targeting outlets that are relevant for policy makers
- Conducting a study tours to the project areas to enable sharing between stakeholders, farmers, and local communities.
- Producing audio-visual material describing the projects' products and results.
- Ensuring good media coverage for programme activities.

B. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities.

The main expected benefits would consist of increased community resilience and adaptive capacity to climate change in three highly vulnerable focus areas.

Irrigated crops in the project focus areas are mostly high value fruits and vegetables. These crops are marketed by producers for cash purposes and destined to both internal and international markets. In good conditions, they largely contribute to the farmers' cash income. The project focus area includes as well the largest rangeland area of the country with significant livestock of sheep and goat. The predicted climate change scenarios for Lebanon will jeopardize the performance of these crops (yields, quality and therefore selling prices) and small ruminants relying on rangelands. The project aims at supporting local communities in enhancing their adaptive capacity to climate change through:

a. Increasing quantity of reliable water supply through construction of water harvesting structures, irrigation facilities and improved water management. This is considered the key factor contributing to increased productivity.

b. Enhancing capacity for assessing vulnerability, evaluating the foreseen impact and providing adaptation means by that delivering several techniques including early warning systems, integrated production and protection of crops, introducing adapted crop varieties and risk-coping agriculture techniques, as well as assessing the carrying capacity of rangeland.

c. Increasing the resilience of shepherds and herds to climate extremes through implementing rangeland sustainable management plan, ii) training herders on good animal husbandry practices and dairy processing, iii) reducing flash floods through the installation of suitable infrastructure, iv) protecting the watersheds from further degradation, through vegetation cover restoration by planting fodder species shrubs and trees and conducting protective measures.

d. Initiating climate index insurance scheme in Lebanon by identifying the most appropriate climate index for the focus areas, and setting a sustainable financial mechanism for the system.

e. Influencing policy through advocacy activities and implementing a knowledge management system to capture and disseminate lessons learned throughout the project.

Other benefits such as institutional strengthening have are substantial positive impact on the long run. In particular, the local stakeholders participating in the project would see their technical skills, knowledge, and capacities improved. At another level, the Ministry of Agriculture, Green Plan, and LARI would see their capacities enhanced, their respective field presence and partnership strengthened and their procedures improved.

Summary of key benefits of the proposed programme

Benefits	Project	Baseline
Economic benefits	- More than 1000 exploitation/household are expected to benefit from outcome 1. The irrigated area will increase (200ha) which will result in increased production and generated income for households. The average irrigated vegetable or fruit orchard produces 30t/ha, which means an increase by more than 3750t of crop products. - Reduced pumping and increasing the resilience of greenhouse product growers will avoid sea intrusion and water salinity in coastal areas and sustain greenhouse production. - The new SSGs will enhance the crops' quality and productivity of greenhouses to become GAP certified. This will strengthen the exporting potential and thus enhance the economic situation in the target areas. - Drip irrigation will reduce the cost of the production as labor for weed control and reduce water consumption. - The overall reduction of inputs (water, fertilizers, herbicides, pesticides) from the enhanced early warning system, integrated pest management, water management, and other risk-coping practices will reduce the cost of production by more than 30%. Cereal and legume growers, olive and fruit tree growers and vegetable growers in northern Bekaa, Akkar, Dannieh and southern Lebanon will benefit from outcome 2. Yields are preserved, and consequently income is increased.	- Farmers will increase water harvesting from hill lakes, however this technique is limited to few mountainous areas. Plant water demand will be increasing under future climate, along with the population demand while water quantity and quality are adversely affected. Excessive pumping into a lowered water table will increase the cost of production. Limited water resources will affect irrigated areas, and consequently production is decreased. - The wooden arched greenhouses do not stand the adverse climate conditions and have lower productivity compared to the SSGs. - Farmers might invest in drip irrigation systems as well. However, if water distribution and irrigation programs are not adjusted to meet plant demand variability with climate, crops will face water stress and their yields will decrease. - Without early warning system and index insurance, farmers will be always exposed to climate adverse effects, which can often result into dramatic reduction in their income. Farmers are driven to invest more into their capital to sustain their exploitation, on the expense of their livelihood by more than 20%. - Investing without taking into consideration adaptation measures that are suggested will leave farmers into the vicious circle of poverty. More inputs are used

	- The number of benefiting municipalities, shepherds and households is around 1000, over an area of 3000km^2. 300,000 heads producing more than 20,000tonsof milk will benefit from this output which will tend to optimize the production under climate future scenarios, increase its productivity and its added value through increasing dairy processing by 25%; Activities of outcome 3 will sustain the income of shepherds under climate uncertainty and reduce flood risk in 2 valleys (166 km^2) in a sustainable manner. - The necessary labor for conducting watershed rehabilitation and protection from floods will be pooled from the region itself (Faara and Nahle), which would also increase job opportunities and income for the population. The Government, through the Higher Relief Commission, pays around USD 2.5 Million as compensation for local communities resulting from every flood occurrence in the focus areas. The project activities to reduce the impact of floods will help reduce this cost and allow for directing this funding to support developmental projects. - The number of beneficiaries of index insurance is dependent on the selected area/crop and climate index. However, a sustainable financial mechanism will enable the widening of this service to farmers all over Lebanon. The government will have a reduction of its budget allocation for disaster relief. Index insurance is always an investment opportunity for insurance companies.	(chemicals, seedlings, etc.) nevertheless if they are not fit to climate change, the cost of the production will be higher, and the yields lower, which will double affect the income of farmers (cost of production could increase more than 20%). - Without a national fodder resource assessment coupled with sustainable rangeland management, shepherds will remain under *status quo*, leaving them subject to climate impact on their milk and meat production, and increasing their dependency on imported fodder, which will directly affect their income. Continuous degradation of the exhausted rangeland will result into increasing losses in production and animal lives (more than 300,000 heads affected). - The absence of flood risk management in prone valleys will keep on affecting aquaculture exploitations in Assi River, and consequently affecting the livelihood of many families. - The state will keep allocating disaster relief budgets for floods and climate impacts with an increasing trend.

Social benefits	- MOA and LARI staff will benefit from outcomes 2 and 3 to better understand agriculture crops and rangeland performance under future climate and familiarize them with risk coping agriculture practices and sustainable rangeland management as tools to cope with climate change. They will also be trained to identify, collect, propagate and disseminate fodder species. MOA and LARI will be empowered with the necessary infrastructure to achieve outcomes 2 and 3. - Better linkage and collaboration between the different parties is always a gain. - Farmers are more aware of climate change and its impact on their resources, income and livelihood. Their resilience and readiness to climate uncertainty are increased.	- The increased demand on water and rangeland limited resources will culminate conflicts among different users within the agriculture sector, and with the different sectors. - Human settlements around flood prone areas will be affected, and population will tend to migrate to urban areas and abandon agriculture lands. - Social instability and insecurity will amplify in the poor suburbs which are not ready to absorb additional rural migrants. - Reduced agriculture (and range) production will increase the dependence on food imports, and amplify the debt of the country and threaten food security.
Environmental benefits	- Improved water harvesting will reduce sea intrusion and water salinity in coastal areas; reduce losses in surface runoff and erosion mainly on agriculture roads. - Improved water efficient use through drip irrigation will reduce weed dissemination and consequently reduce weed control and GHG emissions. - Early warning system coupled with IPM, and risk-coping agriculture practices will decrease chemical use, soil and water pollution, preserve soil fertility and conserve soil and water. No-till practice will reduce carbon emission from agriculture soils. - Rangeland sustainable management will protect the vegetation from further degradation, as overgrazing is minimized. Consequently the soil is protected from erosion by the	- Without the project, the limited water and range resources will directly affect the natural ecosystems. A lower water table with increase sea intrusion, will negatively impact water quality and increase soil pollution. Both rangeland and fresh water ecosystems will suffer from further loss in biodiversity. Land degradation due to overgrazing will accelerate erosion and desertification. Flood risk which is already present will be amplified as the vegetation cover is depleted, with more damages to natural ecosystems and rural livelihood. -

	enhanced vegetation cover, and water infiltration is increased. Appropriate management of herds in pastures will protect the biodiversity of rangeland species as well. Land degradation, erosion and floods are reduced, namely in the valleys where watershed rehabilitation will be implemented(in the 2 watersheds covering 166 km^2). - Rehabilitation of the vegetation cover through tree and shrub plantation (125,000seedling/year over 300ha) will enhance carbon sequestration as well.	

C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

Investments in an area/sector, which is significantly affected by land degradation and adverse climate change effects, through innovative techniques and well-targeted activities would lead to increased cost-effectiveness. Reduced cost in relation to community organization and engagement (due to the blended nature of the operation) will further reduce the share of "soft activities", leading to stronger investment and higher return. Cost-effectiveness will be further analyzed during project inception and implementation when actual and updated cost figures will be collected.

The proposed adaptation techniques to be implemented by the project, namely: water harvesting and irrigation, rangeland management, flood risk reduction, and agricultural adaptation techniques are all proven to be effective in enhancing resilience to climate change, enhancing agricultural productivity, as well as enhancing the sustainable use of natural resources. Thus the investments have relatively secured results and the fund is not being used on testing technologies with unknown effectiveness.

The project is mainly investment-oriented with a view to maximize the impact in a cost-effective manner. Around half of the programme budget (50%) is allocated for the implementation of Outcomes 1 and 3 that are dedicated to field implementation of needed infrastructure, material, and services and will directly benefit the targeted farmers and local communities. Around 27% of the budget allocated for Outcomes 2 and 4 dedicated for enhancing the technical capacities and know how on adaptation, and providing soft infrastructure and tools to relevant national and local institutions to enable them to provide the needed services to farmers. Around 6% of the project budget is dedicated to policy advocacy and knowledge management to ensure proper dissemination and potential replication of the project results and experiences gained. Further analysis of the cost-effectiveness of rainwater harvesting is presented below.

The proposed outcomes and outputs have been developed to address climate-related agricultural priorities that are not only the most urgent and most pressing, but which can also be

addressed through a bottom-up approach that generates lessons and case studies which can be used to develop a more systemic and systematic approach for a coherent national response to issues on the climate change-agriculture-food security interface. This will be promoted through the knowledge management and policy feedback loop components of the programme.

Project implementation will heavily rely on existing Government structures. This approach is believed to be particularly cost-effective, as it reduces the need for higher costs that would need to be spent on consultant-driven implementation, and it builds the capacity of the government system for ongoing and more widespread implementation of similar climate-sensitive development. The size of the project management unit (PMU) has been carefully considered, in order to keep costs down - at around 9.5% of the project budget - while still ensuring effective management of the project. The PMU staff will be selected from national experts and existing government staff. Alternative implementation arrangements were considered, including a higher number of programme staff and national and international consultants in the design, but this implementation option was not further elaborated as it carries higher short-term costs and will generate less long-term sustainability.

The cost effectiveness of the project components is further elaborated in the table below.

OUTCOME 1	**Cost ($)**	**Number of beneficiaries**	**Losses averted/Benefits generated**	**Alternatives to Project**
Output 1.1: Rainwater harvested from greenhouse roof tops	662,500	135 poor farmer families and 200 laborer families based on a total area of 5ha greenhouse cover. These exploitations can upgrade their storage capacity to cover more area, and the technology will be expanded by the Green Plan once the technology is spread amongst farmers.	The system will ensure 25000 m^3 annually. The stored water will be used in late summer/autumn, in period where the water table is low and exposed to salinity. Soil and groundwater salinity are minimized and agriculture is sustained. Crop resilience to climate change is enhanced. The SSG will enhance crop productivity and quality, support IPP practices, and reduce losses due to emerging diseases and adverse climatic conditions. Based on a preliminary comparative financial study between arched and SSG greenhouses, within 22 months the famer is able to compensate	-The recharge of the aquifers is unreasonable and requires more fresh water amounts that cannot be easily supplied in the dry season. - Desalinization of sea water is not a familiar technology for Lebanon and requires an energy source and a water distribution system which require higher investments and increases the cost of production. - Reuse of treated wastewater is feasible,

			the extra initial investment cost paid to install SSGs.	however no stations are functional in the region, and the water distribution system is lacking. - Most farmers still use arched greenhouses with limited access to SSG.
Output 1.2: Rainwater harvested from roads	538,300	At least 250 farmers Moreover, this system will increase the expertise of the Green Plan in designing and implementing agriculture roads in a manner to cope with climate change and increase crop adaptation.	About 50000m^3 of water is collected. This amount is enough to irrigate 10ha. Enabling irrigation in rain-fed cropping will multiply the production by 3 fold at least. The investment return is very high as roads and drainage/storage system has a long life, and the generated income from productivity increase is important.	- Farmers continue with rain fed agriculture, however yields are much lower, and crops more vulnerable to climate change.
Output 1.3: Water efficient irrigation systems deployed	426,000	More than 400 farmers benefit to deploy efficient irrigation systems to benefit from hill lakes	The harvested water will enable the irrigation of 150ha. Efficient irrigation will increase the irrigated surface, reduce water losses, and reduce chemical uses (herbicides, fertilizers) and labor. Yields are homogeneous and expected to increase by 15% when compared to surface irrigation. The cost of production will be decreased by 20% at least. Adapting irrigation schedule to climate and plant	- Farmers can still rely on surface irrigation; this will increase water and nutrient losses, weeds infestation, labor for land preparation, weed control and for irrigation. The cost of production is higher. The use of chemicals and machinery for

			demand will increase the resilience to climate change.	plowing will increase GHG emissions.
OUTCOME 2	**Cost ($)**	**Number of beneficiaries**	**Losses averted/Benefits generated**	**Alternatives to Project**
Output 2.1: Enhanced early warning system to farmers through improved existing system	190,000	All farmers of Lebanon can benefit from the system, at different levels according to the provided service (water management, IPM, index insurance, etc.). The research community, decision makers, technicians and insurance companies are also benefiting from the system.	The losses averted are those related to the impact of adverse climate effects on crops (i.e. frost, drought, etc.) that can be avoided through early warning. Moreover, the system enabling the prediction of pest and disease infestation as well as water demand, will minimize the damages on crops, and increase the resilience of farmers to climate change. The system is also a mean to reduce the cost of compensations paid to farmers subject to climate adverse every year.	Farmers producing under uncertainty will be under continuous climatic pressure and pest outbreaks, with an increasing trend with future climate scenarios. Losses will be amplified; systematic spraying of chemicals will increase the cost of production and pollution. Budget allocated for relief will be amplifying the burden of debt of the state.
Output2.2:Expanded farmer outreach and ensured financial and management sustainability of the warning system	100,000	All framers in the project focus areas, LARI, Research Institutes, , NGOs and Insurance companies	The efficiency of the system depends on the successful outreach to farmers. The activities under this outcome will ensure the maintenance and proper management of the early warning system. These activities will ensure the budget return and financial sustainability.	The past and future investments in weather stations will not prove useful to farmer, LARI, and MOA. The farmers will be re-exposed to climate adverse and their resilience will be weakened.
Output 2.3: Capacity building on	250,000	Cereals and legume	Farmers will be able to increase their yields	- Farmers will continue

adaptation techniques for vulnerable field crops enhanced		growers in the three focus areas. LARI staff, MOA and MOE Technicians.	under current and future climate (up to 15% increase), rationalize their inputs (water, fertilizers), save scarce water resources, minimize energy and labor for land preparation (reduction of cost of production by 350$/ha). IPM practices will reduce spraying, pollution hazards, and the cost of production as well. All these measures will increase the adaptation capacity. Farmers' income will be preserved if not increased.	growing the same way, thus facing more climate negative impact on yields and product quality. The cost of production will increase due to improper agriculture practices. Farmers' income will be reduced. - Farmers will shift to other crops that require more investments, and rely more on inputs and natural resources exploitation, leading to unsustainable agriculture cropping pattern.
Output 2.4: Guidelines and recommendations on agricultural adaptation techniques for vulnerable areas developed	400,000	Vegetable, olive, and fruit growers of the three focus areas. LARI staff, MOA and NGOs technicians will take advantage to increase their knowledge on the impact of climate change and adaptation tools for the agriculture	Farmers will be acquainted to new technologies enabling them to cope with climate change, and preserve their production. These technologies are also tools to minimize inputs (water, fertilizers, herbicides and pesticides) and thus reduce the cost of production up to 30%. Products will be less subject to climate impacts, and to pesticide residues, which increases their	- Farmers may adopt organic farming. However, this might result in technical problems related to yield reduction, insect or disease outbreaks, and higher cost of production, especially with the cost required for certification. - Farmers will

		sector. This will increase the readiness to climate change.	competitiveness on both local and international market.	rely on intensive agriculture, which requires more inputs, more investments and result in a higher cost of production. The yield will not necessarily increase under future climate scenarios, if proper practices and adaptation measures are not deployed.
Output 2.5: National fodder resource assessment prepared	860,000	All shepherds of Lebanon, municipalities or communities owning rangeland, the DRDNR and LARI staff	Rangeland covers more than 50% of the country. A first assessment will enable the deployment of management plans. Around 800,000 heads of goat and sheep depend on rangeland and the livelihood of the shepherds is related to the grazing service provided by these natural ecosystems that are vulnerable to climate change.	Without assessing the fodder, and consequently the carrying capacity of rangeland, overgrazing will result in rangeland degradation. The climate trend will accelerate the depletion of these resources, loss of biodiversity, erosion and desertification.
OUTCOME 3.	**Cost ($)**	**Number of beneficiaries**	**Losses averted/Benefits generated**	**Alternatives to Project**
Output 3.1: Community-based sustainable rangeland management plan prepared	580,000	1000 households will benefit from this output, the municipalities managing communal	More than 300,000 heads of goat and sheep are likely to be found in the pilot area which is situated within the most vulnerable area to climate change and	- Farmers will either reduce the number of herds, or increase their dependency on imported forage by at

		rangelands, DRDNR.	desertification. Shepherds in this area along with land owners will be able to implement under the assistance of DRNR sustainable management practices which would sustain both natural resources and livelihood of the households. The processing, storing and marketing of dairy products will increase the income of households, empower women. The equilibrium between fodder from natural resources and imported forage will be optimal. The natural ecosystem is capable to cope with climate rangelands are less subject to overgrazing, vegetation cover is able to sustain and protect the soil from erosion. The DRNR laws are reviewed and ensure a proper enabling environment for exploiting rangeland under a win-win situation for shepherds and land owners. Revenues generated for both parties are preserved.	least 30% under future scenarios, with increasing fodder prices. The imported fodder annually will not be cost-effective, as the rangeland will continue to degrade and dairy products increasing prices will not cover the losses in profits. - The payment of compensations and subsidies for affected households or for shepherds to withdraw from a rangeland for protection is not a sustainable alternative. - The change in land use of rangeland into forests, quarries or agriculture land will result in a heavier environmental impact, leading to increasing pressure on the remaining pastures.
Output 3.2: Restored degraded rangeland areas and reduced flood risks	1,970,000	Communities of Faara and Nahleh, shepherds,	The infrastructure cost will enable reduce flash flood damages which occur on an	- The construction of bigger dams requires more

(Faara and Nahle valleys)		aquaculture exploitations along Assi River and farmers affected by floods. 300ha of degraded land restored through plantation of shrubs and tree seedlings and enrichment with fodder species.	average every 4 years (Faara) or 12 years (Nahle). The damage to the agriculture areas and to the aquaculture exploitations caused by flash floods will be minimized. Farmers' resilience and livelihood will be preserved, and the disaster relief compensations saved. The rehabilitation of the watershed will increase the cost-effectiveness and efficiency of the deployed infrastructure. Moreover, the ecosystem will be restored, and will provide more services for the communities.	investment. - The payment of compensations for affected communities will not resolve the problem on the long run. With future climate, floods are expected to be more frequent and more damaging as the volume of the carried debris and erosion will be amplified. The life of the infrastructure will be reduced.

Preliminary analysis of the cost-effectiveness of main project activities

The data is extracted from the Technology Needs Assessment; Barrier Analysis Report prepared by the Ministry of Environment and UNDP.

1- Rainwater harvesting from roads (RWHR)

The benefits from RWHR are: i) increasing farmers' revenue through additional irrigated agriculture surface, ii) increased agriculture production and hence increased food security, iii) increased resilience to climate change and iv) reduced public expenditure on road damage restoration.

Design parameters for RWHR:

- Road slope > 5%
- Road length: 1000m
- Road width: 6m
- Rainfall: 0.8m/year
- Additional water coming from upstream >50%
- Losses in infiltration : 20%
- Losses in evaporation during storage: 15%
- Water available for irrigation: 4900m^3

The expected costs per road are:

- Road design for RWH (drainage system): 10$/m
- Sieves, filters and pumps: 1500$
- Digging earth for storage or decantation: 8$/$m^3$
- Vehicle for water distribution: 40000$
- Annual maintenance of system: 250$
- Annual cost for water distribution: 150$

The stored amount will produce 20t of agriculture products, with an average value of 800$/t

RWHR Adaptation Benefits (US Dollars):

Year	Benefits without adaptation	Benefits with adaptation	Adaptation benefits, total	Adaptation costs, total	Net adaptation benefits	Discounted net adaptation benefits (4%)
2015	-	16000	16000	144060	-128060	-123135
2016	-	16000	16000	400	15400	15000
2017	-	16000	16000	400	15400	15000
2018	-	16000	16000	400	15400	15000
2019	-	16000	16000	400	15400	15000
2020	-	16000	16000	400	15400	15000
2021	-	16000	16000	400	15400	15000
2022	-	16000	16000	400	15400	15000
2023	-	16000	16000	400	15400	15000
2024	-	16000	16000	400	15400	15000
Net Present Value						**11865**

2. Rainwater harvesting from greenhouse roof tops (RWHG)

Design Parameters and benefits of RWHG

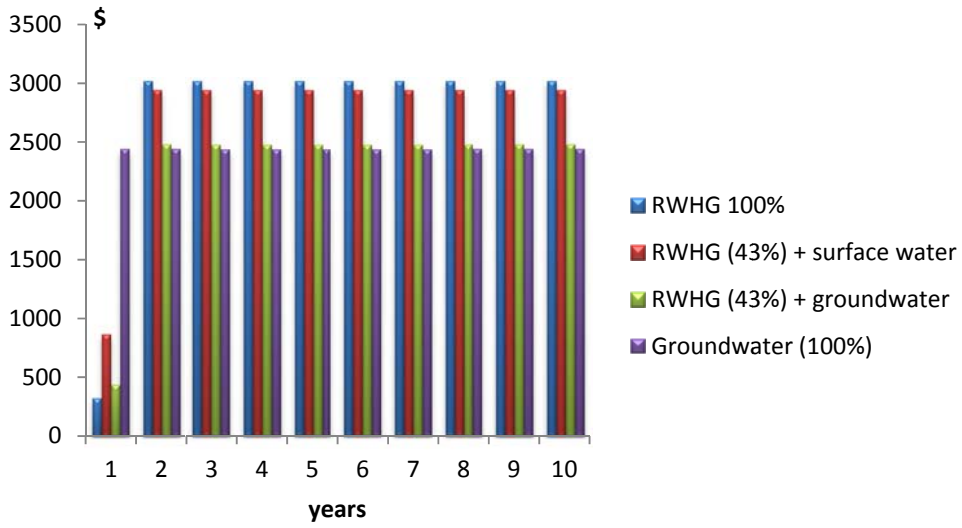
- An annual average rainfall of 600mm are necessary to cover from RWHG, water demand for the crops inside a greenhouse.
- A storage unit can be used for irrigation before being totally filled, assuming that a storage unit could be filled twice a year.
- The annual demand of a standard greenhouse of 400m^2 is between 360 and 550m^3 depending on the crop type and microclimatic conditions.
- The collected water from a standard greenhouse is 240m^3 for an area with average precipitations of 600mm/year, up to 400m^3 in areas having 1000mm/year of rainfall.
- The storage unit of a greenhouse should have a minimal capacity of 125m^3 (half of the annual water demand) in exploitations with limited land available.
- Cost of storage unit is 8$/$m^3$ in earth reservoirs. The economy of scale is not accounted.
- Cost of drainage system (30$/m) or 1200$/greenhouse. This can be reduced by half in “Chappelle” system.
- Current maximal cost of land rental (value of area dedicated for earth reservoir): 1$/$m^2$/year. The economy of scale is not accounted.

- Pumping cost is 1.833$/$m^3$ at 500m a.s.l, on a deep water table.
- In this exercise we consider that the price is the same even next to sea level where water table is shallow, in order to value the poor quality of water (salinity).
- Surface water annual fees in a common irrigation scheme is 100$/year. We assume that this water is rarely available all year round due to several reasons (water shortage, leakage problems, water pollution, etc.).
- A greenhouse produces 4t of crops, sold at 800$/t, generating a revenue of 3200$/ha/year.

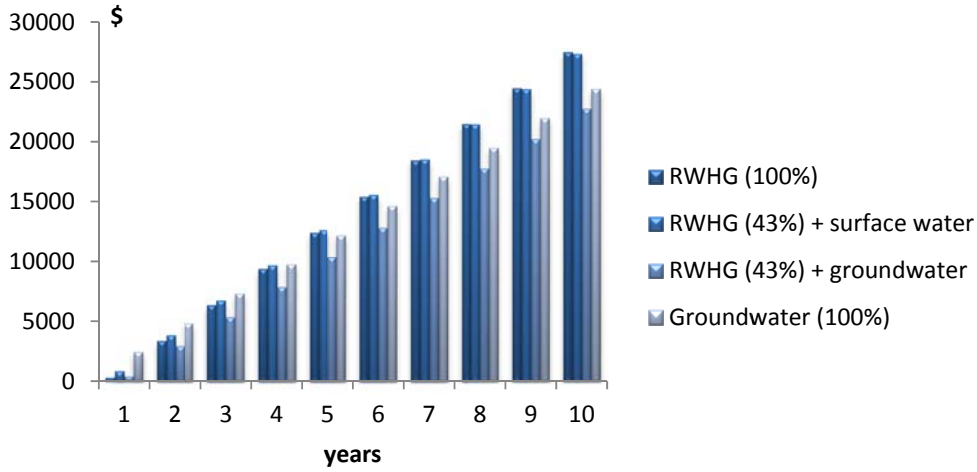
The deducted benefits are calculated by deducing only the cost of water from the revenue (3200$/year/greenhouse). Under all scenarios, RWHG is the most beneficial to farmers, except if the farmer has a sustainable surface water of a standard quality all year round. Even if RWHG does not cover all the water demand, 43% of the water demand will keep the system cost-effective

In addition, farmers will be more autonomous in terms of water availability and rely less on other fluctuating resources, which would increase their resilience and reduces conflict risks among water users. Accordingly, farmers will put more efforts in preserving water resources that will enable them to keep producing, and consequently sustain their revenue and food security.

Discounted benefits of RWHG over a period of 10 years for different water source scenarios:



Cumulative discounted benefits of RWHG over a period of 10 years from different water source scenarios:



D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

Lebanon has signed the United Nations Framework Convention on Climate Change (UNFCCC) in June 1992and has ratified the convention on August 11th 1994 by virtue of Law 359, and acceded to the Kyoto Protocol on November 13th 2006 by virtue of Law 738. Moreover,

Lebanon has ratified the UNCBD in 1993, and the UNCCD three years later, in 1996. While ratification demonstrates a commitment to international legislation, the Government of Lebanon is striving to apply real measures for fulfilling the goals set in the Conventions. In spite of that, Lebanon still needs additional financial, technical and human means to implement all three Conventions.

Lebanon is eligible to receive funding from the Adaptation Fund as a developing country party to the Kyoto Protocol and is vulnerable to the adverse effects of climate change, due to its arid and semi-arid environment, relatively small geographic area, propensity to desertification, its low-lying coastal area and fragile mountain ecosystem, and its existing high levels of vulnerability to climate variability.

The Government is contributing to Climate Change negotiations at the international level and is promoting adaptation and mitigation measures at the national level to the best extent possible. The Ministry of Environment has prepared the Second National Communication under UNFCCC that identified the agriculture sector as heavily affected by the predicted impacts of climate change. In addition, a large proportion of the rural population, particularly the poor, depend on agriculture and livestock for their livelihood.

Accordingly, the Government is committed to promote and implement all measures that would increase the resilience of agriculture to climate change, focusing on water as a key natural resource for agricultural productivity and development in the country.

In addition to its direct contribution directly to the fulfillment of the priorities and recommendations set out set out in Lebanon‘s SNC to UNFCCC, the project is fully aligned with the Government of Lebanon objectives of rural poverty alleviation; and its priorities for water resources development and management, introduction of sustainable agricultural support services and infrastructure, and preserving natural resources, as expressed on the Ministerial Statement of the current government.

Agriculture Strategy. In 2004, the MOA prepared an Agriculture Strategy with the assistance of the “Support to Agricultural Census Project” implemented by FAO and financed by the World Bank. The Agriculture Strategy document identifies the following three main constraints to the development of agriculture in Lebanon in accordance with its potential: lack of sufficient mobilization of water, lack of appropriate agricultural extension and rural advisory services, and deficiencies in the prevailing marketing systems. The Agriculture Strategy defines accordingly seven main strategic directions :(i) increasing the mobilization of water resources and improving water efficiency;(ii) improving land use and management, and soil conservation; (iii) disseminating improved farm technology (varieties, cultivation practices, disease control);(iv) improving the efficiency of commodity chains; (v) taking into account the spatial dimension of agriculture and rural development, with support to local development initiatives; (vi) renovating the public and private institutional setup; and (vii) promoting stakeholder participation and diversification of rural activities.

The MOA is currently reviewing its strategy and plans to address the various constraints facing the agriculture sector, not only from an economic perspective but also from the perspective of bringing about social balance and poverty reduction. The EU and the FAO/Italian Cooperation are supporting this effort. IFAD is contributing to the capacity building of the MOA for pro-poor and gender-focused update of the Lebanese agricultural development strategy through a small grant.

The project also supports the implementation of the United Nations Development Assistance Framework 2010-2014 (UNDAF) by complementing planned programmes under rural development, environment and agriculture pillars.

IFAD Country Strategy and Opportunities Paper (COSOP) for Lebanon (2000) has identified five main strategic thrusts for the country programme: (i) promotion of on-farm and off-farm enterprise development; (ii) reduction of production costs through investments in new technology, use of high yielding varieties and improved water use efficiency;(iii) increase in the value added of agricultural products; (iv) promotion of local associations and grassroots organizations, mainly credit cooperatives; and(v) empowerment of the rural women. The objectives of the COSOP(2000) remain valid today although higher priority is now placed on improved water resources management and access to capital, by the government and the farmers, respectively.

E. Describe how the project / programme meets relevant national technical standards, where applicable.

Relevant national technical standards required by the Government of Lebanon, including environmental impact assessments, regulations that guide construction and infrastructure development, water related regulations, land management and land use regulations, and agricultural codes and guidelines will be taken into account. In addition, the standard quality guidelines of MOA, GP and LARI will be applied.

Moreover, all IFAD supported projects are appraised before approval. During appraisal, appropriate experts and stakeholders ensure that the project has been designed with a clear focus on agreed results. The appraisal is conducted through the formal meeting of the Quality Evaluation Committee established by IFAD. The committee members are independent in that they should not have participated in the formulation of the project and should have no vested interest in the approval of the project. Appraisal is based on a detailed quality programming checklist which ensures, amongst other issues, that necessary safeguards have been addressed and incorporated into the project design.

F. Describe if there is duplication of project / programme with other funding sources, if any.

IFAD has designed and co-financed, along with OFID and the Government of Lebanon, the “Hilly Areas Sustainable Agricultural Development” (HASAD) Project that is currently under implementation with the Ministry of Agriculture. The project targets priority arid and semi-arid areas with high poverty levels where local communities depend primarily on agriculture for their livelihoods. HASAD aims at achieving a sustainable increase in agriculture productivity and incomes by:

a) Improving water and soil management in rain-fed areas through participatory development of small and medium-scale water harvesting infrastructure, together with soil conservation works.

b) Improving agricultural production and market linkages for small farmers through the provision of technical support services.

c) Strengthening the capacities of the implementing agencies and partners.

In spite of the large scope of work of HASAD project, additional technical and financial resources are needed to complement the project activities by adding more emphasis on adaptation measures needed in the target areas and at the national level. The proposed AgriCal project will complement HASAD activities as follows:

- With regards to water harvesting, HASAD project will only use hilly lakes for water harvesting and provide the main irrigation canal in some areas to link the lakes to the farms at the farm gate level. AgriCal project will complement this component of HASAD by providing on-farm water efficient irrigation systems and training on their installation and use. Previous experiences with hilly lakes in Lebanon showed that farmers are not using efficiently the existing lakes as they were not provided with the appropriate on-farm irrigation systems. Accordingly, AgriCal will ensure that the hilly lakes built by HASAD will be used by the targeted farmers. In addition, AgriCal will introduce other means for water harvesting including greenhouses and roads.

- With regards to the provision of technical support services, HASAD will establish Farmer Service Centers that will provide specialized services to farmers by enhancing the traditional extension services of MOA and emphasizing on marketing issues. AgriCal will complement this component by adding the Climate Change dimension to these services through the provision of technical support and demonstration of the identified climate change adaptation techniques. In addition, HASAD does not cover rangeland management, early warning systems, climate index insurance.

- At the policy level, AgriCal will also support the efforts of the Ministry of Agriculture, the Ministry of Environment and other national stakeholders in advancing climate change adaptation priorities in the agriculture sector whereas HASAD policy work does not cover this aspect. AgriCal's work on policy and knowledge management will add the climate change dimension and provide additional means to implement HASAD's policy recommendations and lessons learnt.

Links with Complementary Projects

In addition to IFAD HASAD project, this proposed project will complement with other projects, namely:

- A FAO supported project (TCP/LEB/3002) assisting MOA to strengthen and build the capacity of its extension services and to introduce an extension strategy based on Private-Public-Partnership (PPP);

  AgriCal will complement this project by introducing the climate change adaptation techniques, experiences, and knowledge to the extension strategy.

- The Improved Production and Marketing Capacities of the Lebanese Agricultural Products (PMCLAP) Project with funding from the Italian Cooperation Office (ICO) to increase the quantity of exportable fresh agricultural produce through training within the whole value

chain including farmers, traders and exporters with emphasis on the role of MOA in the process;

AgriCal will complement this project by enhancing the potential of the export of some crops by enhancing the production in greenhouses, IPP practices, and providing early warning advice to farmers so that they do not lose their crops planned for export.

- The UNDP project on Flood Risks Management and Water Harvesting for Livelihood Recovery in Baalback-Hermel (Phase I & II) funded by the Lebanon Recovery Fund. The project aims at assisting the Government of Lebanon in its recovery efforts in the conflict-affected and desertification-prone region of Baalback – El Hermel through better land management practices, namely: flood risk reduction, restoration of vegetation cover and improved availability of irrigation water needed to increase crop productivity and improve standards of living;

  The experiences gained from the above-mentioned project will be taken into account while designing the relevant activities of AgriCal. AgriCal will cover two additional watershed that not covered by this or any other planned project. will complement this project by

- The FAO Recovery and Rehabilitation of the Dairy Sector in Bekaa Valley and Hermel-Akkar Uplands project funded by the Lebanon Recovery Fund. The project is aiming to bring urgent assistance to dairy sub-sector with emphasis on strengthening the capacity of milk production of poor dairy smallholders, where their dairying is threatened by low price for milk marketing and soaring feed prices with increasing cost of milk production;

  The FAO project targets dairy sector farmers that raise livestock in their farms. AgriCal project will target shepherds depending on rangelands to raise their livestock. Synergies will be built between the two projects in relation to enhancing the quality and market of milk and dairy products.

- EU programme for Support of Local Development in North Lebanon with two strategic objectives: improvement of competitiveness of agricultural sector and conservation and valorization of environmental assets of the region.

  AgriCal will complement this project by working on geographic areas that are not covered by this project, and by adding the climate change dimension to its activities.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

The transfer of knowledge generated through the project is crucial since AgriCal will be the first climate change adaptation project targeting the agricultural sector in Lebanon. The knowledge will include adaptation techniques at the farm level, best practices, early warning information, sound sustainable agricultural practices, climate index insurance, and other policy recommendations and technical guidelines produced by the project.

The various trainings and knowledge generated from all project components will provide an integrated package for beneficiaries to guide them in improving agricultural resilience to climate change and productivity of their products.

The experiences of AgriCal will be documented and shared with all development cooperation partners as well as government institutions and local NGOs, Municipalities, and cooperatives. The M&E Knowledge Management Officer will be responsible for knowledge management and communication responsibilities in the PMU. The compilation and dissemination of project information will also be facilitated by the participation of IFAD in advising on, and backing up the project implementation. The IFAD Country Programme Manager will also be involved in sharing experiences of the AgriCal project through the various Governmental, Donor Coordination, UN and other organization functions. IFAD is a member of the United Nations Country Team (UNCT) and has taken part in the development of the United Nations Development Assistance Framework (UNDAF) that will monitor collectively the outputs and outcome of UN development efforts, the AgriCal project will be incorporated in future analysis and coordination functions of the UNCT.

Regional knowledge networking

The project would be directly involved in the various supported IFAD regional initiatives which includes: (i) the regional network 'Knowledge Access in Rural Inter-Connected Areas' (KARIANET) that serves to link all ongoing projects to share knowledge and experiences in order to increase effectiveness of the project; (ii) the Capacity Building in Managing for Results and Impact (CaMaRI) launched recently to enhance capacity of monitoring and evaluation; and (iii) the ongoing relevant IFAD projects in the region.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation.

In response to the request from the Government of Lebanon (GOL)'s Ministry of Agriculture (MOA), IFAD is resuming its financing of rural development projects in Lebanon. A draft project brief was developed by IFAD for an adaptation project in the agricultural sector in Lebanon based on consultations with MOA. This original project brief was shared and discussed with the main Government institutions. Accordingly the project brief has been developed into a concept note refined to ensure that the project responds to the priorities and needs of the country and the focus areas to respond to climate change by carrying out relevant adaptation activities.

Individual meetings were held with the Ministry of Agriculture and its relevant departments, the Ministry of Environment and its Climate Change Unit, the Green Plan and LARI.

Given that Lebanon currently lacks a national climate change coordinating committee, it was necessary to approach key stakeholders individually and not through an overarching institutional arrangement. Nevertheless, the Ministry of Environment as UNFCCC Focal Point played a key role in providing initial guidance for the project formulation team.

As the executing entity for the proposed project, the Ministry of Agriculture is a primary stakeholder and is playing an important role in guiding the development of the project document.

A national consultation workshop was organized in February 2012 where key stakeholders were provided with the draft project proposal, and their inputs on specific elements of the project were integrated into the final draft. (Annex 1)

Consultations at the local level have also been conducted in the three geographical areas where the project will be operating. These consultations mainly included the farmers' groups to identify their main challenges, their needs and type of technical support to be provided by the project partners (IFAD, MOA, Green Plan and LARI). The support efforts needed for them to better adapt to climate change were also identified. This needs assessment was captured by AgriCAL where the needed support fell within the scope of the project, and otherwise was taken up by the partners for the inclusion in their development activities. In addition, within the UNDP TNA Project, stakeholders and farmers at the local level were consulted to identify the most relevant adaptation techniques required to be promoted and implemented in the rural agricultural areas. The result of this survey was also captured, and was the basis for the selection of the technologies selected by AgriCAL. The assessment provided a list of measures for adaptation as follow:

For agriculture: conservation agriculture, selection of adapted varieties and rootstocks, good agriculture practices, integrated pest management, integrated production in greenhouses, early warning systems and index insurance.

For water: rainwater harvesting from hill lakes, rainwater harvesting from roads, rainwater harvesting from greenhouse tops, soilless culture, early warning system through snowpack monitoring, water efficient use irrigation systems, water user association and reuse of treated wastewater.

During a validation workshop was held in January 2012, 3 technologies per sector were prioritized. The selected technologies or measures for adaptation were: i) rainwater harvesting from greenhouse tops, ii) rainwater harvesting from roads and iii) water users association, for water sector. As for agriculture, the prioritized technologies were: i) conservation agriculture, ii) selection of adapted varieties and rootstocks and iii) good agriculture practices.

Green Plan, which is responsible for the implementation of component 1 of the AgriCAL project, has adopted the two measures related to water harvesting, and therefore these were included in the activities that will be undertaken.

LARI, which adopted a series of measures including: conservation agriculture, selection of adapted varieties and cultivars, early warning system linked to integrated pest management and irrigation water monitoring, has validated them through a consultation workshop with farmers held in Baalbeck in the Bekaa valley.

The national fodder resources assessment and the activities related to it emerged from the need of the Ministry of Agriculture to assess its rangeland resources, and undertake a sustainable rangeland management in state and communal lands, that are under the mandate of the ministry. In addition, natural ecosystems, including rangeland and small ruminants, depending on these grazing areas were also found vulnerable to climate change, and validated by the concerned stakeholders in the validation workshop under the Second National Communication to Climate Change.

Moreover, and as a follow-up to the national consultation meeting in February, UNDP and the Ministry of Environment organized a coordination meeting on 11 April 2012 with all national stakeholders to present the ongoing and planned climate change adaptation activities, including the activities that AgriCAL will be working on. The meeting served concurrently as a coordination meeting to share initiatives and achievements of institutions and a consultation meeting to promote complementarities as well as identify the barriers and the enabling framework for the deployment of the technologies selected under the Technology Needs Assessment (TNA) including: Rainwater Harvesting from Greenhouse tops and Roads, Conservation Agriculture, Select Adapted Varieties and Rootstocks, Risk-Coping Production Systems and Water User Associations.

The project went through an IFAD Quality Enhancement (QE) process where a group of experts expressed their technical views towards making the project more viable and technically solid. All the comments of the QE process were integrated into the final project document.

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Under the adaptation alternative, an integrated response will be developed to manage climate risks to agriculture in the three focus areas. Project activities will target vulnerable communities in order to unlock agricultural development opportunities through the improved management of water and rangelands, and enhanced agricultural practices. The baseline situation and adaptation alternative per project outcome are presented below:

Outcome 1: Increased water availability and efficient use through water harvesting and irrigation technologies

Baseline:

Currently MOA and GP with the support of IFAD are working on increasing water harvesting in several areas in Lebanon, through the construction of hilly water lakes and ponds. However water harvesting from greenhouses and agricultural roads is not being invested in, in spite of their high potential and relatively low cost. In addition, at the farm level, farmers still rely on rain fed agriculture, and on ground water for irrigation without considering water-harvesting options.

The most used greenhouses in Lebanon are the round arched tunnel greenhouses that have the following disadvantages compared to the Single Span Greenhouses (SSG):The net greenhouse floor area that fits for plant cultivation is small; the plastic-film consumption is higher; ventilation efficiency is not sufficient; extra cost for the control of Tuta absoluta because of the inefficiency of the anti-insects nets; the extra use of Plastic, Pesticides, and Fuel makes this type far from being environmentally sound; lower productivity of Arched Tunnel type greenhouses; arched type in best cases produce 25%less than SSG, this production lost can easily overpass 40-50%.

Adaptation alternative:

The project will support farmers in applying appropriate water management practices as key to ensuring that agricultural production can withstand the stresses caused by climate change. This includes upgrading of rainfed and irrigated agriculture through applying integrated rainwater harvesting systems and complementary technologies such as low-cost pumps and water application methods, low-head drip irrigation kits, and other techniques. Rainwater harvesting systems to be implemented by the project target greenhouses and agricultural roads. Water

harvesting from roads will supply additional water for irrigation, hence increased yields. Depending on the crop, the increase would be up to 2-3 folds the baseline production. In around 10 years, the return on investment will be achieved for a road of 1km in an area receiving 800mm rainfall/year. Moreover, water harvesting from greenhouse tops will provide significant cost savings from pumping, in areas receiving 600mm/year, covering 43% of the plant irrigation needs.

In addition, other practices to be promoted by the project include technologies that increase rainwater infiltration and storage in the soil for crop use, and run-off storage for supplemental irrigation using storage structures such as farm ponds, earth dams, water pans and underground tanks.

The introduction of the SSG Greenhouses will result in the following advantages: Environmentally-lower application of pesticides and fertilizers, better soil organic matter; socially- better quality of life for farmers (reducing cost of inputs and less contact with pesticides), healthier quality of food, better hygiene and safety working conditions, economically- more income due to better quality and less cost, better efficiency per unit area. These benefits make the SSG a sustainable alternative for growers. The relatively high investment cost needed for the installation of SSG could be compensated by the higher productivity and lower expenditures within 2 or 3 years depending on the prices offered on the market. In our case, this period is only 2 years. Finally, it is highly recommended to adopt this type of greenhouses and broaden its use in Lebanon helping farmers to comply with international standards of Global GAP.

Outcome 2: Increased adaptation to climate change for crop production

Baseline:

LARI is currently conducting some activities to support farmers in enhancing their agricultural practices and productivity namely through: production of quality seeds, diagnosis of animal diseases, production of vaccines, food quality control, soil analysis, feed composition, plant protection and others. In addition, LARI operates a network of weather stations covering most of the Lebanese territory. LARI is well aware of the climate change scenarios and their potential impact on agriculture in Lebanon. However, for LARI to expand its research and extension activities to cover climate change issues, it is in need of additional technical and financial support.

Adaptation alternative:

The project will directly support LARI in enhancing its capacity to deliver climate-smart technology for enhanced agricultural production. This will be developed and disseminated by means of enhanced extension services and direct training to local institutions and farmers. A range of climate-resilient agricultural technologies and methods will be developed and transferred to farmers e.g. drought- and disease-resistant varieties, integrated crop-livestock production systems, conservation agriculture, enhanced rangeland management, and others.

The early warning system linked to IPM and water management as well as good agriculture practices, will enable farmers to be more efficient in terms of inputs usage (chemicals and water) and labor. Savings may reach more than 30% of the cost of production. The current measures such as following an annual calendar will increase not only the cost, but will be less efficient and make crops more vulnerable to climate variability and pest outbreaks.

The fodder resource assessment will enable the establishment of a rangeland managerial scheme that will promote adaptive grazing practices to climate variability and preserving natural resources.

Outcome 3: Increased resilience of shepherds and small ruminants to climate change through sustainable rangeland management

Baseline:

Although rangelands form a very important part of the agricultural production system in Lebanon, and they are the most vulnerable to climate change and desertification, MOA does not have ongoing programmes to manage rangelands, and development partners are also not investing in this field. Currently, rangelands are being used by herders without acknowledges guidelines or regulations. Ad hoc measures are being taken by local authorities and community groups in some locations. Degradation of rangelands is being observed caused by natural (climate effects, floods, drought, etc.) and man-made (over-grazing, desertification, etc.) factors.

Adaptation alternative:

The project will be the first project to support MOA in addressing climate change effects in the rangeland ecosystems in Lebanon. The project will undertake a national assessment of the rangelands, and will target its activities in the three project focus areas by providing improved soil management techniques, limit erosion and improve water and nutrient efficiency, thereby contributing to adaptation. Rangelands also support reduced NO2 emissions and carbon sequestration, improved feed resources.

Outcome 4: Climate index-based insurance initiated, policy influenced and lessons learned and shared through a knowledge management system

Baseline:
Currently, there is no insurance scheme applied for agriculture in general and for climate adverse effects in particular. In cases of severe weather conditions or natural disasters, when farmers lose their crop yields, the Government, through MOA or the High Relief Commission would assess the damages in the field and disburse compensation payments to the farmers based on the estimated assessment of their losses. This process poses a financial burden on the public budget, and is not institutionalized in a manner to prevent malfunctioning and in some cases unfair assessments and delays in disbursements of funds.

While policy makers and planners are becoming more aware of the importance of an enhanced response to climate change, Lebanon has not yet developed a national climate change policy or action plan. While at the national level, people are aware of the increasing climatic variability that is negatively affecting the environment and eventually their livelihoods, they still consider that this is a global issue that is hard to be tackled at the local level.

Despite progress, there remains a lack of understanding of the sectoral and development implications of climate change effects in line ministries. This is an underlying cause of the current situation, in which climate change in general and adaptation in particular is not mainstreamed into development planning processes. This is the case both nationally and in the regions. Currently there is little collated information available on climate-related risks in the

agricultural sector, either at the national or local levels. Information about climate change-related risks is often missing, and when present, its management and dissemination is not carried out systematically, which further also militates against an effective response. Moreover, any lessons learned are not being captured in a way that facilitates broader sharing, to enhance awareness and influence policy.

Adaptation alternative:

The project will complement the ongoing efforts of MOA to introduce climate index insurance in Lebanon. Index insurance is linked to a weather index such as rainfall, rather than a possible consequence of weather, such as crop failure. This subtle distinction resolves a number of fundamental problems that make traditional insurance unworkable in rural parts of developing countries especially in Lebanon. One key advantage is that the transaction costs are low. This makes it workable under real market conditions – both financially viable for private sector insurers and affordable to small farmers. Unlike traditional crop insurance against crop failure, the insurance company does not need to visit farmers' fields, to determine premiums or to assess damages. Instead the insurance is designed around rainfall data (for example). If the rainfall amount is below the earlier agreed threshold, the insurance pays out. Since there is no need for the insurance company to corroborate actual losses, payouts can be made quickly and distress sales of assets avoided.

This process also removes the 'perverse incentives' of crop insurance, or compensation payments from the Government. In some cases, assessments of damages in the field are conducted either late or with inaccurate estimations, as well as delayed disbursements. Accordingly, some farmers tend to provide inaccurate information related to their cultivated areas, crops and material losses, and may actually prefer their crops to fail so that they receive a payout. For example, when given an early warning notice regarding a storm, some farmers may not undertake the necessary measures to protect their greenhouses, crops, or livestock with the aim to get the maximum amount of compensation. With index insurance, the payout is not linked to the crop survival or failure, so the farmer has the incentive to make the best decisions for crop survival.

This insurance scheme will save the funds paid for compensation by the Government to be allocated for actual investments in agriculture.

The project will have a strong learning and knowledge management component to capture and disseminate lessons learned and to influence policy. The knowledge management system will be institutionalised within MOA and linked to relevant Governmental and research institutions. Lessons will be shared through various appropriate national and regional networks. The knowledge management system will focus on targeting policy makers at the national level, to facilitate uptake of lessons learned into policy.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project implementation.

Upon the request of the Government of Lebanon, IFAD is the Multilateral Implementing Entity (MIE) for the project. The project is nationally implemented in line with the IFAD procedures and guidelines as agreed upon with the Government of Lebanon through the Ministry of Agriculture. While IFAD is the MIE for the Project, the Ministry of Agriculture (MOA) is the government

institution that will act as the Implementing Partner/Executing Agency. While MOA will be responsible for overall project implementation and will be the project executing entity, GP and LARI will be a major partner under the components 1 and 2 respectively.

The project will work with the following main partner entities:

Ministry of Agriculture (MOA), the MOA is responsible for the formulation and implementation of agricultural development policies and strategies in the various regions of the country. The MOA has implemented several donor funded projects, mostly through grants. This includes technical assistance projects from various multilateral and bilateral sources.

MOA will undertake the overall management and coordination of the project, host and supervise the PMU, and implement Outcomes 3, 4 and 5 in full cooperation with GP and LARI.

The Ministry of Environment (MOE) is the main governmental body concerned with environmental issues in the country. It was established in 1993 under Law 216/93 to meet Lebanon's environmental challenges, and articulate environmental policy principles and strategy objectives. In the past few years, the MOE has demonstrated its ability to steer project activities towards successful implementation and within the overall strategic objectives of the Ministry.

MOE is the national focal point institution for the UNFCCC as well as the Adaptation Fund. MOE has prepared the Lebanon's Second National Communication (SNC) to the UNFCCC in February 2010. The SNC analysed the climate change scenarios for Lebanon and identified the adaptation measures that need to be implemented to enhance the country's resilience to climate change. MOE has endorsed AgriCal project proposal as a highly relevant and needed initiative to enhance the resilience of the agriculture sector and help implement the adaptation plan for Lebanon. MOE will take part of the Project Steering Committee of the project.

The Council for Development and Reconstruction (CDR) is a government agency with a key role in the reconstruction and economic recovery, and is responsible for formulating and monitoring implementation of public investment projects. The CDR is also directly responsible for implementing a large part of the reconstruction programme. In this capacity it acts in coordination with various institutions, principally relevant ministries that will ultimately operate and maintain the investments. Recently, CDR has taken a significant step towards social and economic development and in cooperation with several governmental and international agencies, has planned and coordinated several projects that aim to raise the living standards of marginalized groups leading to significant changes at the national level. CDR will take part of the Project Steering Committee of the project.

Green Plan (GP),was established in accordance with Law No. 13335, on10 July 1963 as an autonomous authority under the auspices of the MOA. The GP's mandate is to study and execute land reclamation and development projects. Its activities include land reclamation, improving and building agricultural roads, building concrete water tanks and earth reservoirs for irrigation, constructing stone retaining walls and terraces, installing on-farm irrigation systems and providing fruit trees and plants in addition to other related activities.

GP will implement Outcome 1 of the project in-line with its mandate and in full cooperation with MOA and LARI.

The Lebanese Agricultural Research Institute (LARI) is an autonomous public institution under auspices of the MOA. LARI has a number of very good core facilities and activities which

are capable of providing key services to agricultural producers and those involved in the marketing and export of agricultural products. LARI has also been given a remit to provide extension activities, mainly for dissemination of research results. From 2001, LARI has been moving towards a demand driven approach in undertaking practical research with farmers and related extension activities.

LARI will implement Outcome 2 of the project in-line with its mandate and in full cooperation with MOA and GP.

The International Fund for Agricultural Development (IFAD), in line with the operational policies and guidelines for accessing the Adaptation Fund, IFAD's role as a multilateral implementing entity will support eligible countries in accessing resources for concrete agriculture-related adaptation projects and programmes aiming to reduce the risks and impacts of climate change on smallholders and their associated livelihoods. IFAD has recently established its Environment and Climate Division and produced its Climate Change Strategy and its Environment and Natural Resource Management Policy, thus enhancing the role of IFAD as bridging the nexus between poverty alleviation, natural resource management and climate change adaptation.

IFAD's added value as a multilateral implementing entity lies in its rural poverty focus and its expertise in addressing climate change challenges at the local level. IFAD's services as a multilateral implementing entity would be of relevance to countries that have not yet nominated a national implementing entity such as Lebanon.

In this respect, IFAD is well positioned to drive Adaptation Fund investments around the key adaptation objective of increasing food security and reducing the vulnerability of smallholder farming systems and rural livelihoods.

Accordingly, IFAD is responsible for providing a number of key general management and specialized technical support services to the project. These services are provided through IFAD's Country Programme and the Climate and Environment Unit and include assistance in: project formulation and appraisal; determination of local capacity assessment; briefing and de-briefing of project staff and consultants; general oversight and monitoring, including participation in project reviews; receipt, allocation and reporting to the donor of financial resources; thematic and technical backstopping; provision of knowledge transfer; research and development; participation in policy negotiations; policy advisory services; programme identification and development; identification and consolidation of learning; and training and capacity building.

IFAD will carry out the fiduciary aspects and implementation support functions. The project will be directly supervised by IFAD. The supervision missions will be implemented bi-annually. The composition of the mission in terms of technical expertise will be based on the annual supervision plan. The supervision plan will highlight in addition to the routine supervision tasks, the main thematic or performance area that requires strengthening and would imply deployment of additional inputs of capacity building, in-depth analytical studies or review of existing policies.

Technical partners in implementation

Private consulting engineering firms and contractors would be the key implementing partners for planning, design and construction of infrastructure systems funded under the project. Qualified consulting engineering and construction firms are widely available in the country.

Project coordination and management

The project will have the same **Project Steering Committee (PSC)** as the HASAD project, which is presided by the Minister of Agriculture. It will be responsible for the review of the Annual Work Plans and Budget (AWPB) and results achieved by the project and, more generally, facilitating and supporting project implementation. Members of the PSC would include representatives from the CDR the Director General of MOA, the President of the GP Executive Committee, and the Director General of LARI. The Ministry of Environment will be invited to become a member of the PSC given its role in the implementation of the UNFCCC in Lebanon.

The Ministry of Agriculture (MOA) would be the Lead Project Agency (LPA) responsible for the project. The overall project management and coordination would be the responsibility of a Project Management Unit (PMU) located at MOA under the supervision of the Minister of Agriculture, since the bulk of the project works and expenditures are under its mandate. The MOA has prior experience with financing from IFAD and other international lending agencies (World Bank), including direct handling of procurement and disbursement matters. MOA will organize the recruitment of the PMU Staff following competitive procedures.

The **Project Management Unit (PMU)** would implement the project activities according to the approved annual work plans and budgets. Provisions are made for salaries for officers and staff, field allowances for central MOA, GP, and LARI staff who would participate in project management and implementation, vehicles and office equipment together with corresponding operation and maintenance costs. Provisions are also made for national and international technical assistance and studies, as well as training, workshops and study tours to build the capacities of staff involved in project management and implementation.

The PMU would be responsible for procurement of goods and services under the project. It will advertise the Expression of Interest for the pre-qualification of consultants, services providers and contractors and enter into agreement for implementation of the project interventions, in accordance with the procurement guidelines adopted for the project.

The arrangement for project coordination and management is driven by: (i) the use of existing institutions and capabilities, as far as possible, whilst making necessary adjustments for building their capacity where needed; (ii) the need to create effective coordination mechanisms and synergies between MOA, GP, LARI and the farming communities so that maximum benefits from the project interventions are realized; and (iii) the importance of having an effective project M&E and knowledge management system that provides the necessary information for managers and decision makers and to reach credible conclusions about the effectiveness and efficiency of the project

The PMU needs to achieve effective synergy between the project components by providing strong and effective multi-disciplinary teams to implement the project, including its participatory approach both at central and field level to work together and report to a single line of command.

Key PMU staff will be recruited to meet agreed qualifications and should be approved by IFAD. The PMU should include at least the following staff:

1. Project Manager who will report directly to MOA and the Project Steering Committee;
2. Senior Technical Expert hosted by GP who will be in charge of the implementation of Outcome 1;

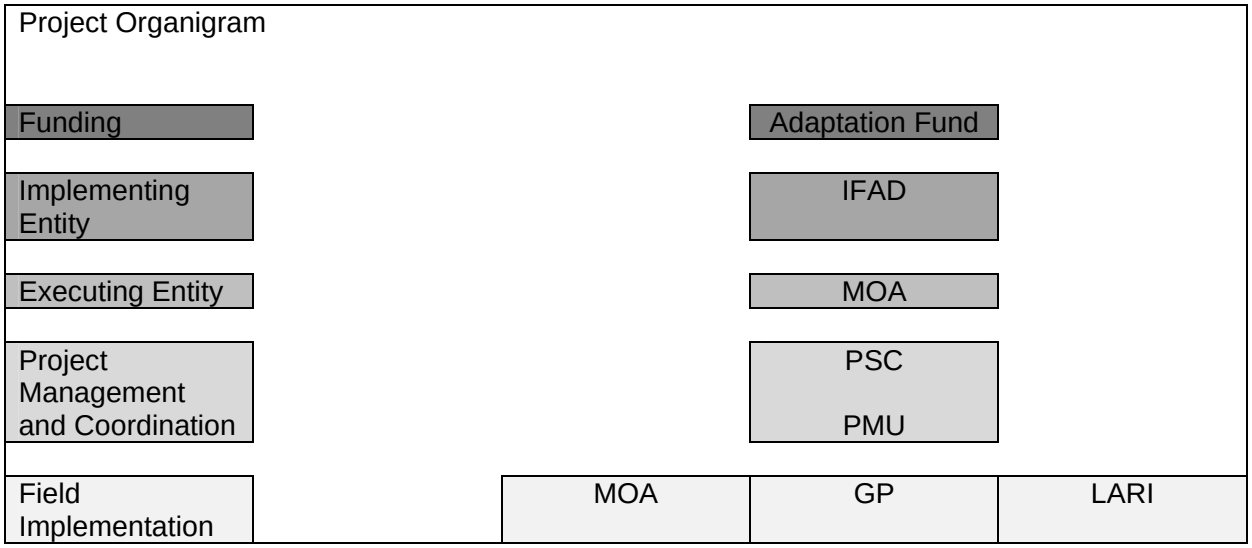
3. Senior Technical Expert hosted by LARI who will be in charge of the implementation of Outcome 2;
4. M&E and \Communication Specialist;
5. Administrative Assistant;
6. Other specialists as needed.

The PMU will be assisted by field multidisciplinary teams from MOA, GP, and LARI, supported by external consultants when needed, to implement the planned project activities.

IFAD will assume the role supervision and fund administration and will provide technical backstopping during project implementation.

Institutional support for improved coordination of the project activities would include provisions for: (i) Project Launch Workshop; (ii) workshops to familiarize implementing staff and beneficiaries with the objectives of the project, its components, implementation strategy, administrative and management procedures; (iii) Annual Review Workshops to assess the progress of component implementation as the basis for preparing the Annual Work Plan and Budgets (AWPBs) for the following fiscal year; and(iv) finalization of the Project Implementation Manual (PIM) to streamline participatory approaches and targeting, as well as, technical, administrative and financial management of the project.

Training. Provisions would be made on an ongoing and systematic basis for training the project and other staff from MOA, GP, and LARI on project cycle management(including participatory planning, monitoring and evaluation), implementation modalities, gender issues and financial management through workshops and seminars. Training would be provided for key and senior project staff in project management and administration, participatory project implementation methodologies and impact Monitoring and Evaluation.



Functions of management entities

Entity	Proposed Functions
National Steering Committee (NSC)	▪ Overall oversight to ensure programme implementation ▪ Approves Annual Work plan (AWP) and Budget ▪ Approves strategy adjustment ▪ Appoints external evaluators ▪ Reviews project reports ▪ Integration of local lessons learnt into national policy context ▪ Knowledge management contribution ▪ Up-scaling of successful activities
Project Management Unit (PMU)	▪ Reports to the PSC and IFAD ▪ Provide technical and administrative support ▪ Supervision of technical works ▪ Updating, readjustment of technical elements ▪ Coordination of implementation at local level ▪ Undertakes M&E activities ▪ Facilitates implementation ▪ Prepares AWP and Budget ▪ Prepares progress and financial reports ▪ Programme resource management ▪ Arranges meeting of the PSC ▪ Coordinates implementation partners
Ministry of Agriculture (MOA)	▪ Overall oversight and coordination ▪ Implementation of Outcomes 3, 4 and 5 ▪ Contributes to M&E activities
Green Plan (GP)	▪ Overall oversight and coordination ▪ Implementation of Outcome 1 ▪ Contributes to M&E activities

Lebanese Agriculture Research Institute (LARI)	▪ Overall oversight and coordination ▪ Implementation of Outcome 2 ▪ Contributes to M&E activities

B. Describe the measures for financial and project risk management.

The Lebanese political and institutional circumstance has improved since last year while the country sustained its improvement and resilience to internal and external crises through sound macroeconomic and monetary performance. The GoL showed strong interest and commitment for this project as a concrete national pilot programme for adaptation to climate change. There are however political, institutional and technical risks associated with the implementation of the project. These risks have been taken into account in the project design, with a view to minimizing or mitigating them. Such risks and mitigation strategies are briefly summarised below. Based on the overall assessment, AgriCal can be classified as belonging to "moderate" risk category.

During the project formulation phase, key risks underlying the project have been analyzed and qualitatively assessed in connection with the context of the planned outcomes and target sites for the project. It is assumed that both IFAD as the Implementing Entity, and the Ministry of Agriculture, as the Executing Entity are responsible towards addressing and mitigating the project risks, although IFAD has the ultimate responsibility with regard to all financial risks, and the right of cessation of activities, or withdrawal of funding in the event of risks that cannot be otherwise managed. Potential risks with an assessment of the degree of each risk, and the mitigation measures identified to mitigate are presented in the table below:

Risks and mitigation measures

No	Risk	Classification	Possible Measures for Addressing the Risk
1	Low human and institutional capacity for the implementation of CC related interventions, especially at the local level.	Moderate	The project has a strong capacity building and training component, designed to promote effectiveness and sustainability at the local level.
2	Delays in programme implementation, and particularly in the development of infrastructure intervention	Moderate	PMU to carry out feasibility studies for a number of the proposed infrastructure components, and identify any possible bottlenecks in implementation and undertake necessary measures to enhance implementation.
3	Unforeseen delays in undertaking essential preparatory works and surveys due to weather/access issues etc.	Moderate	Surveys to be scheduled to maximize favorable weather conditions. Early reconnaissance visits to remote areas will determine potential access difficulties.
4	Lack of incentives for particular local communities to cooperate in activities that do not yield	High	The project incorporates activities that yield immediate benefits for communities in terms of awareness,

	immediate financial value, but aim at longer-term resilience, may reduce stakeholder engagement and comprehensive participation.		preparedness, skill development and income generation. This will be emphasized during all meetings and consultations with community representatives during the inception phase.
5	Delays in recruitment or appointment of qualified project staff may affect the timeframe of different project activities.	Low	A pro-active coordination mechanism will be established by IFAD and MOA during the project inception phase. TORs for project staff will be prepared immediately after project endorsement by the AF Board.
6	Potential for unsatisfactory performance of government agencies in charge of implementing the project	Moderate	The competencies, authority and funding of the implementing agencies were assessed and the necessary support was prescribed. The provision of appropriate external technical support would limit the risk of possible insufficient technical performances.
7	Required coordination with other ongoing projects fails to occur and synergies do not materialize.	Low	Donors are committed to harmonization and alignment. During project preparation, IFAD country team has closely consulted with the partners who are responsible of the main ongoing projects. The specific implementation arrangements of AgriCal – with strong coordination mechanism at the Steering Committee will be instrumental to ensure continuous coordination.
8	Changes in the government structures and functions of the implementing partners,	Low	Closely monitor situation and keep regularly updated on any developments in this regards.
9	Political instability might cause effectiveness or implementation delay.	Moderate	The Lebanese institutional and financial systems have shown admirable resilience to various political stalemates; however the risks exist and will be monitored.

Over the course of the project, a PMU risk log will be regularly updated in intervals of no less than every six months in which critical risks to the project have been identified. Issues/Risks will be raised to the NSC and adequate mitigation measures will be discussed/approved by NSC and Implemented. At the time of project formulation, strong political commitment from national as well as local partners is evident which will limit a number of risks from materializing. Consistent involvement of a diverse set of partners will further reduce these risks.

C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

The project would introduce a monitoring, evaluation and knowledge management system to facilitate compilation and dissemination of relevant project knowledge about issues, experiences and insights to all stakeholders. The project would introduce a gender disaggregated system of data collection and reporting for each project component. The system would be designed to capture the rate of implementation against planned targets and objectives, as set out by the project design and reflected in the AWPBs, and would monitor: (i) the financial information of the proposed project;(ii) the regular and systematic recording and reporting of progress against planned project targets; and (iii) more importantly, the assessment of the impact of project activities on the target group and the environment.

The Monitoring and Evaluation of the project achievements and knowledge management would be the responsibility of PMU. The results-based approach will be adopted, involving regular recording of, and accounting for progress against AWPB targets; and routine, periodic assessments of movement towards beneficiary impact. In accordance with lessons learnt from previous projects, a strong and clearly defined M&E function will be established from the beginning of the project. For this purpose, the PMU staff will include a dedicated M&E officer.

The M&E and Knowledge Management Officer will be responsible for all M&E activities, based on the IFAD Guide, which specifies a matrix and performance checklist to orient the selection of indicators, baseline data, methods for data collection, synthesis and a communication strategy for lessons learned. Service providers, contractors and beneficiary groups will be the prime sources of data emanating from grass roots activities. The Project draft M&E matrix will be prepared in a participatory manner as part of the start-up activities in line with the logical framework.

Project monitoring and evaluation (M&E) is in-line with established IFAD procedures and will be carried out by the PMU, verified by MOA, GP, LARI, and IFAD. Dedicated support by the technical team at IFAD will be provided on a regular basis. The Results Framework of the project defines performance indicators for project implementation as well as the respective means of verification. A Monitoring and Evaluation system for the project will be established accordingly and implemented by the PMU.

The key M&E activities will rely on the update and validation of benchmark data used in project design; baseline surveys in the project selected sites; half-yearly data collection and reporting of activity and output targets and achievements; annual impact assessment and evaluation; a mid-term review; and a final completion assessment. The activities will be guided by a number of fundamental considerations:

a) Data will be disaggregated by poverty, livelihood group and gender.
b) Each implementing or partner agency will have clear M&E responsibilities with specific reporting deadlines and a forum for presenting and discussing the findings of the monitoring exercise.
c) M&E will be linked to the project rationale, log frame, annual work plans and budgets and the beneficiary assessments. The findings of the M&E will be used to take corrective or enhancing measures at the level of project management.

The project key M&E activities include the following:

Project Inception Workshop
A Project Inception Workshop will be conducted within two months of project start up with the full project team, relevant government counterparts and IFAD. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan. A fundamental objective of the Inception Workshop will be to present the modalities of project implementation and execution, and assist the project team to understand and take ownership of the project's goals and objectives. An Inception Workshop Report will be prepared and shared with participants.

Reporting
Semi-annual and Annual Project Reports will be prepared by the PMU and verified by the PSC to monitor progress made since project start and in particular for the previous reporting period. These reports include, but are not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
- Project outputs delivered per project outcome (annual);
- Lessons learned/good practices;
- Annual expenditure reports;
- Reporting on project risk management.

Quarterly Progress Reports will also be prepared by MOA, GP and LARI and submitted to the Project Manager to ensure continuous monitoring of project activities and identify challenges to corrective measures in due time.

A PMU risk log will be regularly updated in intervals of no less than every six months in which critical risks to the project have been identified.

Financial Reporting
In terms of financial monitoring, the project team will provide IFAD with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of funds according to the established procedures.

External Evaluations
The project will undergo an independent external Mid-Term Evaluation at the mid-point of project implementation, which will determine progress being made toward the achievement of outcomes and identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the projects term. Final External Evaluation will be conducted 3 months before project closure.

The external evaluations would be carried out jointly by MOA and IFAD based on terms of reference prepared by the Government, and approved by IFAD. At the conclusion of the project a completion evaluation would be conducted, as an input into the Project Completion Report (PCR)through a formal survey preferably undertaken by a neutral agency with no previous involvement in project implementation.

Field Visits
Government authorities, members of PSC and IFAD staff will conduct regular field visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress.

The M&E framework, including data collection and analysis arrangements, baseline information, and programme of work and budget will be updated at project start-up with the participation of the M&E officer as well as other concerned staff of the PMU, MOA, GP and LARI. The updated framework will be submitted to IFAD for approval not later than three months after project effectiveness.

The project budgeted Monitoring & Evaluation plan is presented in the table below:

M&E Activity	Responsibility	Budget (USD)	Timeframe
Inception workshop	PMU - MoA	2500	Within first two months of start date
Quarterly Reports	PMU	-	Every 3 Months
Semi-annual reports	PMU	-	Every 6 Months
Annual reports	PMU	-	Every Year
Mid-term Evaluation	PMU External Evaluator	22000	End of 2nd Year of implementation
Final Evaluation	PMU External Evaluator	22000	Within last two months of the project
Final completion report	PMU	-	By the end date of the project
Field visits	PMU, PSC, IFAD	2000	Quarterly and upon need or request
Audit	IFAD	4000	After operational closure of the project
Total Indicative Cost		**52500**	

D. Include a results framework for the project proposal, including milestones, targets and indicators.

Output	Indicator	Baseline	Target	Source of Verification	Risks and Assumptions
Component 1: Water Management					
Outcome 1: Increased water availability and efficient use through water harvesting and irrigation technologies	Quantity (m^3) of supplementary water available for agriculture as a result of water harvesting and the use of efficient irrigation systems	No supplementary water available from water harvesting in the project focus areas	By year 4, 75000 m^3 of supplementary water available for agriculture in the project focus areas	Mid-term and final evaluations Project progress reports	Political instability might cause effectiveness or implementation delay. Delays in programme implementation, and particularly in the development of infrastructure intervention. Farmers cooperate with the project and provide the land and required contributions.
Output 1.1: Rainwater harvested from greenhouse roof tops	Number of farms/hectares using the SSG Quantity of stored water for supplementary irrigation	Zero hectares out of 1000ha approx. Zero m^3	135 Farms/5 Hectares 25,000 m^3	Green Plan field reports Procurement reports	
Output 1.2: Rainwater harvested from agriculture roads	Number of farms/hectares using the water supply for supplementary irrigation Quantity of stored water	Zero hectares Zero m^3	120 Farms/10 Hectares 50,000 m^3	Green Plan field reports Procurement reports	

Output 1.3: Water efficient irrigation systems deployed	Number of hectares served by efficient irrigation systems	15,000ha all over the country. Data in focus area not available.	150 Hectares	Green Plan field reports Procurement reports	
Component 2: Adaptation Techniques Roll-out					
Outcome 2: Increased adaptation to climate change for crop production	Change in food security in the programme area as a result of using climate-resilient agricultural and livestock production methods, measured as increase in quantity of local production		By year 4, 25% increase in crop and livestock production or in income in the focus areas	Mid-term and final evaluations Project progress reports Livelihood surveys Agriculture observatory annual production survey	Low human and institutional capacity for the implementation of climate change related interventions, especially at the local level. Project capable of mobilizing partners to contribute to the financial sustainability of the warning system. Farmers perceive the benefits of acting to the early warning system recommendations, and expand its use.
Output 2.1: Enhanced early warning system to farmers through improved existing system	Number of meteorological stations installed in the project focus areas Number of staff trained on	40 weather stations 4 staff	2 additional weather stations 15 staff	LARI weather reports Training reports and	

	meteorological observation and analysis Frequency of production of improved climate risk information (for pest outbreak prediction, water demand, etc)	Not available	Daily	evaluations LARI weather reports Farmers' satisfaction survey	
Output 2.2:Expanded farmer outreach and ensured financial and management sustainability of the warning system	Number of farmers receiving climate risk information Financial flow to sustain the system	4500 farmer Zero %	20000 farmer 50% of the system's cost covered by non-core budget	LARI weather reports Farmers' satisfaction survey LARI financial reports	
Output 2.3: Capacity building on adaptation techniques for vulnerable field crops enhanced	Number of project beneficiaries trained on agricultural adaptation measures disaggregated according to gender	None	At least 300 farmers	Training reports and evaluations Training reports and	

	Number of professionals trained to enable rolling out of climate-resilient agricultural production technologies and methods	None	20 professionals	evaluations	
Output 2.4:Guidelines and recommendations on agricultural adaptation techniques for vulnerable areas developed	Agricultural adaptation techniques for vulnerable areas identified	None	5000 copies of the guidelines (on different techniques) published and disseminated on websites and networks	Published guidelines Project website	
Output 2.5: National fodder resource (NFRA) assessment prepared	List of fodder species, their distribution and nutritional value prepared The carrying capacity of the rangelands in the sampled areas calculated	Non existent	Nationwide assessment completed	Published NFRA study	
Component 3: Rangeland Management					
Outcome	Increased		At least 25%	Mid-term	Lack of incentives

3:Increased resilience of shepherds and small ruminants to climate change through sustainable rangeland management	productivity of the rangelands in the focus areas measured by increase in quantity of locally produced meat and dairy products		increase in income and milk productivity by year 4 of the project	and final evaluations Project progress reports Milk production monitoring	for particular local communities to cooperate in activities that do not yield immediate financial value, but aim at longer-term resilience, may reduce stakeholder engagement and comprehensive participation
Output 3.1: Pilot sustainable rangeland management plan implemented	Management plan prepared and adopted National guidelines prepared and adopted Number of professionals trained on sustainable rangeland management Number of households trained and participating in	Non existent Old obsolete guidelines not based on scientific results None None	One management plan Adopted national guidelines 20 professionals 200 households	Published management plan Published national guidelines MOA Decisions Training reports and evaluations Field surveys	

	rangeland management and dairy product processing disaggregated according to gender				
	Number of nurseries rehabilitated Number of seedlings produced Area covered by flood risk reduction measures	One in the focus areas Zero 2 watersheds managed out of 14	2 nurseries 125,000 seedling/year 2300 hectares (2 additional watersheds)	Field survey MOA reports	
Component 4: Climate index-based insurance, Policy and Knowledge Management					
Outcome 4: Climate index-based insurance initiated, policy influenced and lessons learned and shared through a knowledge management system	Amount of compensation funds disbursed to affected farmers Level of increase in awareness	Not existent	At least 50% of farmers' losses due to climate change compensated for through the climate index insurance scheme At least 60% of	Mid-term and final evaluations Project progress reports	National stakeholders cooperate and agree on designing and implementing the climate index insurance scheme Changes in the

	about climate change among decision makers and farmers		targeted decision makers and farmers show increase in the level of awareness		government structures and functions of the implementing partners Decision and policy-makers at all levels are slow to appreciate the need to mainstream climate change considerations into activities and investments
Output 4.1: Climate index-based insurance initiated	Climate index adopted One index piloted	None None	By year 2, 1 climate index One focus area or one crop	Project reports LARI weather reports	
Output 4.2: Policy advocacy activities implemented	Number of policies/plans/ strategies revised or developed as a result of policy advocacy activities	None	By year 4, at least 3 policies/plans/ strategies	Published policies/plans/strategies Governmental decisions and decrees	
Output 4.3: Knowledge management system established and knowledge management activities implemented	Number of knowledge products developed for use in policy advocacy activities Number of lessons learned and best practices up	None	By year 4, at least 8 policy briefs Every year of project implementatio	Policy Briefs Experience Notes	

	taken in the project outreach strategy Number of relevant networks or communities through which lessons learned are disseminated		n, at least 8 lessons learned and best practices consolidated in Experience Notes disseminated through website and other media Project outputs disseminated through at least two networks	Project website Project inputs to networks	

Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

Project Objective(s)	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator
To support the implementation of climate change adaptation measures in the agriculture sector in three highly vulnerable focus areas.	# of poor smallholder households whose livelihoods from agriculture has been increased because of AgriCAL, disaggregated by sex	**Outcome 2:** Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses **Outcome 4:** Increased adaptive capacity within relevant development and natural resource sectors **Outcome 5**: Increased ecosystem resilience in response to climate change and variability-induced stress **Outcome 7:** Improved policies and regulations that promote and enforce resilience measures	2.2. Number of people with reduced risk to extreme weather events 4.1. Development sectors' services responsive to evolving needs from changing and variable climate 5. Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress 7. Climate change priorities are integrated into national development strategy
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**
1. Increased water availability and efficient use through water harvesting and irrigation technologies	Quantity (m3) of supplementary water available for agriculture as a result of water harvesting and the use of efficient irrigation	**Output 4:** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types)

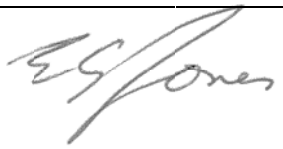
	systems		
2:Increased adaptation to climate change for crop production	Change in food security in the programme area as a result of using climate-resilient agricultural and livestock production methods, measured as increase in quantity of local production	***Output 5:*** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets)
3:Increased resilience of shepherds and small ruminants to climate change through sustainable rangeland management	Increased productivity of the rangelands in the focus areas measured by increase in quantity of locally produced meat and dairy products	***Output 5:*** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets)
4. Climate index based insurance initiated, policy influenced and lessons learned and shared through a knowledge management system	Amount of compensation funds disbursed to affected farmers Level of increase in awareness about climate change among decision makers and farmers	**Output 2.2*:*** Targeted population groups covered by adequate risk reduction systems **Output 7:** Improved integration of climate-resilience strategies into country development plans	2.2.1. Percentage of population covered by adequate risk-reduction systems 7.1. No., type, and sector of policies introduced or adjusted to address climate change risks

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[3] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Nazem El-Khoury *Minister of Environment*	Date*: 14/05/2012*

B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Elwyn Grainger-Jones Director, Environment and Climate Division IFAD 	
Date: *21/05/2012*	Email:e.grainger-jones@ifad.org Tel: +390654592151
Project Contact Person: Rami Abu Salman	
Email:r.salman@ifad.org Tel: +39 06 5459 2291	

6. Each Party shall designate and communicate to the Secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

ANNEX 1 National Consultation

A. **Invitation**

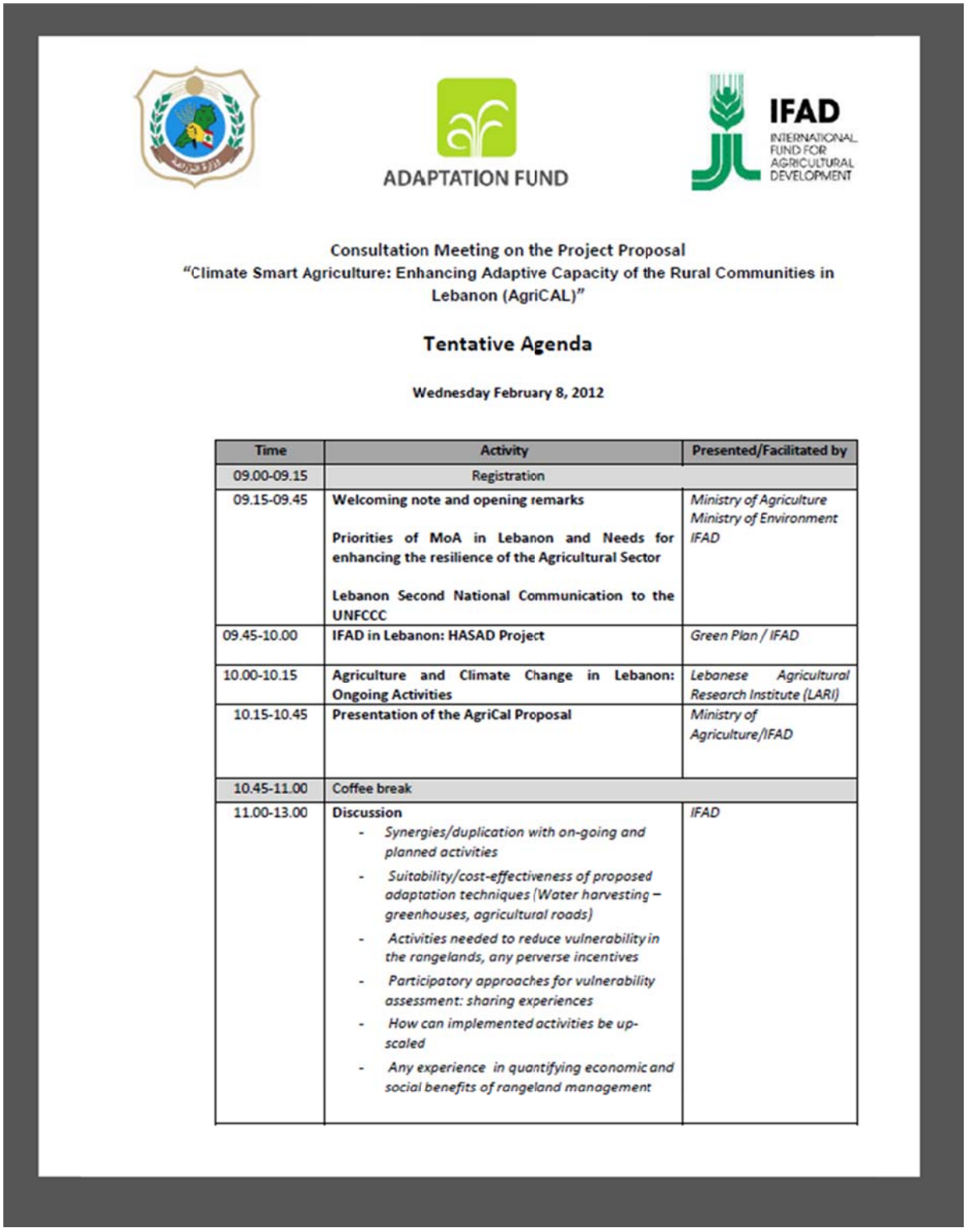
B. **Agenda**

C. **Proceedings Brief**

D. **List of Participants**

A. Invitation

B. Agenda



ADAPTATION FUND

IFAD
INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT

Consultation Meeting on the Project Proposal
"Climate Smart Agriculture: Enhancing Adaptive Capacity of the Rural Communities in Lebanon (AgriCAL)"

Tentative Agenda

Wednesday February 8, 2012

Time	Activity	Presented/Facilitated by
09.00-09.15	Registration	
09.15-09.45	**Welcoming note and opening remarks** **Priorities of MoA in Lebanon and Needs for enhancing the resilience of the Agricultural Sector** **Lebanon Second National Communication to the UNFCCC**	*Ministry of Agriculture* *Ministry of Environment* *IFAD*
09.45-10.00	**IFAD in Lebanon: HASAD Project**	*Green Plan / IFAD*
10.00-10.15	**Agriculture and Climate Change in Lebanon: Ongoing Activities**	*Lebanese Agricultural Research Institute (LARI)*
10.15-10.45	**Presentation of the AgriCal Proposal**	*Ministry of Agriculture/IFAD*
10.45-11.00	Coffee break	
11.00-13.00	**Discussion** - *Synergies/duplication with on-going and planned activities* - *Suitability/cost-effectiveness of proposed adaptation techniques (Water harvesting – greenhouses, agricultural roads)* - *Activities needed to reduce vulnerability in the rangelands, any perverse incentives* - *Participatory approaches for vulnerability assessment: sharing experiences* - *How can implemented activities be up-scaled* - *Any experience in quantifying economic and social benefits of rangeland management*	*IFAD*

C. Main Proceedings

Consultation Meeting on the Project Proposal
"Climate Smart Agriculture: Enhancing Adaptive Capacity of the Rural Communities in Lebanon (AgriCAL)"

PROCEEDINGS BRIEF

Wednesday February 8, 2012

Introductory Presentations:

IFAD/Rami Abu Salman: Brief presentation about the Adaptation fund emphasizing that the fund focuses on concrete adaptation actions and broad consultation to ensure that the project responds to national priorities – the purpose of the consultation.

MoA/Chadi Mhanna: the proposed project is in line with the MOA strategy for 2010-2020, especially with respect to natural resources management. The MOA is launching its first National Forest Policy (NFP) considering the impacts from climate change.

Green Plan/Raymond Khoury: HASAD briefing; target group of 24000 poor households, 890,000m^3 of water storage; increase yields by 30%.

LARI/Michel Frem: LARI enhanced its early warning system with 900 sms reaching farmers. It has 60 weather stations, 12 monitoring stations, 120 laboratories, staff of 430 technicians, and able to produce all the needs of Lebanon from wheat seeds (6000t) from varieties adapted to CC. it is working on IPM namely on Wheat rust and Tuta Absoluta on tomato, which outbreak results from CC.

Discussion Session:

Green Plan: upgrade the outcome 1 for water harvesting from agriculture roads to all roads, and to do the activities all over the country.

IFAD (Aziz Merzouk): increase budget for storage facilities, namely for water harvested from roads. Cost effectiveness on these issues is mentioned in HASAD document.

CDR (Faten A.): ADELNORD is implementing 120km of roads and 2 hill lakes; ready to implement one common pilot road with the project. Requested that Agrical ensures the deployment of irrigation systems from the water harvested in the 2 hill lakes, as ADELNORD will ensure the water to farm gate only.

CNRS (Talal D.): focus on water distribution after harvesting from roads. Presented CNRS experience in agro-pastoral system, project with IFAD on monitoring water and yield for potato and wheat.

GIZ (Kassem J.): recommended the use of a layer of stone over the plastic membrane in hill lakes to increase shelf live. Recommended empowering MOA extension centres rather than creating FSCs.

UNDP (Lea K.): Confirmed that technologies proposed in AgriCal are in line with Technology Needs Assessment (TNA) conducted for the water and agriculture sectors in Lebanon. Agrical provides an opportunity to immediately build on policy recommendations of the government.

LARI (Frem): suggested spending one day with partners and stakeholders to discuss activities and build on synergies.

MOA (Zeina T.): avoid trend of protection and conservation and focus on food security and management. Proposing the replacement of the existing green houses with single span green houses to ensure continued yield in the light of climate change impacts in Lebanon. Discussion around this point affected changes in outcome 1.

MOA (Dahej): increase pilot area in rangeland component to Mount Lebanon and West Bekaa-Rachaya. Stressed on importance of assessment of rangeland, rehabilitation of rangeland, creation of hill lakes for animals to drink.

FAO (Dany L.): Noted importance to consider rangeland access issues. Information should also be gathered about shepherds' movement, assess the demand on fodder; raised PPP issue, especially that extension is not a "paying" service. Explained FAO's expertise in previous projects on Greenhouses, and suggested that MOA Plant resources directorate should be involved in project. As for Climate index, he mentioned MOA initiative to create solidarity funds, which could be a good base to start from.

ICARDA (Hassan M.): ICARDA is developing technologies to adapt to CC. This includes Conservation agriculture, plant breeding, spineless cacti as animal fodder, deficit irrigation. Noted that capacity building for farmers on how to use these technologies is essential. Need to link with other projects including what has been done like Machrek-Maghreb project on rangeland management with AUB. Suggested to work on drainage to solve water logging problem.

ITALIAN COOP: ready to share outcomes of projects realized in similar field, mainly on water efficient use.

MOA (Chady M.): on-going project with GIZ-SYLVAMEDITERRANEA on NFP; focuses on forest policy, but includes also rangeland, need to avoid duplication. Not to forget trans-boundary herds movement in project.

UNDP/MoE (Lea K): MOE/climate change unit is ready to host the next meeting as proposed by Mr.Frem to exchange projects experiences and undertake further consultation on AgriCAL after the project activities are modified to respond to the national consultation and field consultation.

CDR (Nancy): willing to provide data or collaborate in several activities. Highlighted the study on land management or master plan for natural resources use in Danniyeh, and the regional master plan for Akkar heights with ADELNORD. Pointed olive hydric stress in Akkar (Beino).

GIZ-EFL (Charbel Z.): will to share projects details elaborated by EFL.

ARC-EN-CIEL (Wajdi K.): On-going index insurance initiative, ready to share information. Pointed IDEA participatory approach to design intervention needs at the local level; working with EFL in Akkar to increase the resilience of farmers. AgriCAL will use the results of IDEA to further enhance participation in vulnerability assessment.

CDR (Faten A.): creation of water user associations require close coordination with MOEW; deficit irrigation on olive and Conservation agriculture direct seeding for forage crops could be applied in Agrical.

IFAD (Aziz) and FAO (Dany): rangeland fodder resources assessment would require more than 3 years to be realized and lots of resources mobilized. The focus should be on the main HASAD areas

Ricardo: proposed a table to be filled by all partners including their list of projects to be used as a tool to gather information about on-going and planned projects.

MOA (Mohamad K.): 8 axes in MOA strategy. AGRICAL is a result of convergence of MOA and IFAD's policies. Solidarity funds first pilot activity to be launched for table grape production. Priority to work on rangeland. Welcomed a meeting among partners as an initiative for coordination.

Additional general comments:

- Project implementation to be reduced to 42 months
- Second national consultation workshop to be sponsored by the Government and held prior to the final submission of the project

D. List of Participants

ADAPTATION FUND

IFAD INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT

Consultation Meeting on the Project Proposal
"Climate Smart Agriculture: Enhancing Adaptive Capacity of the Rural Communities in Lebanon (AgriCAL)"
Wednesday February 8, 2012

Registration Form

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ADAPTATION FUND

IFAD INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT

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