

## **Annex 21: Operations Manual – Operations and maintenance**

The Operations Manual includes the maintenance activities for the EbA and water technologies-related actions for a period of 20 years.

### **I. Description of Operations and maintenance activities for Knowledge Hub (output 3)**

The hub will continue to serve as a repository of information on the progress and impacts of financed measures. The web-based nature of the Hub does not demand a physical office space post-project implementation, thus the operational costs of the hub refer to staffing and site maintenance. The collaboration with the Regional Environmental Observatory (OAR for its initials in Spanish) and cooperation agreements signed with governmental, financial and research institution throughout the project will sustain the Knowledge Hub's activities after the project's completion.

The OAR is a specialized instrument of the Central American Commission for Environment and Development (CCAD), defined within its Regional Environmental Framework Strategy (ERAM for its initials in Spanish) to consolidate environmental information for the SICA region and use it in strategic decision-making. The OAR will be operational in the second half of 2020 through a virtual presence on SICA General Secretariat's portal. Its objective is aligned with the Knowledge Hub's focus, fostering the collaboration of both structures during the project implementation period and ensuring the continuity of the long-term knowledge mission of the Hub.

This cooperation will first be achieved through the OAR's territorial approach (though sub regional priority areas) in which the Knowledge Hub is adequately framed: by providing information on the Central American Dry Corridor and the Arid Zones of the Dominican Republic, it completes the panorama of areas already integrated in the OAR, such as the Mayan Forest and coastal areas.

Under the GCF project, the Knowledge Hub will focus specifically on knowledge gaps on nature-based solutions for climate change adaptation and access to financing. These are two of the seven OAR thematic approaches; the observatory would particularly benefit from the second mentioned topic, with its specificity of women economic empowerment developed by the Hub. Both initiatives will also focus on the definition of national metrics and indicators that would lead to the generation of homogeneous aggregated data at the regional level.

The Hub products that will gather the obtained information (protocols, methodologies, technical guides, etc.) will be standardized to the SICA/OAR model, in order to ensure the information's homogenization and facilitate communication with key stakeholders and beneficiaries. During the development of the Hub's online platform, the necessary communication links between the two websites will be established to ensure the continuity of the site after the 7 years.

Additionally, through the 3<sup>rd</sup> output, the project will establish partnership arrangements with academia and research institutions, which will be carried out in coordination with the OAR in order to consolidate the regional knowledge network. The initial investment of the project will be a key input to encourage research; by including knowledge actors and products on the OAR platform, long-term content creation can be managed and monitored by ensuring the appropriation of research lines by local institutions.

These arrangements will ease the operation and maintenance costs following the closure of the project, as the Knowledge Hub online platform will be attached to the OAR server, and its experts will be able to carry out the work through the CCAD initiative.

## II. Description of maintenance activities for EbA actions (output 2)

In addition to the costs of establishing the EbA actions that will help strengthen the resilience to climate change in the selected territories, it is necessary to consider some operation and maintenance activities for a period of 20 years to ensure the success of the initial investment.

The trends for the last 9 years in the growth of Minimum Wages and Inflation according to the Consumer Price Index are applied, as well as the devaluation of the local currency versus the value of the US dollar. Data from the Central American Monetary Council (Executive Secretary, 2019) and from the World Bank (2019) has been used, as shown in the following tables:

Table 1. Historical exchange rate (2010-2018)

Exchange rate of the local currency with the US dollar	2010	2011	2012	2013	2014	2015	2016	2017	2018	Annual average change rate
Costa Rica	525.8	505.7	502.9	499.8	538.3	534.6	544.7	567.5	577.0	-1.1%
El Salvador	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	0.0%
Guatemala	8.1	7.8	7.8	7.9	7.7	7.7	7.6	7.4	7.5	0.9%
Honduras	18.9	18.9	19.5	20.2	20.3	22.0	22.9	23.5	23.9	-2.6%
Nicaragua	21.4	22.4	23.5	24.7	26.0	27.3	28.6	30.1	31.6	-4.0%
Dominican Republic	36.8	38.1	39.3	41.8	43.5	45.0	45.9	47.4	49.5	-3.2%
Panamá	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0%

Table 2. Historical minimum wages (2010-2018)

Minimum wage	2010	2011	2012	2013	2014	2015	2016	2017	Annual average change rate
Costa Rica	514.9	569.1	608.2	651.5	646.5	679.1	675.8	657.9	4.0%
El Salvador	207.6	224.1	224.1	233.0	242.0	251.7	251.7	304.2	6.6%
Guatemala	237.0	272.0	290.4	300.8	319.3	337.0	352.0	383.4	8.8%
Honduras	299.1	300.6	305.4	314.7	327.6	332.2	n.d.	359.6	2.9%
Nicaragua	149.2	155.0	161.9	166.9	178.4	189.9	196.7	n.d.	5.3%
Dominican Republic	168.7	188.5	185.0	193.1	190.5	204.4	205.7	n.d.	3.6%
Panama		432.0	432.0	432.0	488.0	488.0	488.0	488.0	2.2%

Table 3. Inflation, measured by the variation in consumer prices

Inflation, based on the variation of consumer prices	2010	2011	2012	2013	2014	2015	2016	2017	2018	Annual average change rate
Costa Rica	5.7	4.9	4.5	5.2	4.5	0.8	0.0	1.6	2.2	3.3%
El Salvador	1.2	5.1	1.7	0.8	1.1	-0.7	0.6	1.0	1.1	1.3%
eGuatemala	3.9	6.2	3.8	4.3	3.4	2.4	4.4	4.4	3.8	4.1%
Honduras	4.7	6.8	5.2	5.2	6.1	3.2	2.7	3.9	4.3	4.7%
Nicaragua	5.5	8.1	7.2	7.1	6.0	4.0	3.5	3.9	4.9	5.6%
Dominican Republic	6.3	8.5	3.7	4.8	3.0	0.8	1.6	3.3	3.6	4.0%
Panama	3.5	5.9	5.7	4.0	2.6	0.1	0.7	0.9	0.8	2.7%

### 2.1. Establish 36 tree nurseries focused on native species

Forest nurseries are necessary for several activities, including the restoration of natural forests, forest plantations, agroforestry systems and silvopastoral systems.

For the maintenance of forest nurseries, three important aspects are contemplated: the renewal of irrigation systems after 5, 10 and 15 years; the maintenance of the germination beds of forest seeds in years 5, 10 and 15; and infrastructure maintenance, which includes general infrastructure, electrical systems, and access roads to the different sections of the nursery on year 10 (Table 4).

Table 4. Maintenance sub activities of forest nurseries and their year of application.

Sub activity      Establish 36 tree nurseries focused on native species		
#	Activity	Years
1	Irrigation System Renewal	5 – 10 – 15
2	Germination beds maintenance	5 – 10 – 15
3	Infrastructure maintenance	10

## 2.2. Establish 4,160 ha of forest protection zones

In the areas of forest protection, the remaining forest cover is sought to be protected through the regulation of human activities that interfere with the natural cycles of the forest and its regeneration. For this reason, the extraction of timber for construction is not recommended, but moderate extraction of firewood and / or non-timber forest products can be allowed.

As part of its maintenance, the demarcation or cleaning of the perimeter of the area to be protected should be considered, as well as the placement of signs that inform the local population about the management of that land. According to the regulations of each country, the restrictions that apply, such as public access, hunting, and the entrance of cattle (cows, sheep or goats) can be included in the signs. Surveillance is essential to detect possible unauthorized entrance into the area of protection, unauthorized extraction of timber and non-timber forest products, or change of land use. The periodicity of maintenance work in forest protection areas is shown in Table 5.

Table 5. Maintenance sub activities for forest protection areas.

Sub activity      Establish 4,160 ha of forest protection zones		
#	Activity	Years
1	Perimeter cleaning	2-4-6-8-10-12-14-16-18
2	Signs Renewal	5 – 10 - 15
3	Surveillance	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20

## 2.3. Protect and restore 1,820 ha of natural forest in major recharge areas and riparian zones

To favor the infiltration of water and protect existing channels, it is necessary to restore forest cover in areas of aquifer recharge and riparian areas. To this end, the restriction of some of the human activities is indispensable. However, it should be taken into account that, in some of the selected countries, the local population is used to venturing into these areas as part of their subsistence activities, such as the collection of water for human consumption or farm animal maintenance.

As part of the maintenance work, the perimeter fence repair is considered, as well as the clear demarcation of the perimeters. Also, the placement of signs that inform the local population about the management of this land, with similar considerations to those of forest protection areas. In addition, the replanting trees to counteract the mortality of enrichment plantations should also be done. The years of its application are shown in Table 6.

Table 6. Maintenance sub activities for recharge areas and riparian zones.

Sub activity      Protect and restore 1,820 ha of natural forest in major recharge areas and riparian zones.		
#	Activity	Years
1	Perimeter cleaning	2-4-6-8-10-12-14-16-18
2	Signs Renewal	5 – 10 - 15
3	Perimeter fence repair	2-4-6-8-10-12-14-16-18
4	Tree replanting	1-2-3-4-5

#### 2.4. Restore 5,170 ha of forested areas across seven catchments

The location of the water catchments, in general, are well identified by the local population, however, the minimum protection area must be clearly delimited and have a perimeter fence. When natural regeneration is not enough, planting should be made to assist regeneration, through enrichment plantations and their respective replanting to counteract tree mortality. These are areas that should be intended solely for the collection of water for human consumption, so the placement and maintenance of informational labels are indispensable (Table 7).

Table 7. Maintenance sub activities for areas across catchments.

Sub activity      Restore 5,170 ha of forested areas across seven catchments.		
#	Activity	Years
1	Perimeter cleaning	2-4-6-8-10-12-14-16-18
2	Signs Renewal	5 – 10 - 15
3	Perimeter fence repair	2-4-6-8-10-12-14-16-18
4	Tree replanting	1-2-3-4-5

#### 2.5. Restore 820 ha of pine forests in Guatemala, Honduras and Nicaragua

For the restoration of pine forests in Guatemala, Honduras and Nicaragua, natural regeneration and assisted regeneration through enrichment plantations will be used. It is essential to replant trees that die during the first 5 years of the project, in order to strengthen the regeneration capacity of natural forests (Table 8). It is also important to maintain the boundaries, perimeter fences and informational signs that are placed.

Table 8. Maintenance sub activities for restoration areas of pine forests.

Sub activity      Restore 820 ha of pine forests in Guatemala, Honduras and Nicaragua		
#	Activity	Years
1	Perimeter cleaning	2-4-6-8-10-12-14-16-18
2	Signs Renewal	5 – 10 - 15
3	Perimeter fence repair	2-4-6-8-10-12-14-16-18
4	Tree replanting	1-2-3-4-5

#### 2.6. Establish 1,293 km of agroforestry systems using diversified living fence arrangements in basic grains crops

The maintenance of living fences in agroforestry systems associated with basic grain crops focuses on the repair of fences that delimit the plots, as well as on the renovation of live posts and dead posts according to their useful life and replanting of the multi-purpose trees that are established (Table 9).

Table 9. Maintenance sub activities for the establishment of agroforestry systems using diversified living fence arrangements in basic grains crops.

Sub activity      Establish 1,293 km of agroforestry systems using diversified living fence arrangements in basic grains crops.		
#	Activity	Years
1	Fence repair	2-4-6-8-10-12-14-16-18
2	Tree replanting	1-2-3-4-5
3	Renewal of live posts	5-10
4	Renewal of dead posts	5-10

### 2.7. Establish 612 ha of agroforestry systems for natural shade in coffee plantations

Agroforestry systems with coffee require that multiple-use trees, associated with coffee cultivation, be replanted in order to maintain the desired percentage of shade and preserve the presence of the forest element that will provide firewood, fruits and wood, in addition to the shade. This must be done in the first two years after establishment and new planting (Table 10).

Table 10. Maintenance sub activities for the establishment of agroforestry systems for natural shade in coffee plantations.

Sub activity      Establish 612 ha of agroforestry systems for natural shade in coffee plantations.		
#	Activity	Years
1	Multi-purpose tree replanting	2-3-10-11
2	Coffee plant renovation	10

### 2.8. Establish 1,280 km of silvopasture systems using diversified living fence arrangements

The maintenance of living fences in silvopastoral systems focuses on the repair of fences that delimit grazing areas, as well as on the renovation of live posts and dead posts according to their useful life and the replanting of multi-use trees that are established in them (Table 11).

Table 11. Maintenance sub activities for the establishment of silvopasture systems using diversified living fence arrangements.

Sub activity      Establish 1,280 km of silvopasture systems using diversified living fence arrangements.		
#	Activity	Years
1	Fence repair	2-4-6-8-10-12-14-16-18
2	Tree replanting	1-2-3-4-5
3	Renewal of live posts	5-10
4	Renewal of dead posts	5-10

### 2.9. Establish 1,280 ha of silvopasture systems

In silvopastoral systems, the protection of trees in their initial years to allow their proper establishment is vital to the success of the project. For this reason, maintenance should focus on replacing trees that die at the beginning of each cycle, as well as repairing the protective barriers surrounding trees and avoiding damage caused by livestock (Table 12).

Table 12. Maintenance sub activities for the establishment of silvopasture systems.

Sub activity      Establish 1,280 ha of silvopasture systems.		
#	Activity	Years
1	Multi-purpose tree replanting	2-3-10-11
2	Repair of tree protection barriers	2-3-10-11

### 2.10. Establish 5,305 ha of sustainable fuelwood and timber plantations

When it comes to plantations for firewood production, pruning and thinning are not relevant, since the selection of shafts or formation of single shafts are not the priority. However, these silvicultural treatments are important in the case of maintaining the plantations that also serve for the production

of timber for construction. Like other forest plantations, replanting trees that die to maintain adequate tree density per hectare is important (Table 13).

Table 13. Maintenance sub activities for the establishment of fuelwood and timber plantations.

Sub activity      Establish 5,305 ha of sustainable fuelwood and timber plantations.		
#	Activity	Years
1	Perimeter cleaning	2-4-6-8-10-12-14-16-18
2	Pruning	2-4-12-14
3	Thinning	5-10-15
4	Tree replanting	2-11-12

### **2.11.      Establish 129 km of firebreaks for forests and plantations**

The removal of vegetation in the fire barriers must be carried out annually. In addition, a more intensive cleaning, that restores the barrier to the level of the mineral soil, is necessary to happen every 5 years (Table 14).

Table 14. Maintenance sub activities for the establishment of firebreaks for forests and plantations.

Sub activity      Establish 129 km of firebreaks for forests and plantations.		
#	Activity	Years
1	Surface vegetation removal	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20
2	Vegetation removal at the mineral soil level	5-10-15

### **2.12.      Construct 118 km of living barriers for soil conservation**

Because for the construction of living barriers, which prevent soil erosion, short-lived vegetation (such as herbaceous and shrubs) is used, it is necessary to renew the barriers every 3 years, in the lands where it is necessary (Table 15).

Table 15. Maintenance sub activities for the establishment of living barriers for soil conservation.

Sub activity      Construct 118 km of living barriers for soil conservation.		
#	Activity	Years
1	Renewal of living barriers	3-6-9-12-15-18

### **2.13.      Construct 118 km of superficial drainage for soil conservation**

Drains for surface runoff should receive more intensive maintenance at least every 2 years, during the entire project period, to maintain their soil protection functionality and not lose the investment and initial effort (Table 16).

Table 16. Maintenance sub activities for the establishment of superficial drainage for soil conservation.

Sub activity      Construct 118 km of superficial drainage for soil conservation.		
#	Activity	Years
1	Drainage maintenance	2-4-6-8-10-12-14-16-18

## II. Description of maintenance activities for water technologies-related actions

### 2.1. Maintenance of rainwater harvesting systems (109) on public or community building using the roof of houses and plastic or geomembrane bag-deposits for storage (25 mt<sup>3</sup> / water supply for 8-12 families)

The main parts of the rainwater harvesting systems are the collector tank and the geomembrane bag, which are made based on polyethylene. This material has long useful life and will not break down in the sun for at least 25 years. The polyethylene geomembrane has a high chemical resistance, resistance to cracking due to environmental exposure, dimensional stability, resistance to temperature aging, and resistance to UV radiation.

Considering the useful life of the geomembrane and collection tank, these won't need to be replaced in 20 years, according to the manufacturers.

The annual maintenance will include cleaning activities and replacement of small parts such as valves, hydraulic accessories and change of gaskets to avoid water leaks, mainly.

The annual maintenance costs will increase in an estimated annual percentage rate of 1.5% - 3.5% in order to cover a possible increase in the labor price and the fuel oil or cement annual price variation, which impacts on the prices of all materials.

It is very important to protect the tank and collection bag from solar radiation with natural shadow or a roofed area.

- a) During the **first 5 years**, the annual maintenance main activities for the rainwater harvesting system will be the following:
  - Annual weed cleaning and cutting around the geomembrane bag and its ground terrace in order to protect the water container from break or damages.
  - Annual roof cleaning from solid materials, tree leafs or sediments that could obstruct the filters or pipe.
  - Annual filter and hydraulic accessories cleaning.
  - Year 4: Wash the inside of the geomembrane bag and remove all sediments and soil particles.
- b) From **years 5-10**, the annual maintenance main activities for the rainwater harvesting system will be the following:
  - Annual weed cleaning and cutting around the geomembrane bag and its ground terrace in order to protect the water container from break or damages.
  - Annual roof cleaning from solid materials, tree leafs or sediments that could obstruct the filters or pipe.
  - Filter and hydraulic accessories cleaning.
  - Year 7: Overhaul and replace the hydraulic accessories and filters which could be broken or damaged by the constant use. Repair the geomembrane bag and the water collection system if necessary.
  - Year 9: Wash the inside of the geomembrane bag and remove all sediments and soil particles.
- c) From **years 10-15**, the annual maintenance main activities for the rainwater harvesting system will be the following:
  - Annual weed cleaning and cutting around the geomembrane bag and its ground terrace in order to protect the water container from break or damages.

- Annual roof cleaning from solid materials, tree leaves or sediments that could obstruct the filters or pipe.
  - Filter and hydraulic accessories cleaning.
  - Year 12: Overhaul and replace the hydraulic accessories and filters which could be broken or damaged by the constant use. Repair the geomembrane bag and the water collection system if necessary.
  - Year 14: Wash the inside of the geomembrane bag and remove all sediments and soil particles.
- d) From **years 15-20**, the annual maintenance main activities of the rainwater harvesting system will be the following:
- Annual weed cleaning and cutting around the geomembrane bag and its ground terrace in order to protect the water container from break or damages.
  - Annual roof cleaning from solid materials, tree leaves or sediments that could obstruct the filters or pipe.
  - Filter and hydraulic accessories cleaning.
  - Year 17: Overhaul and replace the hydraulic accessories and filters which could be broken or damaged by the constant use. Repair the geomembrane bag and the water collection system if necessary.
  - Year 19: Wash the inside of the geomembrane bag and remove all sediments and soil particles.

## 2.2. Maintenance of community-level rainwater reservoirs (500 m<sup>3</sup>) (156)

The main activities in the annual maintenance during 20 years for the community-level rainwater reservoir (500 m<sup>3</sup>) will include cleaning activities in the intake flow areas to remove the sediments and soil particles. The same activities should be done for the internal parts of the rainwater reservoir. Small parts such valves and hydraulic accessories will be replaced and gaskets will be changed to avoid water leaks.

The polyethylene geomembrane has a high chemical resistance, resistance to cracking due to environmental exposure, dimensional stability, resistance to temperature aging, and resistance to UV radiation. It could also be used to waterproof the reservoir floor and it has a useful life of at least 25 years, so it doesn't need to be replaced in 20 years, according to the manufacturers.

The annual maintenance costs will increase in an estimated annual percentage rate of 1.5% - 3.5% in order to cover a possible increase in the labor price and the fuel oil or cement annual price variation, which impacts on the prices of all materials.

- a) During the **first 5 years**, the annual maintenance main activities for the community-level rainwater reservoirs (500 m<sup>3</sup>) will be the following:
- Annual filter cleaning and cleaning of intake flow areas of reservoir (remove weed, tree leaves and sediments).
  - Annual cleaning and removal of sediments from reservoir.
  - Overhauling, cleaning and mechanical maintenance of the aeration (blower) and solar water pumping/recirculation systems.
  - Annual cleaning of solar panel.
  - Use hydraulic cleaning tools and devices to clean the filtration area and pipe from the filling devices and catchment area to the reservoir, including sediment removal in reservoir.



- Year 4: Replace device parts of the mechanic aeration (blower) or solar water pumping/recirculation systems (connecting parts, adjustment or rectification of parts, bearing device, balancing, etc.).
- b) From **years 5-10**, the annual maintenance main activities for the community-level rainwater reservoirs (500 m<sup>3</sup>) will be the following:
- Annual filter cleaning and cleaning of intake flow areas of reservoir (remove weed, tree leaves and sediments).
  - Annual cleaning and removal of sediments from reservoir.
  - Overhauling, cleaning and mechanical maintenance of the aeration (blower) and solar pump water recirculation systems.
  - Annual cleaning of solar panel.
  - Annual lubrication of motor pump.
  - Year 7: Rectification, balancing and alignment activities for the solar motor-pump.
  - Use hydraulic cleaning tools and devices to clean the filtration area and pipe from the filling devices and catchment area to the reservoir, including sediment removal in the reservoir.
  - Year 9: Replace device parts of the mechanic aeration (blower) or solar pumped water recirculation systems (connecting parts, adjustment or rectification of parts, bearing device, balancing, etc.).
- c) From **years 10-15**, the annual maintenance main activities for the community-level rainwater reservoirs (500 m<sup>3</sup>) will be the following:
- Annual filter cleaning and cleaning of intake flow areas of reservoir (remove weed, tree leaves and sediments).
  - Annual cleaning and removal of sediments from rain water reservoirs.
  - Overhauling, cleaning and mechanical maintenance of the aeration (blower) and solar water pumping/recirculation systems.
  - Annual cleaning of solar panel.
  - Annual lubrication of motor pump.
  - Year 12: Rectification of bearing device, balancing and alignment activities for the solar motor pump.
  - Use hydraulic cleaning tools and devices to clean the filtration area and pipe from the filling devices and catchment area to the reservoir, including sediment removal in the reservoir.
  - Year 14: Replace device parts of the mechanic aeration (blower) or solar water pumping/recirculation systems (connecting parts, adjustment or rectification of parts, bearing device, balancing, etc.).
- d) From **years 15-20**, the annual maintenance main activities for the community-level rainwater reservoirs (500 m<sup>3</sup>) will be the following:
- Annual filter cleaning and cleaning of intake flow areas of reservoir (remove weed, tree leaves and sediments).
  - Annual cleaning and removal of sediments from rain water reservoirs.
  - Overhauling, cleaning and mechanical maintenance of the aeration (blower) and solar water pumping/recirculation systems.
  - Annual cleaning of solar panel.
  - Annual lubrication of motor pump.

- Year 16: Rectification of bearing parts, balancing and alignment activities for the solar motor pump.
- Use hydraulic cleaning tools and devices to clean the filtration area and pipe from the filling devices and catchment area to the reservoir, including sediment removal in the reservoir.
- Year 18: Replace device parts of the mechanic aeration (blower) or solar water pumping/recirculation systems (connecting parts, adjustment or rectification of parts, bearing device, balancing, etc.).

### **2.3. Maintenance of half-orange kilns for efficient charcoal production in target communities (2-6mt<sup>3</sup>) administered by organized local groups/cooperatives (43).**

- Biannual cleaning of the charcoal kiln floor.
- Annual cleaning of the charcoal kiln internal walls and the chimney.
- Annual filling of wall fissures with cement mix if necessary.
- Get cleaning material (brushes, brooms, water, etc.), cement and sand for eventual fissures repair.

### **2.4. Maintenance of water pumping systems by solar panels (8 HP) (38).**

The solar water pumping system is made of solar panels, battery, inverter, electrical control panel, solar pump and hydraulic system.

The main activities of the annual maintenance during 20 years for the water pumping systems with solar panels (8 HP) will include the annual cleaning of solar panels, parts lubrication, calibration and balancing of mechanical devices and electrical charge, replacement or rectification of the mechanical bearing device and overhauling of the electric control panel.

In general, the water pumping system with solar panels will be used to propel water and distribute it from the rainwater reservoir or community well to the irrigation ground or for the community consumption.

The solar panels have a useful life of 20 years or more according the manufactures.

The annual maintenance costs will increase in an estimated annual percentage rate of 1.5% - 3.5% in order to cover possible increases in the labor price, electrical devices, hydraulic devices, logistics and materials.

- a) During the **first 5 years**, the annual maintenance main activities for the solar pumping system will be the following:
  - Overhauling, cleaning and mechanical maintenance of the solar pump system and the connection point to hydraulic system (to avoid leaks).
  - Annual cleaning of solar panels.
  - Annual lubrication of solar motor pump.
  - Year 4: Overhaul of bearing parts, alignment for the solar motor pump and electrical balance adjustment.
  - Year 5: Replacement, if necessary, of mechanical parts of solar pump (connecting parts, adjustment or rectification of parts, bearing device, etc.).
- b) From **years 5-10**, the annual maintenance main activities of the solar pumping systems will be the following:

- Annual operation overhauling, cleaning and mechanical maintenance of solar pump system. Overhaul the connection point to the hydraulic system to avoid leaks.
  - Annual cleaning of solar panels.
  - Annual lubrication of solar motor pump.
  - Year 6: Rectification of bearing parts, electrical balance adjustment, and alignment activities for the solar motor pump.
  - Year 9: Replacement, if necessary, of mechanical part of solar pump (connecting parts, adjustment or rectification of parts, bearing device, overhauling or part-replacement for the power panel control, etc.).
- c) From **years 10-15**, the annual maintenance main activities for the solar pumping system will be the following:
- Operation overhauling, cleaning and mechanical maintenance of solar pump system and the connection point to the hydraulic system to avoid leaks.
  - Annual cleaning of solar panels.
  - Annual lubrication of solar motor pump.
  - Year 12: Rectification of bearing parts, electrical balance adjustment, and alignment activities in the solar motor pump.
  - Year 15: Replacement, if necessary, of mechanical parts of solar pump (connecting parts, adjustment or rectification of parts, bearing device, overhauling or part-replacements for the power control panel, etc.).
- d) From **years 15-20**, the annual maintenance main activities for the solar pumping system will be the following:
- Operation overhauling, cleaning and mechanical maintenance of solar pump system and the connection point to the hydraulic system to avoid leaks.
  - Annual cleaning of solar panels.
  - Annual lubrication of solar motor pump.
  - Year 17: Rectification of bearing parts, electrical balance adjustment, and alignment activities in the solar motor pump.
  - Year 19: Replacement, if necessary, of mechanical parts of solar pump (connecting parts, adjustment or rectification of parts, bearing device, overhauling or replacement of power control panel, etc.).

### III. Cost of maintenance activities for EbA and water/energy efficient actions

#### 3.1 Costa Rica

##### • EbA activities

Project activity	Maintenance activity	Total cost in each year in USD - Costa Rica																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.1. Establish tree nurseries focused on native species	Irrigation System Renewal					8050.9					9779.5					11879.2					14429.7	44139.3
	Annual operation	36597.6	38049.3	39558.6	41127.8	42759.2	44455.3	46218.7	48052.0	49958.1	51939.8	54000.0	56142.1	58369.0	60684.3	63091.5	65594.1	68196.0	70901.2	73713.6	76637.6	1086045.7
	Germination beds maintenance					579.3					703.7					854.8					1038.4	3176.3
	Infrastructure maintenance					965.6					1172.9					1424.7					1730.6	5293.8
	Total	36597.6	38049.3	39558.6	41127.8	52355.0	44455.3	46218.7	48052.0	49958.1	63595.9	54000.0	56142.1	58369.0	60684.3	77250.2	65594.1	68196.0	70901.2	73713.6	93836.2	1138655.0
2.1.2 Establish forest protection zones.	Perimeter cleaning		601.1		649.7		702.3		759.1		820.6		886.9		958.7		1036.3		1120.1		1210.7	8745.6
	Signs Renewal					707.1					830.5					975.4					1145.5	3658.5
	Surveillance	1927.2	2003.7	2083.2	2165.8	2251.7	2341.0	2433.9	2530.4	2630.8	2735.2	2843.7	2956.5	3073.7	3195.7	3322.4	3454.2	3591.2	3733.7	3881.8	4035.8	57191.7
	Total	1927.2	2604.8	2083.2	2815.5	2958.8	3043.3	2433.9	3289.6	2630.8	4386.2	2843.7	3843.4	3073.7	4154.4	4297.8	4490.5	3591.2	4853.8	3881.8	6392.0	69595.7
2.1.3 Protect and restore natural forest in major recharge areas and riparian zones.	Perimeter cleaning		257.8		278.6		301.2		325.5		351.9		380.3		411.1		444.4		480.3		519.2	3750.3
	Surveillance	826.4	859.2	893.3	928.7	965.6	1003.9	1043.7	1085.1	1128.1	1172.9	1219.4	1267.8	1318.1	1370.4	1424.7	1481.2	1540.0	1601.1	1664.6	1730.6	24524.7
	Signs Renewal					1516.1					1780.6					2091.3					2456.1	7844.1
	Perimeter fence repair		23455.8		25119.8		26903.1		28814.0		30861.9		33056.6		35408.8		37930.0		40632.2		43528.8	325710.9
	Tree replanting	2464.4	2548.2	2634.9	2724.6	2817.3																13189.4
	Total	3290.9	27121.0	3528.2	29051.8	5298.9	28208.1	1043.7	30224.6	1128.1	34167.2	1219.4	34704.7	1318.1	37190.3	3516.0	39855.5	1540.0	42713.6	1664.6	48234.7	375019.3

[illegible]

Project activity	Maintenance activity	Total cost in each year in USD - Costa Rica																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
systems using individual trees.	Repair of tree protection barriers	13867.1	14417.2								19680.4	20461.1									29038.6	97464.4
	Total	15837.6	16465.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22476.9	23368.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33164.9	111313.6
2.1.10 Establish sustainable fuelwood and timber plantations.	Perimeter cleaning		12630.5		13652.4		14757.0		15950.9		17241.4		18636.4		20144.2		21774.0		23535.7		25439.9	183762.3
	Signs Renewal					8914.5					10469.9					12296.6				14442.1	46123.1	
	Surveillance	36445.8	37891.5	39394.5	40957.1	42581.8	44270.9	46026.9	47852.7	49750.8	51724.3	53776.0	55909.2	58126.9	60432.6	62829.8	65322.0	67913.1	70607.0	73407.8	76319.6	1081540.5
	Pruning		16037.1		17334.6								23662.9		25577.4							82612.0
	Thinning					28034.6					34053.8					41365.3					50246.6	153700.2
	Tree replanting	23079.6	23995.1									34054.2	35405.0									116533.9
	Total	59525.4	90554.2	39394.5	71944.1	79530.9	59027.8	46026.9	63803.6	49750.8	113489.4	87830.2	133613.4	58126.9	106154.2	116491.7	87096.0	67913.1	94142.7	73407.8	166448.2	1664272.0
2.1.11 Establish firebreaks for forests and plantations.	Surface vegetation removal	17200.6	17882.9	18592.3	19329.7	20096.5	20893.7	21722.4	22584.1	23479.9	24411.3	25379.6	26386.4	27433.0	28521.2	29652.5	30828.8	32051.6	33323.0	34644.8	36019.1	510433.6
	Vegetation removal at the mineral soil level					13035.2					15834.0					19233.6					23363.2	71466.0
	Total	17200.6	17882.9	18592.3	19329.7	33131.7	20893.7	21722.4	22584.1	23479.9	40245.3	25379.6	26386.4	27433.0	28521.2	48886.2	30828.8	32051.6	33323.0	34644.8	59382.3	581899.6
2.1.12 Construct living barriers for soil conservation.	Renewal of living barriers	0.0	0.0	4019.8	0.0	0.0	4517.4	0.0	0.0	5076.6	0.0	0.0	5705.0	0.0	0.0	6411.2	0.0	0.0	7204.8	0.0	0.0	32934.9
2.1.13 Construct superficial drainage for soil conservation.	Drainage maintenance	6485.4	33292.5	7010.2	35986.1	7577.3	38897.6	8190.4	42044.7	8853.1	45446.4	9569.3	49123.4	10343.6	53097.8	11180.4	57393.8	12085.0	62037.3	13062.8	67056.6	578733.6

- Water/energy efficient technologies

Project activity	Maintenanc e activity	Total cost in each year in USD - Costa Rica																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.2.1 Install Rainwater harvesting systems on public or communit y building	Weed cleaning and cutting around the geomembra ne bag	1990.0	1996.0	2004.0	2014.0	2040.2	2068.7	2097.7	2129.1	2163.2	2197.8	2233.0	2273.2	2318.6	2372.0	2436.0	2514.0	2604.5	2721.7	2841.4	2977.8	45992.8
	Roof cleaning	1740.0	1745.2	1752.2	1761.0	1783.9	1808.8	1834.2	1861.7	1891.5	1921.7	1952.5	1987.6	2027.4	2074.0	2130.0	2198.1	2277.3	2379.8	2484.5	2603.7	40214.8
	Filter and hydraulic accessories cleaning	1840.0	1845.5	1852.9	1862.2	1886.4	1912.8	1939.6	1968.7	2000.2	2032.2	2064.7	2101.8	2143.9	2193.2	2252.4	2324.5	2408.2	2516.5	2627.2	2753.4	42526.0
	Wash the inside of the geomembra ne bag				387.4					537.0					832.0					1232.5		2988.9
	Overhaul and replace hydraulic accessories and filters								528.1				948.6					1293.3				2770.0
	Funds reserve	0.0	249.5	314.7		422.6	471.4		587.2	118.5	739.8	841.3		1048.0	307.9	1209.6	1264.4		1257.1		1172.2	10004.2
	Total	5570.0	5836.3	5923.8	6024.5	6132.9	6261.7	6399.5	6546.7	6710.3	6891.5	7091.4	7311.2	7537.8	7779.1	8028.0	8300.9	8583.2	8875.0	9185.6	9507.1	144496.6
2.2.2 Install 25 Communit y-level rainwater reservoirs	Filter cleaning and cleaning of intake flow areas	5875.0	5892.6	5916.2	5945.8	6023.1	6107.4	6192.9	6285.8	6386.4	6488.5	6592.4	6711.0	6845.2	7002.7	7191.8	7421.9	7689.1	8035.1	8388.6	8791.3	135782.7
	Cleaning and removal of sediments	5500.0	5516.5	5538.6	5566.3	5638.6	5717.6	5797.6	5884.6	5978.7	6074.4	6171.6	6282.7	6408.3	6555.7	6732.7	6948.2	7198.3	7522.2	7853.2	8230.1	127115.8
	Overhauling, cleaning and mechanical maintenance of aeration and recirculation system	4850.0	4864.6	4884.0	4908.4	4972.2	5041.8	5112.4	5189.1	5272.1	5356.5	5442.2	5540.2	5651.0	5780.9	5937.0	6127.0	6347.6	6633.2	6925.1	7257.5	112093.0

Project activity	Maintenance activity	Total cost in each year in USD - Costa Rica																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Cleaning of solar panel and base setting	2700.0	2708.1	2718.9	2732.5	2768.0	2806.8	2846.1	2888.8	2935.0	2982.0	3029.7	3084.2	3145.9	3218.3	3305.1	3410.9	3533.7	3692.7	3855.2	4040.3	62402.3
	Hydraulic cleaning tools and devices to clean the filtration area and pipe	2500.0	2507.5	2517.5	2530.1	2563.0	2598.9	2635.3	2674.8	2717.6	2761.1	2805.3	2855.8	2912.9	2979.9	3060.3	3158.3	3272.0	3419.2	3569.6	3741.0	57779.9
	Replace device parts				4510.3					5974.0					8537.2				9555.6			28577.0
	Lubrication of motor pump	2200.0	2206.6	2215.4	2226.5	2255.4	2287.0	2319.0	2353.8	2391.5	2429.8	2468.6	2513.1	2563.3	2622.3	2693.1	2779.3	2879.3	3008.9	3141.3	3292.1	50846.3
	Rectification, balancing and alignment activities for the solar motor-pump							5285.5					7503.0				9313.4					22101.8
	Funds reserve	3500.0	3836.0	4154.2		4711.1	4979.5		5606.4		6417.8	6943.1		8032.4		8951.2		9570.3		9599.2	9496.7	85797.8
	Total	27125.0	27531.9	27944.9	28419.9	28931.5	29539.0	30188.9	30883.3	31655.3	32510.0	33452.8	34489.8	35559.0	36696.9	37871.2	39158.8	40490.2	41866.9	43332.2	44848.9	682496.6

### 3.2 Guatemala

- EbA activities**

Project activity	Maintenance activity	Total cost in each year in USD - Guatemala																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.1. Establish tree nurseries focused on native species	Irrigation System Renewal	1509.9	1643.1	1788.0	1945.8	2117.4	2304.2	2507.5	2728.7	2969.4	3231.4	3516.4	3826.6	4164.2	4531.6	4931.3	5366.4	5839.8	6355.0	6915.6	7525.6	75717.8
	Annual operation	26107.3	28410.5	30916.8	33644.2	36612.2	39842.1	43356.9	47181.7	51344.0	55873.5	60802.5	66166.4	72003.5	78355.5	85267.8	92790.0	100975.7	109883.6	119577.3	130126.2	1309238.0
	Germination beds					435.9					665.3					1015.2					1549.3	3665.7



Project activity	Mainenan ce activity	Total cost in each year in USD - Guatemala																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	maintenan ce																					
	Infrastruct ure mainten ance					726.5					1108.8					1692.1					2582.2	6109.6
	Total	27617 .2	30053. 6	32704 .8	35590 .0	39892. 1	42146 .3	45864 .4	49910 .4	54313 .4	60878. 9	64319. 0	69993. 0	76167. 7	82887. 0	92906. 5	98156. 4	106815 .5	116238 .6	126492 .9	141783 .4	1394731 .1
2.1.2 Establish forest protection zones.	Perimeter cleaning		395.1		467.9		554.1		656.1		777.0		920.2		1089.7		1290.4		1528.1		1809.6	9488.2
	Signs Renewal					741.9					905.7					1105.7					1349.8	4103.1
	Surveillanc e	1210. 2	1317.0	1433. 2	1559. 6	1697.2	1846. 9	2009. 8	2187. 1	2380. 1	2590.0	2818.5	3067.2	3337.8	3632.2	3952.6	4301.3	4680.8	5093.7	5543.1	6032.1	60690.5
	Total	1210. 2	1712.1	1433. 2	2027. 5	2439.1	2401. 0	2009. 8	2843. 3	2380. 1	4272.8	2818.5	3987.3	3337.8	4721.9	5058.3	5591.7	4680.8	6621.8	5543.1	9191.5	74281.7
2.1.3 Protect and restore natural forest in major recharge areas and riparian zones.	Perimeter cleaning		169.1		200.3		237.2		280.9		332.6		393.9		466.5		552.4		654.2		774.7	4061.7
	Surveillanc e	518.1	563.8	613.5	667.6	726.5	790.6	860.4	936.3	1018. 9	1108.8	1206.6	1313.0	1428.8	1554.9	1692.1	1841.3	2003.8	2180.5	2372.9	2582.2	25980.5
	Signs Renewal					1588.1					1938.6					2366.6					2889.0	8782.3
	Perimeter fence repair		21323. 5		23579 .3		26111 .9		28960 .5		32171. 0		35796. 4		39898. 6		44549. 5		49833. 0		55847. 0	358070. 8
	Tree replanting	2322. 2	2430.5	2544. 5	2664. 5	2790.8																12752.4
	Total	2840. 2	24486. 9	3158. 0	27111 .7	5105.3	27139 .7	860.4	30177 .7	1018. 9	35551. 0	1206.6	37503. 3	1428.8	41920. 0	4058.7	46943. 2	2003.8	52667. 7	2372.9	62092. 9	409647. 7
2.1.4 Restore forested areas across seven catchments .	Perimeter cleaning		399.2		472.7		559.8		662.9		785.0		929.6		1100.9		1303.7		1543.8		1828.2	9585.6
	Surveillanc e	1222. 7	1330.5	1447. 9	1575. 6	1714.6	1865. 9	2030. 5	2209. 6	2404. 5	2616.7	2847.5	3098.7	3372.1	3669.5	3993.2	4345.5	4728.9	5146.0	5600.0	6094.0	61314.0
	Signs Renewal					749.6					915.0					1117.0					1363.6	4145.3
	Tree replanting	6313. 3	6607.9	6917. 8	7243. 9	7587.3																34670.2
	Total	7535. 9	8337.5	8365. 7	9292. 2	10051. 5	2425. 6	2030. 5	2872. 5	2404. 5	4316.7	2847.5	4028.3	3372.1	4770.4	5110.3	5649.2	4728.9	6689.9	5600.0	9285.9	109715. 1
2.1.5 Restore pine forests in	Perimeter cleaning		169.1		200.3		237.2		280.9		332.6		393.9		466.5		552.4		654.2		774.7	4061.7
	Surveillanc e	518.1	563.8	613.5	667.6	726.5	790.6	860.4	936.3	1018. 9	1108.8	1206.6	1313.0	1428.8	1554.9	1692.1	1841.3	2003.8	2180.5	2372.9	2582.2	25980.5

Project activity	Maintenance activity	Total cost in each year in USD - Guatemala																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Guatemala, Honduras and Nicaragua.	Signs Renewal					317.6					387.7					473.3					577.8	1756.5
	Tree replanting	2911.4	3168.2	3447.7	3751.9	4082.9																17362.0
	Total	3429.5	3901.1	4061.2	4619.8	5127.0	1027.8	860.4	1217.2	1018.9	1829.1	1206.6	1706.9	1428.8	2021.4	2165.4	2393.7	2003.8	2834.7	2372.9	3934.7	49160.7
2.1.6 Establish agroforestry systems using diversified living fence arrangements in basic grains crops.	Fence repair		30239.0		34219.6		38801.5		44084.5		50185.8		57243.2		65419.1		74904.3		85923.8		98742.3	579763.1
	Renewal of live posts					1581.7					1930.9					2357.1					2877.5	8747.2
	Renewal of dead posts					12653.6					15447.0					18857.0					23019.9	69977.5
	Total	0.0	30239.0	0.0	34219.6	14235.3	38801.5	0.0	44084.5	0.0	67563.6	0.0	57243.2	0.0	65419.1	21214.2	74904.3	0.0	85923.8	0.0	124639.7	658487.8
2.1.7 Establish agroforestry systems for natural shade in coffee plantations.	Multi-purpose tree replanting	17089.5	18597.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36574.1	39800.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85178.9	197240.2
2.1.8 Establish silvopasture systems using diversified living fence arrangements.	Fence repair	13696.6	35597.5		40032.1		45107.3		50926.4		57610.6		65302.2		74168.0		84404.3		96241.7		109951.5	673038.1
	Tree replanting	2080.0	2164.7	2252.8	2344.5	2439.9					2978.5					3636.0					4438.7	22335.1
	Renewal of dead posts					12729.8					15540.1					18970.6					23158.6	70399.1
	Total	15776.6	37762.2	2252.8	42376.6	15169.7	45107.3	0.0	50926.4	0.0	76129.2	0.0	65302.2	0.0	74168.0	22606.7	84404.3	0.0	96241.7	0.0	137548.8	765772.3
2.1.9 Establish silvopasture systems using individual trees.	Multi-purpose tree replanting	2054.0	2235.2								4395.8	4783.6									10237.5	23706.0
	Repair of tree protection barriers	15143.8	16479.8								32409.9	35269.1									75480.9	174783.4
	Total	17197.8	18714.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36805.7	40052.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85718.4	198489.4
2.1.10 Establish	Perimeter cleaning		14376.3		17024.7		20161.0		23875.0		28273.2		33481.6		39649.6		46953.8		55603.5		65846.7	345245.4

Project activity	Maintenance activity	Total cost in each year in USD - Guatemala																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
sustainable fuelwood and timber plantations.	Signs Renewal					16198.2					19774.0					24139.3					29468.2	89579.7
	Surveillance	39632.7	43129.0	46933.7	51074.1	55579.8	60482.9	65818.6	71625.0	77943.6	84819.6	92302.2	100444.9	109306.0	118948.7	129442.2	140861.3	153287.8	166810.5	181526.2	197540.1	1987508.8
	Pruning		18253.8		21616.5								42512.1		50343.6							132726.1
	Thinning					36592.1					55842.7					85220.9					130054.5	307710.2
	Tree replanting	37278.4	40567.0									86819.2	94478.2									259142.8
	Total	76911.0	116326.1	46933.7	89715.3	108370.0	80643.9	65818.6	95500.0	77943.6	188709.5	179121.4	270916.9	109306.0	208942.0	238802.3	187815.0	153287.8	222414.0	181526.2	422909.5	3121912.9
2.1.11 Establish firebreaks for forests and plantations.	Surface vegetation removal	24661.3	26836.9	29204.4	31780.7	34584.4	37635.3	40955.5	44568.5	48500.2	52778.8	57434.8	62501.6	68015.4	74015.6	80545.1	87650.6	95382.9	103797.4	112954.2	122918.8	1236722.3
	Vegetation removal at the mineral soil level					13077.6					19957.6					30457.0					46480.0	109972.1
	Total	24661.3	26836.9	29204.4	31780.7	47662.0	37635.3	40955.5	44568.5	48500.2	72736.3	57434.8	62501.6	68015.4	74015.6	111002.0	87650.6	95382.9	103797.4	112954.2	169398.8	1346694.4
2.1.12 Construct living barriers for soil conservation.	Renewal of living barriers	0.0	0.0	3128.9	0.0	0.0	4032.2	0.0	0.0	5196.2	0.0	0.0	6696.3	0.0	0.0	8629.5	0.0	0.0	11120.7	0.0	0.0	38803.9
2.1.13 Construct superficial drainage for soil conservation.	Drainage maintenance	8052.7	28506.6	9536.1	33758.0	11292.9	39976.8	13373.2	47341.3	15836.8	56062.4	18754.2	66390.2	22209.1	78620.5	26300.5	93103.8	31145.5	110255.2	36883.0	130566.3	877965.1

- Water/energy efficient technologies

Project activity	Maintenance activity	Total cost in each year in USD - Guatemala																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.2.1 Install Rainwater harvesting systems on public or community building	Weed cleaning and cutting around the geomembrane bag	1415.2	1419.4	1425.1	1432.2	1450.9	1471.2	1491.8	1514.2	1538.4	1563.0	1588.0	1616.6	1648.9	1686.8	1732.4	1787.8	1852.2	1935.5	2020.7	2117.7	32708.0
	Roof cleaning	1134.8	1138.2	1142.8	1148.5	1163.4	1179.7	1196.2	1214.1	1233.6	1253.3	1273.4	1296.3	1322.2	1352.6	1389.1	1433.6	1485.2	1552.0	1620.3	1698.1	26227.4
	Filter and hydraulic accessories cleaning	1200.0	1203.6	1208.4	1214.5	1230.2	1247.5	1264.9	1283.9	1304.4	1325.3	1346.5	1370.8	1398.2	1430.3	1469.0	1516.0	1570.5	1641.2	1713.4	1795.7	27734.3
	Wash the inside of the geomembrane bag				133.8					299.9					603.5					636.2		1673.5
	Overhaul and replace hydraulic accessories and filters							220.7					484.6					689.8				1395.0
	Funds reserve	0.0	45.0	87.0		155.2	185.4		257.4		352.8	416.9		546.7	0.0	645.2	676.3		659.3		588.9	4616.0
	Total	3750.0	3806.3	3863.3	3929.0	3999.7	4083.7	4173.6	4269.6	4376.3	4494.5	4624.8	4768.2	4916.0	5073.3	5235.7	5413.7	5597.7	5788.1	5990.6	6200.3	94354.3
2.2.2 Install Community-level rainwater reservoirs in target communities	Filter cleaning and cleaning of intake flow areas	3525.0	3535.6	3549.7	3567.5	3613.8	3664.4	3715.7	3771.5	3831.8	3893.1	3955.4	4026.6	4107.1	4201.6	4315.1	4453.1	4613.5	4821.1	5033.2	5274.8	81469.6
	Cleaning and removal of sediments	3300.0	3309.9	3323.1	3339.8	3383.2	3430.5	3478.6	3530.7	3587.2	3644.6	3702.9	3769.6	3845.0	3933.4	4039.6	4168.9	4319.0	4513.3	4711.9	4938.1	76269.5
	Overhauling, cleaning and mechanical maintenance of aeration and recirculation system	2910.0	2918.7	2930.4	2945.1	2983.3	3025.1	3067.5	3113.5	3163.3	3213.9	3265.3	3324.1	3390.6	3468.6	3562.2	3676.2	3808.6	3979.9	4155.1	4354.5	67255.8
	Cleaning of solar panel and base setting	1620.0	1624.9	1631.4	1639.5	1660.8	1684.1	1707.7	1733.3	1761.0	1789.2	1817.8	1850.5	1887.5	1931.0	1983.1	2046.5	2120.2	2215.6	2313.1	2424.2	37441.4

Project activity	Maintenance activity	Total cost in each year in USD - Guatemala																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Hydraulic cleaning tools and devices to clean the filtration area and pipe	1500.0	1504.5	1510.5	1518.1	1537.8	1559.3	1581.2	1604.9	1630.6	1656.7	1683.2	1713.5	1747.7	1787.9	1836.2	1895.0	1963.2	2051.5	2141.8	2244.6	34667.9
	Replace device parts				2706.2					3584.4					5122.3				5733.4			17146.3
	Lubrication of motor pump	1320.0	1324.0	1329.3	1335.9	1353.3	1372.2	1391.4	1412.3	1434.9	1457.9	1481.2	1507.8	1538.0	1573.4	1615.9	1667.6	1727.6	1805.3	1884.8	1975.2	30507.8
	Rectification, balancing and alignment activities for the solar motor-pump								3171.3					4501.8				5588.0				13261.1
	Funds reserve	2100.0	2301.6	2492.5		2826.6	2987.8		3363.8		3850.7	4165.9		4819.4		5370.7		5742.2		5759.5	5698.0	51478.7

### 3.3 Honduras

- EbA activities

Project activity	Maintenance activity	Total cost in each year in USD - Honduras																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.1. Establish tree nurseries focused on native species	Irrigation System Renewal	1619.6	1666.4	1714.5	1764.0	1815.0	1867.4	1921.3	1976.8	2033.9	2092.6	2153.0	2215.2	2279.2	2345.0	2412.7	2482.4	2554.1	2627.8	2703.7	2781.8	43026.7
	Annual operation	23152.5	23821.0	24508.9	25216.7	25944.9	26694.1	27464.9	28258.0	29074.0	29913.6	30777.4	31666.2	32580.6	33521.5	34489.5	35485.4	36510.2	37564.5	38649.2	39765.3	615058.6
	Germination beds maintenance					283.3					326.6					376.6					434.2	1420.8
	Infrastructure maintenance					472.2					544.4					627.7					723.7	2368.0
	Total		24772.1	25487.5	26223.5	26980.7	28515.3	28561.5	29386.2	30234.8	31107.9	32877.3	32930.5	33881.4	34859.8	35866.5	37906.5	37967.8	39064.2	40192.3	41352.9	43705.0

Project activity	Maintenance activity	Total cost in each year in USD - Honduras																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.2 Establish forest protection zones.	Perimeter cleaning		260.1		275.4		291.5		308.6		326.6		345.8		366.0		387.5		410.2		434.2	3405.9
	Signs Renewal					789.4					992.2					1247.1					1567.5	4596.3
	Surveillance	842.7	867.0	892.1	917.8	944.4	971.6	999.7	1028.5	1058.2	1088.8	1120.3	1152.6	1185.9	1220.1	1255.4	1291.6	1328.9	1367.3	1406.8	1447.4	22387.2
	Total	842.7	1127.2	892.1	1193.2	1733.8	1263.1	999.7	1337.1	1058.2	2407.7	1120.3	1498.4	1185.9	1586.2	2502.5	1679.1	1328.9	1777.5	1406.8	3449.2	30389.4
2.1.3 Protect and restore natural forest in major recharge areas and riparian zones.	Perimeter cleaning		117.1		123.9		131.2		138.9		147.0		155.6		164.7		174.4		184.6		195.4	1532.6
	Surveillance	379.2	390.2	401.4	413.0	425.0	437.2	449.9	462.8	476.2	490.0	504.1	518.7	533.6	549.1	564.9	581.2	598.0	615.3	633.0	651.3	10074.2
	Signs Renewal					1776.2					2232.5					2806.1					3527.0	10341.8
	Perimeter fence repair	98.6	21485.7		23420.1		25532.6		27839.7		30359.7		33112.5		36119.8		39405.6		42995.9		46919.3	327289.6
	Tree replanting	2432.3	2542.2	2657.3	2777.6	2903.4																13312.7
	Total	2910.1	24535.1	3058.7	26734.6	5104.5	26101.0	449.9	28441.4	476.2	33229.2	504.1	33786.8	533.6	36833.6	3371.0	40161.2	598.0	43795.8	633.0	51293.0	362550.9
2.1.4 Restore forested areas across seven catchments.	Perimeter cleaning		260.1		275.4		291.5		308.6		326.6		345.8		366.0		387.5		410.2		434.2	3405.9
	Surveillance	842.7	867.0	892.1	917.8	944.4	971.6	999.7	1028.5	1058.2	1088.8	1120.3	1152.6	1185.9	1220.1	1255.4	1291.6	1328.9	1367.3	1406.8	1447.4	22387.2
	Signs Renewal					789.4					992.2					1247.1					1567.5	4596.3
	Tree replanting	6226.6	6508.1	6802.6	7110.5	7432.6																34080.5
	Total	7069.3	7635.3	7694.7	8303.7	9166.4	1263.1	999.7	1337.1	1058.2	2407.7	1120.3	1498.4	1185.9	1586.2	2502.5	1679.1	1328.9	1777.5	1406.8	3449.2	64469.8
2.1.5 Restore pine forests in Guatemala, Honduras and Nicaragua.	Perimeter cleaning		117.1		123.9		131.2		138.9		147.0		155.6		164.7		174.4		184.6		195.4	1532.6
	Surveillance	379.2	390.2	401.4	413.0	425.0	437.2	449.9	462.8	476.2	490.0	504.1	518.7	533.6	549.1	564.9	581.2	598.0	615.3	633.0	651.3	10074.2
	Signs Renewal					355.2					446.5					561.2					705.4	2068.4
	Tree replanting	2732.4	2811.3	2892.4	2976.0	3061.9																14473.9
	Total	3111.6	3318.5	3293.9	3512.9	3842.1	568.4	449.9	601.7	476.2	1083.5	504.1	674.3	533.6	713.8	1126.1	755.6	598.0	799.9	633.0	1552.1	28149.2
2.1.6 Establish agroforestry systems using diversified	Fence repair		27434.0		29686.2		32132.1		34789.1		37675.8		40813.0		44223.0		47930.3		51961.8		56346.6	402991.9
	Renewal of live posts					1776.2					2232.5					2806.1					3527.0	10341.8
	Renewal of dead posts					14209.7					17860.2					22448.6					28215.7	82734.2

Project activity	Maintenance activity	Total cost in each year in USD - Honduras																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
living fence arrangements in basic grains crops.	Total	0.0	27434.0	0.0	29686.2	15985.9	32132.1	0.0	34789.1	0.0	57768.6	0.0	40813.0	0.0	44223.0	25254.7	47930.3	0.0	51961.8	0.0	88089.3	496067.9
2.1.7 Establish agroforestry systems for natural shade in coffee plantations.	Multi-purpose tree replanting	16377.6	16850.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21160.3	21771.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28129.2	104288.9
2.1.8 Establish silvopasture systems using diversified living fence arrangements.	Fence repair	9429.7	30904.4		33514.0		36353.0		39442.2		42804.3		46464.0		50448.5		54787.3		59512.8		64660.2	468320.6
	Tree replanting	2117.0	2216.1	2319.8	2428.3	2542.0					3195.0					4015.8					5047.5	23881.5
	Renewal of dead posts					13262.4					16669.6					20952.0					26334.6	77218.6
	Total	11546.8	33120.5	2319.8	35942.4	15804.4	36353.0	0.0	39442.2	0.0	62668.9	0.0	46464.0	0.0	50448.5	24967.8	54787.3	0.0	59512.8	0.0	96042.4	569420.7
2.1.9 Establish silvopasture systems using individual trees.	Multi-purpose tree replanting	1809.0	1861.2								2337.2	2404.7									3107.0	11519.1
	Repair of tree protection barriers	13550.6	13941.9								17507.7	18013.3									23273.7	86287.1
	Total	15359.5	15803.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19844.9	20418.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26380.6	97806.2
	Total																					
2.1.10 Establish sustainable fuelwood and timber plantations.	Perimeter cleaning		9104.0		9637.4		10202.0		10799.7		11432.5		12102.3		12811.3		13561.9		14356.5		15197.6	119205.4
	Signs Renewal					16578.0					20837.0					26190.0					32918.3	96523.3
	Surveillance	26545.5	27312.0	28100.7	28912.2	29747.1	30606.1	31489.9	32399.2	33334.8	34297.5	35287.9	36306.9	37355.3	38434.0	39543.9	40685.8	41860.7	43069.5	44313.3	45592.9	705195.3
	Pruning		11559.5		12236.7								15366.5		16266.8							55429.4
	Thinning					19584.6					22580.4					26034.5					30017.0	98216.6
	Tree replanting	31050.5	31947.1									41276.5	42468.5									146742.6
	Total	57595.9	79922.6	28100.7	50786.3	65909.7	40808.1	31489.9	43199.0	33334.8	89147.3	76564.4	106244.1	37355.3	67512.1	91768.5	54247.8	41860.7	57426.0	44313.3	123725.9	1221312.6

Project activity	Maintenance activity	Total cost in each year in USD - Honduras																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.11 Establish firebreaks for forests and plantations.	Surface vegetation removal	26292.8	27052.1	27833.3	28637.0	29464.0	30314.8	31190.2	32090.9	33017.6	33971.1	34952.1	35961.4	36999.8	38068.3	39167.6	40298.6	41462.3	42659.7	43891.5	45159.0	698484.2
	Vegetation removal at the mineral soil level					8499.2					9799.3					11298.3					13026.5	42623.2
	Total	26292.8	27052.1	27833.3	28637.0	37963.2	30314.8	31190.2	32090.9	33017.6	43770.3	34952.1	35961.4	36999.8	38068.3	50465.8	40298.6	41462.3	42659.7	43891.5	58185.6	741107.5
2.1.12 Construct living barriers for soil conservation.	Renewal of living barriers	0.0	0.0	1784.2	0.0	0.0	1943.2	0.0	0.0	2116.5	0.0	0.0	2305.2	0.0	0.0	2510.7	0.0	0.0	2734.6	0.0	0.0	13394.4
2.1.13 Construct superficial drainage for soil conservation.	Drainage maintenance	6775.0	18878.1	7171.9	19984.1	7592.1	21154.9	8036.9	22394.4	8507.8	23706.4	9006.2	25095.3	9533.9	26565.6	10092.4	28122.0	10683.7	29769.7	11309.7	31513.8	335893.9

- Water/energy-efficient technologies**

Project activity	Maintenance activity	Total cost in each year in USD - Honduras																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.2.1 Install Rainwater harvesting systems on public or community building	Weed cleaning and cutting around the geomembrane bag	3868.2	3879.8	3895.3	3914.8	3965.7	4021.2	4077.5	4138.7	4204.9	4272.2	4340.5	4418.7	4507.0	4610.7	4735.2	4886.7	5062.6	5290.5	5523.2	5788.4	89401.9
	Roof cleaning	3101.8	3111.1	3123.5	3139.1	3180.0	3224.5	3269.6	3318.7	3371.8	3425.7	3480.5	3543.2	3614.0	3697.2	3797.0	3918.5	4059.5	4242.2	4428.9	4641.5	71688.2
	Filter and hydraulic accessories cleaning	3280.0	3289.8	3303.0	3319.5	3362.7	3409.7	3457.5	3509.3	3565.5	3622.5	3680.5	3746.8	3821.7	3909.6	4015.1	4143.6	4292.8	4486.0	4683.4	4908.2	75807.2



Project activity	Maintenance activity	Total cost in each year in USD - Honduras																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Wash the inside of the geomembrane bag				365.9					819.8					1649.6					1738.9		4574.1
	Overhaul and replace hydraulic accessories and filters							603.2					1324.4					1885.5				3813.1
	Funds reserve	0.0	123.0	237.9		424.3	506.8		703.5		964.5	1139.6		1494.3	0.0	1763.5	1848.5		1802.0		1609.5	12617.4
	Total	10250.0	10403.7	10559.8	10739.3	10932.6	11162.2	11407.8	11670.2	11961.9	12284.9	12641.2	13033.0	13437.0	13867.0	14310.8	14797.3	15300.5	15820.7	16374.4	16947.5	257901.9
2.2.2 Install Community-level rainwater reservoirs in target communities	Filter cleaning and cleaning of intake flow areas	4935.0	4949.8	4969.6	4994.5	5059.4	5130.2	5202.0	5280.1	5364.5	5450.4	5537.6	5637.3	5750.0	5882.3	6041.1	6234.4	6458.8	6749.5	7046.5	7384.7	114057.5
	Cleaning and removal of sediments	4620.0	4633.9	4652.4	4675.7	4736.4	4802.8	4870.0	4943.0	5022.1	5102.5	5184.1	5277.4	5383.0	5506.8	5655.5	5836.5	6046.6	6318.7	6596.7	6913.3	106777.2
	Overhauling, cleaning and mechanical maintenance of aeration and recirculation system	4074.0	4086.2	4102.6	4123.1	4176.7	4235.2	4294.4	4358.9	4428.6	4499.5	4571.5	4653.7	4746.8	4856.0	4987.1	5146.7	5332.0	5571.9	5817.1	6096.3	94158.1
	Cleaning of solar panel and base setting	2268.0	2274.8	2283.9	2295.3	2325.2	2357.7	2390.7	2426.6	2465.4	2504.9	2544.9	2590.7	2642.6	2703.3	2776.3	2865.2	2968.3	3101.9	3238.4	3393.8	52417.9
	Hydraulic cleaning tools and devices to clean the filtration area and pipe	2100.0	2106.3	2114.7	2125.3	2152.9	2183.1	2213.6	2246.8	2282.8	2319.3	2356.4	2398.8	2446.8	2503.1	2570.7	2652.9	2748.4	2872.1	2998.5	3142.4	48535.1
	Replace device parts				3788.7						5018.2					7171.2				8026.7		

Project activity	Maintenance activity	Total cost in each year in USD - Honduras																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Lubrication of motor pump	1848.0	1853.5	1861.0	1870.3	1894.6	1921.1	1948.0	1977.2	2008.9	2041.0	2073.6	2111.0	2153.2	2202.7	2262.2	2334.6	2418.6	2527.5	2638.7	2765.3	42710.9
	Rectification, balancing and alignment activities for the solar motor-pump							4439.9					6302.5				7823.2					18565.6
	Funds reserve	2940.0	3222.2	3489.5		3957.3	4182.8		4709.3		5390.9	5832.2		6747.2		7519.0		8039.1		8063.4	7977.2	72070.1
	Total	22785.0	23126.8	23473.7	23872.7	24302.4	24812.8	25358.7	25941.9	26590.5	27308.4	28100.4	28971.5	29869.6	30825.4	31811.8	32893.4	34011.8	35168.2	36399.1	37673.1	573297.1

### 3.4 El Salvador

- EbA activities

Project activity	Maintenance activity	Total cost in each year in USD - El Salvador																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.1. Establish tree nurseries focused on native species	Irrigation System Renewal	1450.1	1546.4	1649.2	1758.8	1875.7	2000.3	2133.3	2275.0	2426.2	2587.4	2759.4	2942.8	3138.3	3346.9	3569.3	3806.5	4059.4	4329.2	4616.9	4923.7	57194.7
	Annual operation	17629.6	18801.1	20050.5	21382.9	22803.9	24319.3	25935.4	27658.9	29496.9	31457.1	33547.5	35776.8	38154.3	40689.8	43393.8	46277.5	49352.8	52632.4	56130.0	59860.0	695350.5
	Germination beds maintenance					226.2					312.0					430.4					593.7	1562.3
	Infrastructure maintenance					377.0					520.0					717.3					989.5	2603.8
	Total	19079.7	20347.6	21699.7	23141.7	25282.7	26319.6	28068.7	29933.9	31923.1	34876.5	36306.9	38719.6	41292.7	44036.7	48110.8	50083.9	53412.2	56961.6	60746.9	66366.9	756711.3
2.1.2 Establish forest protection zones.	Perimeter cleaning		223.8		254.5		289.4		329.2		374.4		425.8		484.3		550.8		626.4		712.5	4271.1
	Signs Renewal					649.3					693.4					740.5					790.8	2873.9
	Surveillance	699.4	745.9	795.5	848.3	904.7	964.8	1028.9	1097.3	1170.2	1248.0	1330.9	1419.4	1513.7	1614.3	1721.6	1836.0	1958.0	2088.1	2226.9	2374.8	27586.9
	Total	699.4	969.7	795.5	1102.8	1554.0	1254.3	1028.9	1426.5	1170.2	2315.8	1330.9	1845.2	1513.7	2098.6	2462.1	2386.8	1958.0	2714.5	2226.9	3878.1	34731.9

[illegible]

Project activity	Maintenance activity	Total cost in each year in USD - El Salvador																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
using individual trees.	Repair of tree protection barriers	19428.4	20719.5								34666.8	36970.5									65967.8	177752.9
	Total	21992.2	23453.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39241.5	41849.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	74673.0	201209.5
2.1.10 Establish sustainable fuelwood and timber plantations.	Perimeter cleaning		8158.3		9278.6		10552.8		12001.9		13650.1		15524.5		17656.4		20081.1		22838.6		25974.9	155717.3
	Signs Renewal					14202.4					15167.6					16198.3					17299.0	62867.3
	Surveillance	22949.8	24474.9	26101.4	27835.9	29685.7	31658.4	33762.2	36005.8	38398.5	40950.2	43671.5	46573.6	49668.6	52969.3	56489.3	60243.2	64246.5	68515.9	73069.0	77924.7	905194.6
	Pruning		10358.7		11781.2								19711.7		22418.6							64270.3
	Thinning					19544.2					26960.4					37190.9					51303.3	134998.8
	Tree replanting	33248.2	35457.6									63268.4	67472.8									199447.0
	Total	56198.0	78449.6	26101.4	48895.8	63432.3	42211.2	33762.2	48007.8	38398.5	96728.3	106939.9	149282.7	49668.6	93044.3	109878.4	80324.2	64246.5	91354.5	73069.0	172501.9	1522495.3
2.1.11 Establish firebreaks for forests and plantations.	Surface vegetation removal	29296.7	31243.6	33319.8	35534.0	37895.4	40413.6	43099.3	45963.4	49017.8	52275.2	55749.0	59453.7	63404.6	67618.1	72111.5	76903.6	82014.1	87464.2	93276.5	99475.0	1155529.3
	Vegetation removal at the mineral soil level					8481.6					11700.1					16139.8					22264.2	58585.7
	Total	29296.7	31243.6	33319.8	35534.0	46377.0	40413.6	43099.3	45963.4	49017.8	63975.2	55749.0	59453.7	63404.6	67618.1	88251.3	76903.6	82014.1	87464.2	93276.5	121739.2	1214114.9
2.1.12 Construct living barriers for soil conservation.	Renewal of living barriers	0.0	0.0	2485.8	0.0	0.0	3015.1	0.0	0.0	3657.0	0.0	0.0	4435.6	0.0	0.0	5379.9	0.0	0.0	6525.3	0.0	0.0	25498.8
2.1.13 Construct superficial drainage for soil conservation.	Drainage maintenance	11373.2	28134.9	12935.0	31998.4	14711.3	36392.5	16731.5	41390.0	19029.1	47073.8	21642.2	53538.1	24614.2	60890.1	27994.3	69251.7	31838.6	78761.6	36210.7	89577.3	754088.8

- Water/energy-efficient technologies

Project activity	Maintenance activity	Total cost in each year in USD - El Salvador																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.2.2 Install Community-level rainwater reservoirs in target communities	Filter cleaning and cleaning of intake flow areas	2820.0	2828.5	2839.8	2854.0	2891.1	2931.5	2972.6	3017.2	3065.5	3114.5	3164.3	3221.3	3285.7	3361.3	3452.0	3562.5	3690.8	3856.8	4026.5	4219.8	65175.7
	Cleaning and removal of sediments	2640.0	2647.9	2658.5	2671.8	2706.5	2744.4	2782.9	2824.6	2869.8	2915.7	2962.4	3015.7	3076.0	3146.7	3231.7	3335.1	3455.2	3610.7	3769.5	3950.5	61015.6
	Overhauling , cleaning and mechanical maintenance of aeration and recirculation system	2328.0	2335.0	2344.3	2356.0	2386.7	2420.1	2454.0	2490.8	2530.6	2571.1	2612.3	2659.3	2712.5	2774.9	2849.8	2941.0	3046.8	3183.9	3324.0	3483.6	53804.6
	Cleaning of solar panel	1296.0	1299.9	1305.1	1311.6	1328.7	1347.3	1366.1	1386.6	1408.8	1431.3	1454.2	1480.4	1510.0	1544.8	1586.5	1637.2	1696.2	1772.5	1850.5	1939.3	29953.1
	Hydraulic cleaning tools and devices to clean the filtration area and pipe	1200.0	1203.6	1208.4	1214.5	1230.2	1247.5	1264.9	1283.9	1304.4	1325.3	1346.5	1370.8	1398.2	1430.3	1469.0	1516.0	1570.5	1641.2	1713.4	1795.7	27734.3
	Replace device parts				2165.0					2867.5					4097.8				4586.7			13717.0
	Lubrication of motor pump	1056.0	1059.2	1063.4	1068.7	1082.6	1097.8	1113.1	1129.8	1147.9	1166.3	1184.9	1206.3	1230.4	1258.7	1292.7	1334.0	1382.1	1444.3	1507.8	1580.2	24406.2
	Rectification, balancing and alignment activities for the solar motor-pump							2536.9					3601.4				4470.4					10608.8
	Funds reserve	1680.0	1841.3	1994.0		2261.3	2390.2		2691.1		3080.5	3332.7		3855.6		4296.6		4593.7		4607.6	4558.4	41182.9

Project activity	Maintenance activity	Total cost in each year in USD - El Salvador																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Total	13020.0	13215.3	13413.5	13641.6	13887.1	14178.7	14490.5	14824.0	15194.5	15604.8	16057.4	16555.1	17068.3	17614.5	18178.2	18796.2	19435.3	20096.1	20799.5	21527.5	327598.2
Install Community-level water pumping systems by solar panels	Overhauling , cleaning and mechanical maintenance of the solar pump system	7450.0	7472.4	7502.2	7539.8	7637.8	7744.7	7853.1	7970.9	8098.5	8228.0	8359.7	8510.2	8680.4	8880.0	9119.8	9411.6	9750.4	10189.2	10637.5	11148.1	172184.1
	Cleaning of solar panels	5100.0	5115.3	5135.8	5161.4	5228.5	5301.7	5376.0	5456.6	5543.9	5632.6	5722.7	5825.7	5942.3	6078.9	6243.1	6442.8	6674.8	6975.1	7282.1	7631.6	117871.0
	Lubrication of solar motor pump	4600.0	4613.8	4632.3	4655.4	4715.9	4782.0	4848.9	4921.6	5000.4	5080.4	5161.7	5254.6	5359.7	5483.0	5631.0	5811.2	6020.4	6291.3	6568.1	6883.4	106315.0
	Rectification of bearing parts, electrical balance adjustment, and alignment for the solar motor pump			3545.4				4409.3					6100.5				7715.0					21770.2
	Replacement of mechanical parts of solar pump					3968.4				4936.8					6893.1					7789.9		23588.1
	Funds reserve	3055.0	3306.6		3813.0		4174.8		4655.3		5275.2	5674.4		6505.1		7215.9	7503.2		7730.4		7744.2	66652.9
	Total	20205.0	20508.0	20815.7	21169.6	21550.6	22003.2	22487.2	23004.4	23579.6	24216.2	24918.5	25691.0	26487.4	27335.0	28209.7	29168.8	30160.6	31186.0	32277.5	33407.2	508381.2

### 3.5 Nicaragua

- EbA activities

Project activity	Maintenance activity	Total cost in each year in USD - Nicaragua																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.1. Establish tree nurseries focused on native species	Irrigation System Renewal	1413.7	1488.7	1567.6	1650.7	1738.2	1830.3	1927.3	2029.5	2137.1	2250.4	2369.7	2495.3	2627.5	2766.8	2913.5	3067.9	3230.5	3401.8	3582.1	3771.9	48260.4
	Annual operation	15757.0	16592.3	17471.8	18397.9	19373.1	20400.0	21481.3	22620.0	23819.0	25081.6	26411.1	27811.1	29285.2	30837.6	32472.2	34193.4	36005.9	37914.4	39924.2	42040.4	537889.4
	Germination beds maintenance					180.4					233.5					302.3					391.4	1107.6
	Infrastructure maintenance					300.6					389.2					503.9					652.3	1846.0
	Total	17170.8	18080.9	19039.4	20048.6	21592.3	22230.3	23408.7	24649.5	25956.1	27954.7	28780.7	30306.3	31912.8	33604.4	36191.8	37261.3	39236.4	41316.2	43506.2	46856.1	589103.5
2.1.2 Establish forest protection zones.	Perimeter cleaning		193.1		214.1		237.4		263.2		291.9		323.7		358.9		397.9		441.2		489.3	3210.8
	Signs Renewal					865.7					1135.8					1490.0					1954.8	5446.3
	Surveillance	611.3	643.7	677.8	713.7	751.5	791.4	833.3	877.5	924.0	973.0	1024.6	1078.9	1136.1	1196.3	1259.7	1326.5	1396.8	1470.8	1548.8	1630.9	20866.3
	Total	611.3	836.8	677.8	927.8	1617.2	1028.8	833.3	1140.7	924.0	2400.6	1024.6	1402.5	1136.1	1555.2	2749.7	1724.4	1396.8	1912.1	1548.8	4074.9	29523.3
2.1.3 Protect and restore natural forest in major recharge areas and riparian zones.	Perimeter cleaning		85.0		94.2		104.5		115.8		128.4		142.4		157.9		175.1		194.1		215.3	1412.7
	Surveillance	269.0	283.2	298.2	314.0	330.7	348.2	366.7	386.1	406.6	428.1	450.8	474.7	499.9	526.4	554.3	583.6	614.6	647.2	681.5	717.6	9181.2
	Signs Renewal					1904.6					2498.7					3278.1					4300.6	11981.8
	Perimeter fence repair	102.2	21394.9		23835.1		26553.6		29582.3		32956.5		36715.7		40903.8		45569.7		50768.1		56559.6	364941.3
	Tree replanting	2450.4	2586.7	2730.6	2882.5	3042.8																13693.0
	Total	2821.5	24349.8	3028.8	27125.8	5278.1	27006.3	366.7	30084.2	406.6	36011.7	450.8	37332.8	499.9	41588.1	3832.3	46328.5	614.6	51609.4	681.5	61793.0	401210.1
2.1.4 Restore forested areas across seven catchments.	Perimeter cleaning		193.1		214.1		237.4		263.2		291.9		323.7		358.9		397.9		441.2		489.3	3210.8
	Surveillance	611.3	643.7	677.8	713.7	751.5	791.4	833.3	877.5	924.0	973.0	1024.6	1078.9	1136.1	1196.3	1259.7	1326.5	1396.8	1470.8	1548.8	1630.9	20866.3
	Signs Renewal					865.7					1135.8					1490.0					1954.8	5446.3
	Tree replanting	6415.6	6772.5	7149.2	7546.9	7966.7																35850.8
	Total	7026.8	7609.2	7827.0	8474.7	9584.0	1028.8	833.3	1140.7	924.0	2400.6	1024.6	1402.5	1136.1	1555.2	2749.7	1724.4	1396.8	1912.1	1548.8	4074.9	65374.2
2.1.5 Restore pine	Perimeter cleaning		92.7		102.8		114.0		126.4		140.1		155.4		172.3		191.0		211.8		234.8	1541.2





Project activity	Maintenance activity	Total cost in each year in USD - Nicaragua																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.10 Establish sustainable fuelwood and timber plantations.	Perimeter cleaning		6951.5		7708.0		8546.8		9476.9		10508.3		11651.8		12919.8		14325.8		15884.7		17613.4	115587.1
	Signs Renewal					18699.3					24532.2				32184.5						42223.9	117640.0
	Surveillance	19804.8	20854.6	21960.1	23124.1	24349.8	25640.5	26999.7	28430.8	29937.9	31524.8	33195.8	34955.4	36808.3	38759.4	40813.9	42977.3	45255.4	47654.2	50180.3	52840.1	676067.3
	Pruning		8826.5		9787.0								14794.5		16404.4							49812.4
	Thinning					16031.2					20755.0					26870.7					34788.4	98445.2
	Tree replanting	32628.1	34357.6									54689.5	57588.4									179263.7
	Total	52432.9	70990.3	21960.1	40619.1	59080.4	34187.4	26999.7	37907.8	29937.9	87320.2	87885.3	118990.1	36808.3	68083.6	99869.1	57303.1	45255.4	63539.0	50180.3	147465.8	1236815.6
2.1.11 Establish firebreaks for forests and plantations.	Surface vegetation removal	17101.9	18008.4	18963.0	19968.1	21026.6	22141.1	23314.8	24550.6	25852.0	27222.3	28665.3	30184.7	31784.7	33469.5	35243.7	37111.8	39079.0	41150.4	43331.7	45628.6	583798.3
	Vegetation removal at the mineral soil level					4058.3					5254.1					6802.3					8806.7	24921.4
	Total	17101.9	18008.4	18963.0	19968.1	25084.9	22141.1	23314.8	24550.6	25852.0	32476.4	28665.3	30184.7	31784.7	33469.5	42046.0	37111.8	39079.0	41150.4	43331.7	54435.3	608719.8
2.1.12 Construct living barriers for soil conservation.	Renewal of living barriers	0.0	0.0	1220.0	0.0	0.0	1424.5	0.0	0.0	1663.2	0.0	0.0	1942.0	0.0	0.0	2267.4	0.0	0.0	2647.5	0.0	0.0	11164.6
2.1.13 Construct superficial drainage for soil conservation.	Drainage maintenance	6652.9	14961.2	7376.9	16589.4	8179.7	18394.7	9069.9	20396.5	10056.9	22616.1	11151.3	25077.2	12364.8	27806.2	13710.4	30832.2	15202.4	34187.5	16856.8	37907.9	359391.0

- **Water/energy efficient technologies**

Project activity	Maintenance activity	Total cost in each year in USD - Nicaragua																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.2.1 Install harvesting systems on public or community building	Weed cleaning and cutting around the geomembrane bag	943.5	946.3	950.1	954.8	967.2	980.8	994.5	1009.4	1025.6	1042.0	1058.7	1077.7	1099.3	1124.6	1154.9	1191.9	1234.8	1290.4	1347.1	1411.8	21805.4
	Roof cleaning	756.5	758.8	761.8	765.6	775.6	786.5	797.5	809.4	822.4	835.5	848.9	864.2	881.5	901.7	926.1	955.7	990.1	1034.7	1080.2	1132.1	17484.9
	Filter and hydraulic accessories cleaning	800.0	802.4	805.6	809.6	820.2	831.6	843.3	855.9	869.6	883.5	897.7	913.8	932.1	953.6	979.3	1010.6	1047.0	1094.1	1142.3	1197.1	18489.6
	Wash the inside of the geomembrane bag				89.2					200.0					402.3					424.1		1115.6
	Overhaul and replace hydraulic accessories and filters							147.1					323.0					459.9				930.0
	Funds reserve	0.0	30.0	58.1		103.5	123.6		172.6		235.2	278.0		364.4	0.0	430.1	450.9		439.5		392.6	3078.4
	Total	2500.0	2537.5	2575.6	2619.3	2666.5	2722.5	2782.4	2847.4	2917.6	2996.3	3083.2	3178.8	3277.3	3382.2	3490.4	3609.1	3731.8	3858.7	3993.8	4133.5	62903.9
2.2.2 Install Community-level rainwater reservoirs in target communities	Filter cleaning and cleaning of intake flow areas	3760.0	3771.3	3786.4	3805.3	3854.8	3908.7	3963.5	4022.9	4087.3	4152.7	4219.1	4295.1	4381.0	4481.7	4602.7	4750.0	4921.0	5142.5	5368.7	5626.4	86901.0
	Cleaning and removal of sediments	3520.0	3530.6	3544.7	3562.4	3608.7	3659.2	3710.5	3766.1	3826.4	3887.6	3949.8	4020.9	4101.3	4195.7	4308.9	4446.8	4606.9	4814.2	5026.0	5267.3	81354.1
	Overhauling, cleaning and mechanical maintenance of aeration and recirculation system	3104.0	3113.3	3125.8	3141.4	3182.2	3226.8	3272.0	3321.0	3374.2	3428.2	3483.0	3545.7	3616.6	3699.8	3799.7	3921.3	4062.5	4245.3	4432.1	4644.8	71739.5
	Cleaning of solar panel and base setting	1728.0	1733.2	1740.1	1748.8	1771.6	1796.4	1821.5	1848.8	1878.4	1908.5	1939.0	1973.9	2013.4	2059.7	2115.3	2183.0	2261.6	2363.3	2467.3	2585.8	39937.5

Project activity	Maintenance activity	Total cost in each year in USD - Nicaragua																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Hydraulic cleaning tools and devices to clean the filtration area and pipe	1600.0	1604.8	1611.2	1619.3	1640.3	1663.3	1686.6	1711.9	1739.3	1767.1	1795.4	1827.7	1864.2	1907.1	1958.6	2021.3	2094.0	2188.3	2284.6	2394.2	36979.1
	Replace device parts				2886.6					3823.4					5463.8				6115.6			18289.3
	Lubrication of motor pump	1408.0	1412.2	1417.9	1425.0	1443.5	1463.7	1484.2	1506.5	1530.6	1555.0	1579.9	1608.4	1640.5	1678.3	1723.6	1778.7	1842.8	1925.7	2010.4	2106.9	32541.6
	Rectification, balancing and alignment activities for the solar motor-pump							3382.8					4801.9				5960.5					14145.2
	Funds reserve	2240.0	2455.0	2658.7		3015.1	3186.9		3588.0		4107.3	4443.6		5140.7		5728.8		6125.0		6143.6	6077.9	54910.6
	Total	17360.0	17620.4	17884.8	18188.7	18516.1	18905.0	19320.9	19765.2	20259.4	20806.4	21409.8	22073.5	22757.8	23486.1	24237.6	25061.6	25913.7	26794.8	27732.7	28703.3	436797.8
	2.2.3 Install half-orange kilns for efficient charcoal production in target communities	Cleaning of charcoal kiln floor	374.0	379.6	385.3	391.9	398.9	407.3	416.2	425.8	436.5	448.2	461.2	475.5	490.3	506.0	522.2	539.9	558.3	577.3	597.5	618.4
Cleanning of kiln internal walls and chimney		410.0	416.2	422.4	429.6	437.3	446.5	456.3	466.8	478.5	491.4	505.6	521.3	537.5	554.7	572.4	591.9	612.0	632.8	655.0	677.9	10316.1
Overhaul of wall fissures		480.0	487.2	494.6	502.9	512.0	522.7	534.2	546.5	560.2	575.3	592.0	610.3	629.2	649.4	670.2	692.9	716.5	740.9	766.8	793.6	12077.4
Cleaning materials		240.0	243.6	247.3	251.5	256.0	261.4	267.1	273.3	280.1	287.6	296.0	305.2	314.6	324.7	335.1	346.5	358.3	370.4	383.4	396.8	6038.7
Total		1504.0	1526.6	1549.6	1575.8	1604.2	1637.9	1673.9	1712.4	1755.2	1802.6	1854.9	1912.4	1971.6	2034.7	2099.8	2171.2	2245.1	2321.4	2402.6	2486.7	37842.5
2.2.4 Install community-level water pumping systems by	Overhauling, cleaning and mechanical maintenance of the solar pump system	5960.0	5977.9	6001.8	6031.8	6110.2	6195.8	6282.5	6376.7	6478.8	6582.4	6687.7	6808.1	6944.3	7104.0	7295.8	7529.3	7800.3	8151.3	8510.0	8918.5	137747.3

Project activity	Maintenance activity	Total cost in each year in USD - Nicaragua																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
solar panels	Cleaning of solar panels	4080.0	4092.2	4108.6	4129.2	4182.8	4241.4	4300.8	4365.3	4435.1	4506.1	4578.2	4660.6	4753.8	4863.1	4994.4	5154.3	5339.8	5580.1	5825.6	6105.3	94296.8
	Lubrication of solar motor pump	3680.0	3691.0	3705.8	3724.3	3772.7	3825.6	3879.1	3937.3	4000.3	4064.3	4129.3	4203.7	4287.7	4386.4	4504.8	4648.9	4816.3	5033.0	5254.5	5506.7	85052.0
	Rectification of bearing parts, electrical balance adjustment, and alignment for the solar motor pump			2836.3				3527.5					4880.4					6172.0				17416.2
	Replacement of mechanical parts of solar pump					3174.7				3949.4					5514.5					6231.9		18870.4
	Funds reserve	2444.0	2645.3		3050.4		3339.8		3724.3		4220.2	4539.5		5204.1		5772.7	6002.6		6184.3		6195.4	53322.4
	Total	16164.0	16406.4	16652.5	16935.7	17240.5	17602.5	17989.8	18403.6	18863.6	19373.0	19934.8	20552.8	21189.9	21868.0	22567.7	23335.1	24128.4	24948.8	25822.0	26725.8	406705.0

### 3.6 Panama

- EbA activities

Project activity	Maintenance activity	Total cost in each year in USD - Panama																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.1. Establish tree nurseries focused on native species	Irrigation System Renewal	1330.7	1359.4	1388.8	1418.8	1449.5	1480.8	1512.8	1545.5	1578.8	1613.0	1647.8	1683.4	1719.8	1756.9	1794.9	1833.7	1873.3	1913.8	1955.1	1997.3	32854.0
	Annual operation	28012.0	28617.2	29235.5	29867.1	30512.4	31171.6	31845.1	32533.1	33236.0	33954.0	34687.6	35437.0	36202.7	36984.8	37783.9	38600.2	39434.1	40286.1	41156.5	42045.7	691602.7
	Germination beds maintenance					389.0					432.8					481.6					536.0	1839.4
	Infrastructure					648.3					721.4					802.7					893.3	3065.6

Project activity	Maintenance activity	Total cost in each year in USD - Panama																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	maintenance																					
	Total	29342.7	29976.7	30624.3	31285.9	32999.1	32652.4	33357.9	34078.6	34814.8	36721.2	36335.4	37120.4	37922.4	38741.7	40863.1	40433.9	41307.4	42199.9	43111.6	45472.3	729361.7
2.1.2 Establish forest protection zones.	Perimeter cleaning		426.8		445.4		464.9		485.2		506.4		528.5		551.6		575.7		600.8		627.1	5212.5
	Signs Renewal					686.1					783.6					894.9					1022.0	3386.6
	Surveillance	1392.6	1422.7	1453.4	1484.8	1516.9	1549.7	1583.2	1617.4	1652.3	1688.0	1724.5	1761.7	1799.8	1838.7	1878.4	1919.0	1960.5	2002.8	2046.1	2090.3	34382.7
	Total	1392.6	1849.5	1453.4	1930.3	2203.0	2014.6	1583.2	2102.6	1652.3	2978.0	1724.5	2290.3	1799.8	2390.3	2773.3	2494.7	1960.5	2603.6	2046.1	3739.4	42981.9
2.1.3 Protect and restore natural forest in major recharge areas and riparian zones.	Perimeter cleaning		182.4		190.4		198.7		207.4		216.4		225.9		235.7		246.0		256.8		268.0	2227.6
	Surveillance	595.1	608.0	621.1	634.5	648.3	662.3	676.6	691.2	706.1	721.4	737.0	752.9	769.1	785.8	802.7	820.1	837.8	855.9	874.4	893.3	14693.5
	Signs Renewal					1466.0					1674.3					1912.2					2183.8	7236.4
	Perimeter fence repair		21051.5		22144.0		23293.7		24503.6		25776.9		27116.8		28527.0		30011.1		31572.9		33216.7	267214.3
	Tree replanting	2312.1	2372.6	2434.6	2498.3	2563.7																12181.3
	Total	2907.2	24214.4	3055.7	25467.2	4678.0	24154.7	676.6	25402.2	706.1	28389.0	737.0	28095.6	769.1	29548.5	2714.9	31077.2	837.8	32685.6	874.4	36561.9	303553.0
2.1.4 Restore forested areas across seven catchments.	Perimeter cleaning		609.2		635.8		663.6		692.6		722.8		754.4		787.3		821.7		857.6		895.1	7440.1
	Surveillance	1987.7	2030.7	2074.6	2119.4	2165.2	2211.9	2259.7	2308.6	2358.4	2409.4	2461.4	2514.6	2568.9	2624.4	2681.1	2739.1	2798.3	2858.7	2920.5	2983.6	49076.2
	Signs Renewal					979.3					1118.4					1277.3					1458.8	4833.9
	Tree replanting	8896.2	9128.9	9367.6	9612.7	9864.2																46869.6
	Total	10883.9	11768.7	11442.2	12367.9	13008.7	2875.5	2259.7	3001.1	2358.4	4250.6	2461.4	3269.0	2568.9	3411.8	3958.5	3560.8	2798.3	3716.3	2920.5	5337.4	108219.8
2.1.6 Establish agroforestry systems using diversified living fence arrangements in basic grains crops.	Fence repair		30947.2		32464.4		34057.0		35728.6		37483.3		39325.2		41258.7		43288.5		45419.3		47656.4	387628.5
	Renewal of live posts					1469.0					1677.7					1916.0					2188.2	7250.8
	Renewal of dead posts					11751.7					13421.3					15328.0					17505.7	58006.7
	Total	0.0	30947.2	0.0	32464.4	13220.6	34057.0	0.0	35728.6	0.0	52582.2	0.0	39325.2	0.0	41258.7	17244.1	43288.5	0.0	45419.3	0.0	67350.3	452886.0
2.1.8 Establish	Fence repair	15498.4	35490.5		37257.8		39114.1		41063.9		43112.1		45263.6		47523.8		49898.2		52392.5		55013.0	461628.0

Project activity	Maintenance activity	Total cost in each year in USD - Panama																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
silvopasture systems using diversified living fence arrangements.	Tree replanting	2001.1	2054.9	2110.3	2167.1	2225.4					2541.6					2902.7					3315.1	19318.1
	Renewal of dead posts					11610.9					13260.5					15144.5					17296.1	57312.0
	Total	17499.5	37545.5	2110.3	39424.9	13836.4	39114.1	0.0	41063.9	0.0	58914.2	0.0	45263.6	0.0	47523.8	18047.2	49898.2	0.0	52392.5	0.0	75624.2	538258.1
2.1.9 Establish silvopasture systems using individual trees.	Multi-purpose tree replanting	1834.8	1874.5								2224.0	2272.1									2754.0	10959.4
	Repair of tree protection barriers	13269.0	13555.7								16083.7	16431.2									19916.6	79256.1
	Total	15103.8	15430.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18307.7	18703.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22670.6	90215.5
2.1.10 Establish sustainable fuelwood and timber plantations.	Perimeter cleaning		9393.4		9803.7		10231.9		10678.8		11145.2		11632.0		12140.0		12670.3		13223.7		13801.2	114720.2
	Signs Renewal					9060.1					10347.2					11817.3					13496.2	44720.8
	Surveillance	27584.3	28180.3	28789.1	29411.1	30046.5	30695.7	31358.8	32036.4	32728.5	33435.6	34158.0	34896.0	35649.9	36420.1	37206.9	38010.8	38832.0	39671.0	40528.1	41403.7	681042.6
	Pruning		11927.0		12447.9								14769.3		15414.4							54558.5
	Thinning					19781.7					22013.0					24495.9					27259.0	93549.6
	Tree replanting	21332.6	21793.5									26416.4	26987.2									96529.7
	Total	48916.9	71294.2	28789.1	51662.7	58888.3	40927.6	31358.8	42715.1	32728.5	76941.0	60574.4	88284.4	35649.9	63974.5	73520.2	50681.1	38832.0	52894.6	40528.1	95960.0	1085121.4
2.1.11 Establish firebreaks for forests and plantations.	Surface vegetation removal	16425.6	16780.5	17143.0	17513.4	17891.8	18278.3	18673.2	19076.6	19488.8	19909.8	20340.0	20779.4	21228.4	21687.0	22155.6	22634.2	23123.2	23622.8	24133.2	24654.6	405539.5
	Vegetation removal at the mineral soil level					8751.4					9738.5					10837.0					12059.3	41386.2
	Total	16425.6	16780.5	17143.0	17513.4	26643.2	18278.3	18673.2	19076.6	19488.8	29648.4	20340.0	20779.4	21228.4	21687.0	32992.5	22634.2	23123.2	23622.8	24133.2	36713.9	446925.8
2.1.12 Construct living barriers for soil	Renewal of living barriers	0.0	0.0	2795.1	0.0	0.0	2980.2	0.0	0.0	3177.5	0.0	0.0	3388.0	0.0	0.0	3612.3	0.0	0.0	3851.6	0.0	0.0	19804.6

Project activity	Maintenanc e activity	Total cost in each year in USD - Panama																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
conservation .																						
2.1.13 Construct superficial drainage for coil conservation .	Drainage maintenanc e	6262.1	25184. 2	6535.6	26284. 2	6821.0	27432. 2	7118.9	28630. 3	7429.9	29880. 8	7754.4	31185. 9	8093.1	32548. 0	8446.5	33969. 6	8815.5	35453. 2	9200.5	37001. 7	384047.4

- Water/energy efficient technologies**

Project activity	Maintenance activity	Total cost in each year in USD - Panama																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.2.2 Install community-level rainwater reservoirs	Filter cleaning and cleaning of intake flow areas	11280.0	11313.8	11359.1	11415.9	11564.3	11726.2	11890.4	12068.7	12261.8	12458.0	12657.3	12885.2	13142.9	13445.2	13808.2	14250.0	14763.0	15427.4	16106.2	16879.3	260702.9
	Cleaning and removal of sediments	10560.0	10591.7	10634.0	10687.2	10826.2	10977.7	11131.4	11298.4	11479.2	11662.8	11849.4	12062.7	12304.0	12587.0	12926.8	13340.5	13820.7	14442.7	15078.1	15801.9	244062.3
	Overhauling , cleaning and mechanical maintenance of aeration and recirculation system	9312.0	9339.9	9377.3	9424.2	9546.7	9680.4	9815.9	9963.1	10122.5	10284.5	10449.0	10637.1	10849.9	11099.4	11399.1	11763.9	12187.4	12735.8	13296.2	13934.4	215218.5
	Cleaning of solar panel	5184.0	5199.6	5220.4	5246.5	5314.7	5389.1	5464.5	5546.5	5635.2	5725.4	5817.0	5921.7	6040.1	6179.1	6345.9	6549.0	6784.7	7090.0	7402.0	7757.3	119812.4

	Hydraulic cleaning tools and devices to clean the filtration area and pipe	4800.0	4814.4	4833.7	4857.8	4921.0	4989.9	5059.7	5135.6	5217.8	5301.3	5386.1	5483.1	5592.7	5721.3	5875.8	6063.8	6282.1	6564.8	6853.7	7182.7	110937.4
	Replace device parts				8659.8					11470.0					16391.3				18346.7			54867.8
	Lubrication of motor pump	4224.0	4236.7	4253.6	4274.9	4330.5	4391.1	4452.6	4519.4	4591.7	4665.1	4739.8	4825.1	4921.6	5034.8	5170.7	5336.2	5528.3	5777.1	6031.3	6320.8	97624.9
	Rectification, balancing and alignment activities for the solar motor-pump							10148.2					14405.6				17881.6					42435.5
	Funds reserve	6720.0	7365.1	7976.0		9045.2	9560.7		10764.2		12322.1	13330.7		15422.3		17186.3		18374.9		18430.5	18233.6	164731.6
	Total	52080.0	52861.2	53654.1	54566.2	55548.4	56715.0	57962.7	59295.8	60778.2	62419.2	64229.4	66220.4	68273.4	70458.0	72712.8	75185.0	77741.2	80384.4	83197.9	86109.9	1310393.1
2.2.4 Install Community-level water pumping systems by solar panels	Overhauling , cleaning and mechanical maintenance of the solar pump system	5463.3	5479.7	5501.6	5529.1	5601.0	5679.4	5759.0	5845.3	5938.9	6033.9	6130.4	6240.8	6365.6	6512.0	6687.8	6901.8	7150.3	7472.1	7800.8	8175.3	126268.2
	Cleaning of solar panels	3740.0	3751.2	3766.2	3785.1	3834.3	3887.9	3942.4	4001.5	4065.5	4130.6	4196.7	4272.2	4357.7	4457.9	4578.2	4724.7	4894.8	5115.1	5340.2	5596.5	86438.7
	Lubrication of solar motor pump	3373.3	3383.4	3397.0	3414.0	3458.4	3506.8	3555.9	3609.2	3666.9	3725.6	3785.2	3853.4	3930.4	4020.8	4129.4	4261.5	4414.9	4613.6	4816.6	5047.8	77964.3
	Rectification of bearing parts, electrical balance adjustment, and alignment for the			2600.0				3233.5					4473.7					5657.7				15964.8



	solar motor pump																					
	Replacement of mechanical parts of solar pump					2910.2				3620.3					5057.9					5712.6		17301.0
	funds reserve	2240.3	2424.9		2796.2		3061.5		3413.9		3868.5	4161.2		4770.4		5291.7	5502.4		5669.0		5679.1	48878.9
	Total	14817.0	15039.3	15264.8	15524.3	15803.8	16135.7	16490.6	16869.9	17291.7	17758.6	18273.6	18840.0	19424.1	20048.6	20687.1	21390.5	22117.7	22869.7	23670.2	24498.6	372815.9

### 3.7 Dominican Republic

- EbA activities

Project activity	Maintenance activity	Total cost in each year in USD - Republica Dominicana																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.1.1. Establish tree nurseries focused on native species	Irrigation System Renewal	1369.8	1419.8	1471.6	1525.3	1580.9	1638.6	1698.5	1760.4	1824.7	1891.3	1960.3	2031.9	2106.0	2182.9	2262.5	2345.1	2430.7	2519.4	2611.4	2706.7	39337.7
	Annual operation	18774.1	19459.3	20169.4	20905.6	21668.5	22459.4	23279.1	24128.7	25009.3	25922.0	26868.1	27848.7	28865.1	29918.6	31010.5	32142.3	33315.3	34531.2	35791.5	37097.8	539164.4
	Germination beds maintenance					231.3					276.7					331.0					396.0	1235.1
	Infrastructure maintenance					385.5					461.2					551.7					660.0	2058.5
	Total	20143.8	20879.0	21641.0	22430.8	23866.3	24098.0	24977.5	25889.1	26834.0	28551.2	28828.4	29880.6	30971.1	32101.4	34155.8	34487.4	35746.0	37050.7	38402.9	40860.5	581795.6
2.1.2 Establish forest protection zones.	Perimeter cleaning		242.2		260.2		279.5		300.3		322.6		346.6		372.4		400.1		429.8		461.8	3415.6
	Signs Renewal					735.8					893.4					1084.7					1316.9	4030.8
	Surveillance	778.9	807.4	836.8	867.4	899.0	931.8	965.8	1001.1	1037.6	1075.5	1114.7	1155.4	1197.6	1241.3	1286.6	1333.6	1382.2	1432.7	1485.0	1539.2	22369.8



Project activity	Maintenance activity	Total cost in each year in USD - Republica Dominicana																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
using individual trees.	Repair of tree protection barriers	18399.8	19071.3								25405.3	26332.5									36358.2	125567.1
	Total	20848.3	21609.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28786.1	29836.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41196.6	142276.9
	2.1.10 Establish sustainable fuelwood and timber plantations.	Perimeter cleaning		8672.5		9317.1		10009.6		10753.6		11552.8		12411.5		13334.0		14325.0		15389.7		16533.6
	Signs Renewal					15808.4					19193.1					23302.5					28291.8	86595.8
	Surveillance	25101.4	26017.6	26967.1	27951.3	28971.4	30028.8	31124.8	32260.7	33438.1	34658.5	35923.4	37234.5	38593.4	40001.9	41461.9	42975.1	44543.5	46169.2	47854.2	49600.8	720877.7
	Pruning		11011.6		11830.1								15759.1		16930.3							55531.1
	Thinning					19073.9					22818.1					27297.3					32655.7	101845.0
	Tree replanting	30951.6	32081.2									44295.7	45912.3									153240.8
	Total	56053.0	77782.9	26967.1	49098.5	63853.8	40038.4	31124.8	43014.3	33438.1	88222.5	80219.1	111317.3	38593.4	70266.3	92061.7	57300.1	44543.5	61559.0	47854.2	127081.8	1240389.8
2.1.11 Establish firebreaks for forests and plantations.	Surface vegetation removal	16657.2	17265.1	17895.3	18548.4	19225.3	19927.0	20654.3	21408.1	22189.4	22999.2	23838.6	24708.7	25610.4	26545.1	27513.9	28518.1	29558.9	30637.7	31755.9	32914.9	478371.6
	Vegetation removal at the mineral soil level					5204.5					6226.1					7448.2					8910.3	27789.1
	Total	16657.2	17265.1	17895.3	18548.4	24429.8	19927.0	20654.3	21408.1	22189.4	29225.3	23838.6	24708.7	25610.4	26545.1	34962.2	28518.1	29558.9	30637.7	31755.9	41825.2	506160.6
2.1.12 Construct living barriers for soil conservatio n.	Renewal of living barriers	0.0	0.0	1614.8	0.0	0.0	1798.1	0.0	0.0	2002.3	0.0	0.0	2229.6	0.0	0.0	2482.7	0.0	0.0	2764.6	0.0	0.0	12892.2
2.1.13 Construct superficial drainage for coil conservatio n.	Drainage maintenanc e	6446.0	17379.0	6925.0	18670.7	7439.8	20058.5	7992.7	21549.3	8586.8	23151.0	9225.0	24871.7	9910.6	26720.2	10647.2	28706.2	11438.6	30839.8	12288.8	33132.0	335978.9

- Water/energy efficient technologies

Project activity	Maintenanc e activity	Total cost in each year in USD - Republica Dominicana																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
2.2.1. Install rainwater harvesting systems on community buildings in targeted municipalities.	Weed cleaning and cutting around the geomembrane bag	1886.9	1892.6	1900.2	1909.7	1934.5	1961.6	1989.0	2018.9	2051.2	2084.0	2117.3	2155.5	2198.6	2249.1	2309.9	2383.8	2469.6	2580.7	2694.3	2823.6	43610.9
	Roof cleaning	1513.1	1517.6	1523.7	1531.3	1551.2	1572.9	1594.9	1618.9	1644.8	1671.1	1697.8	1728.4	1762.9	1803.5	1852.2	1911.5	1980.3	2069.4	2160.4	2264.1	34969.8
	Filter and hydraulic accessories cleaning	1600.0	1604.8	1611.2	1619.3	1640.3	1663.3	1686.6	1711.9	1739.3	1767.1	1795.4	1827.7	1864.2	1907.1	1958.6	2021.3	2094.0	2188.3	2284.6	2394.2	36979.1
	Wash the inside of the geomembrane bag				178.5					399.9					804.7					848.3		2231.3
	Overhaul and replace hydraulic accessories and filters							294.2					646.1					919.7				1860.0
	Funds reserve	0.0	60.0	116.1		207.0	247.2		345.2		470.5	555.9		728.9	0.0	860.2	901.7		879.0		785.1	6156.8
	Total	5000.0	5075.0	5151.1	5238.7	5333.0	5445.0	5564.8	5694.8	5835.1	5992.6	6166.4	6357.6	6554.7	6764.4	6980.9	7218.2	7463.6	7717.4	7987.5	8267.1	125807.8
2.2.2. Install community-level rainwater reservoirs in target communities	Filter cleaning and cleaning of intake flow areas	4465.0	4478.4	4496.3	4518.8	4577.5	4641.6	4706.6	4777.2	4853.6	4931.3	5010.2	5100.4	5202.4	5322.0	5465.7	5640.6	5843.7	6106.7	6375.4	6681.4	103194.9
	Cleaning and removal of sediments	4180.0	4192.5	4209.3	4230.4	4285.4	4345.3	4406.2	4472.3	4543.8	4616.5	4690.4	4774.8	4870.3	4982.3	5116.9	5280.6	5470.7	5716.9	5968.4	6254.9	96608.0
	Overhauling, cleaning and mechanical maintenance of aeration and recirculation system	3686.0	3697.1	3711.8	3730.4	3778.9	3831.8	3885.5	3943.7	4006.8	4070.9	4136.1	4210.5	4294.7	4393.5	4512.1	4656.5	4824.2	5041.3	5263.1	5515.7	85190.7
	Cleaning of solar panel	2052.0	2058.2	2066.4	2076.7	2103.7	2133.2	2163.0	2195.5	2230.6	2266.3	2302.6	2344.0	2390.9	2445.9	2511.9	2592.3	2685.6	2806.5	2930.0	3070.6	47425.7

Project activity	Maintenanc e activity	Total cost in each year in USD - Republica Dominicana																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	and base setting																					
	Hydraulic cleaning tools and devices to clean the filtration area and pipe	1900.0	1905.7	1913.3	1922.9	1947.9	1975.2	2002.8	2032.9	2065.4	2098.4	2132.0	2170.4	2213.8	2264.7	2325.8	2400.3	2486.7	2598.6	2712.9	2843.1	43912.7
	Replace device parts				3427.8					4540.2					6488.3				7262.2			21718.6
	Lubrication of motor pump	1672.0	1677.0	1683.7	1692.1	1714.1	1738.1	1762.5	1788.9	1817.5	1846.6	1876.2	1909.9	1948.1	1992.9	2046.7	2112.2	2188.3	2286.8	2387.4	2502.0	38643.2
	Rectification, balancing and alignment activities for the solar motor-pump							4017.0					5702.2				7078.1					16797.4
	Funds reserve	2660.0	2915.4	3157.2		3580.4	3784.4		4260.8		4877.5	5276.8		6104.6		6802.9		7273.4		7295.4	7217.5	65206.2
	Total	20615.0	20924.2	21238.1	21599.1	21987.9	22449.7	22943.6	23471.3	24058.0	24707.6	25424.1	26212.3	27024.9	27889.7	28782.1	29760.7	30772.6	31818.8	32932.5	34085.1	518697.3
2.2.3. Install half-orange kilns for efficient charcoal production in target communities	Cleaning of charcoal kiln floor	631.1	640.6	650.3	661.3	673.2	687.3	702.4	718.6	736.5	756.4	778.4	802.5	827.4	853.8	881.2	911.1	942.1	974.1	1008.2	1043.5	15880.0
	Cleaning of kiln internal walls and chimney	691.9	702.3	712.9	724.9	738.0	753.5	770.0	787.7	807.4	829.2	853.3	879.7	907.0	936.0	966.0	998.8	1032.8	1067.9	1105.3	1144.0	17408.6
	Overhaul of wall fissures	810.0	822.2	834.6	848.7	863.9	882.1	901.5	922.2	945.3	970.8	999.0	1029.9	1061.9	1095.8	1130.9	1169.4	1209.1	1250.2	1294.0	1339.3	20380.6
	Cleaning materials	405.0	411.1	417.3	424.3	432.0	441.0	450.7	461.1	472.6	485.4	499.5	515.0	530.9	547.9	565.5	584.7	604.6	625.1	647.0	669.6	10190.3
	Total	2538.0	2576.1	2615.0	2659.2	2707.0	2763.9	2824.7	2889.7	2961.9	3041.9	3130.1	3227.1	3327.2	3433.6	3543.5	3664.0	3788.6	3917.4	4054.5	4196.4	63859.5