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ENVIRONMENTAL COMPLIANCE REVIEW

FINAL REPORT

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ABSTRACT

The objective of this study is to determine the level of compliance with the measures included in the Environmental Monitoring and Mitigation plans of four USAID activities in Peru. Two of the activities are related to the production of coffee and cocoa, one to the development of fish farms, and the last one to improve access and internet use. These activities are implemented in the regions of San Martín, Huánuco, Ucayali. and Pasco. The measurement of compliance was carried out using quantitative and qualitative methods applied in the field. The results show that the level of compliance with environmental measures is different for each activity and that the level reached is explained by factors that are beyond the capacity of local partners or beneficiaries. The presence of public or private institutions that carry out similar activities reinforces the knowledge and practice of farmers; the strategies developed by the implementing partners (training, technical assistance, field schools, technological agents, for example) show positive results. But the costs for small farmers to adhere to these environmental care practices is a factor that limits its compliance, as well as the lack of coordination between the various institutions and the weakness in the formulation of the indicators.

RESUMEN

Este estudio tiene como objetivo determinar el nivel de cumplimiento de las medidas incluidas en los planes de Monitoreo y Mitigación Ambiental de cuatro actividades de USAID en Perú, dos vinculadas a la producción de café y cacao, una al desarrollo de piscigranjas y la última para mejorar el acceso y uso de internet. Estas actividades se implementan en las regiones de San Martín, Huánuco, Ucayali y Pasco. La medición del cumplimiento se realizó usando métodos cuantitativos y cualitativos aplicados en campo. Los resultados muestran que el cumplimiento de las medidas ambientales es diferente en cada proyecto y el nivel alcanzado se explica por factores que no siempre están bajo control de los implementadores locales. La presencia de instituciones públicas o privadas que realizan actividades similares refuerza el conocimiento y la práctica de los agricultores; las estrategias desarrolladas por las actividades (capacitaciones, asistencia técnica, escuelas de campo, agentes tecnológicos, por ejemplo) muestran resultados positivos. Pero, los costos que representa para pequeños agricultores implementar estas prácticas de cuidado ambiental es un factor que limita su cumplimiento, así como la falta de coordinación entre las diversas instituciones y la debilidad en la formulación de los indicadores.

CONTENTS

ACRONYMS

AMIGE	Aquaculture by Medium-sized and Large Enterprise
AMYPE	Aquaculture by Micro and Small Enterprise
ANA	National Water Authority of Peru
ALA	Local Water Authorities
AREL	Aquaculture of Limited Resources
CADA	Assistance Body for Alternative Development
CEDRO	Center for Information and Education on Drug Abuse Prevention
DEVIDA	National Commission for Development and Life without Drugs
ECR	Environmental Compliance Review
INIA	National Agricultural Innovation Institute
MELS	Monitoring, Evaluation, and Learning for Sustainability
MINAGRI	Ministry of Agriculture and Irrigation
MINAM	Ministry of the Environment
EMMP	Environmental Monitoring and Mitigation Plan
PORI	Operational Plan for Institutional Reinforcement by DEVIDA
SENASA	National Agricultural Health Service
SERNAP	National Protected Natural Area Service
SERFOR	National Forest Service
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

The USAID Alternative Development Program is implemented in the Huánuco, Ucayali, San Martín, and Pasco regions. The program includes the Alliance for Digital and Financial Services - CR3CE (implemented by CEDRO), the CAFE Project (implemented by TechnoServe), the Peru Cacao Alliance (implemented by Palladium), and the *Plan for Institutional Strengthening* (PORI) Government-to-Government Agreement with DEVIDA. The above implementing partners carry out environmental mitigation actions through Environmental Monitoring and Mitigation Plans (EMMPs) and internal Environmental Compliance Reviews (ECRs), in accordance with USAID Reg. 216 and the requirements of Peruvian environmental legislation. USAID also carries out external ECRs such as the one presented herein.

PURPOSE

The purpose of the Environmental Compliance Review performed by USAID's Alternative Development Office is to analyze the compliance levels with environmental mitigation measures in the plans for each activity. Other objectives of the study were to identify the factors enabling or hindering compliance with environmental mitigation measures, and to provide recommendations.

METHODOLOGY

The study used a mixed methodology, which included qualitative and quantitative techniques. Regarding the quantitative methods, differentiated surveys were administered to samples of 90 coffee farmers, 173 cacao farmers and 131 aquafarmers. Qualitative methods included in-depth interviews with several stakeholders from each project. A total of 24 interviews were conducted in relation to telecenters, 26 interviews with CAFE Project stakeholders, 37 in relation to the Peru Cacao Alliance, and 16 with PORI stakeholders. The team also reviewed intervention documents as part of a desk review, and non-participant site observations were made to 16 towers and 15 telecenters.

FINDINGS

ALLIANCE FOR DIGITAL AND FINANCIAL SERVICES (CR3CE ALLIANCE)

1. Compliance with environmental mitigation measures from the EMMP for lifting towers and relay masts reached an average satisfaction rate of 68%. Measures related to the adequate location of towers and masts show a compliance rate of 100%. Maintenance of plants for afforestation compliance reached 94%. Solid waste management compliance reaches 41%. The lowest compliance rate is noted in signposting measures, with 3%.
2. The average rate of compliance with EMMP environmental mitigation measures in telecenters is 52%. The highest rate of compliance is found in protection of the environment (69%), particularly, in energy efficiency compliance. The lowest compliance rate is found in water care, electronic waste, and organic/inorganic waste management, recording 49%, 48% and 43% respectively.
3. The greater degree of responsibility for compliance with environmental mitigation measures falls upon municipalities, such as the entities that manage telecenters. This also applies to the CR3CE Alliance as advisors to municipalities for compliance with quality standards, and for implementing

complementary environmental management mechanisms and procedures, where several interinstitutional agreements are currently in place.

4. Factors hindering compliance with environmental measures are lack of training in mitigation measures/energy efficiency/water, lack of knowledge of environmental protocols, insufficient support for equipment and premise maintenance, limited solid and electronic waste segregation, telecenter management not coordinating with municipality management, staff turnover, and insufficient budget for solid waste management.
5. Enabling factors for compliance with environmental measures include telecenter manager capacity and responsibility, and telecenter manager efforts in solid waste management, as well as basic equipment and internet service access.
6. The key stakeholders involved in compliance with environmental mitigation measures are municipalities, partners committees, and public bodies related to healthcare. The CR3CE Alliance has a limited role in environmental issues.
7. Women play an important role in telecenter management, in partner committee actions, as training course participants, and as individuals responsible for cleaning and solid waste collection. Men play roles as telecenter decision-makers, in management, or in issues dealing with equipment or information technology.
8. Monitoring mechanisms related to environmental issues are extremely weak because regional CR3CE managers and coordinators are unaware of them, and municipalities are not responsible for this task.
9. Most telecenter managers are not aware of progress in compliance with environmental measures (ECR). Regional CR3CE staff responsible for them claim that this task is conducted in Lima, and do not know the results.

ALLIANCE FOR COFFEE EXCELLENCE (CAFE)

1. The rate of compliance with environmental mitigation measures in the CAFE Alliance project reached its highest average in reforestation and erosion control (63%) and solid waste management (61%). Water conservation and management (32%) reported the lowest rate of compliance.
2. Factors facilitating compliance with environmental mitigation measures are the existence of entities that address environmental issues, the strategies developed by the CAFE Alliance for capacity strengthening, and having a specialist in environmental issues on the team.
3. Hindering factors for compliance with environmental measures are related to the high implementation costs, lack of interest, and insufficient awareness.
4. The stakeholders involved in environmental mitigation measure implementation are: SENASA, DEVIDA, municipalities, the Regional Government, the Regional Environmental Authority (ARA by its Spanish initials), the United Nations Development Program (UNDP), and private companies.
5. Women perform both domestic and agricultural tasks, including environmental mitigation measures.
6. Monitoring mechanisms to learn the rate of compliance with environmental mitigation measures were the technical assistance provided to producers, and the internal inspections conducted by CAFE Alliance technical personnel. These monitoring activities confirmed a compliance rate above 60%.

7. The technical advisors are not aware of the internal ECR recommendations. However, specialists in environmental issues and project leaders know these results because they are responsible for preparing the environmental compliance report. The recommendations given by the external ECR were implemented in part.

PERU CACAO ALLIANCE - STAGE II

1. The project had an average rate of compliance with environmental mitigation measures above 40% in 7 out of 8 themes of its EMMP. The measure associated with the greatest relative progress is pesticide management, 74%, while the one with the lowest rate was water source conservation, 7%.
2. Factors facilitating compliance with environmental measures are presence of other institutions strengthening producer capacity for environmental mitigation measures and strategies developed by the Peru Cacao Alliance.
3. Factors hindering compliance with environmental mitigation measures are related to farmers' financial problems preventing implementation, lack of inter-institutional coordination, several weaknesses in the formulation of EMMP indicators, and farmers' practices.
4. Several public entities are present in Cacao Alliance's intervention zones, and their intervention reinforces farmers' knowledge of environmental mitigation topics.
5. Women's participation has become more visible, empowering their participation in the process of environmental care.
6. Compliance with environmental measures is monitored in the Lima office. This internal ECR is shared with technical personnel in order to perfect or deepen fieldwork, but the external ECR has not been shared.

PORI-DEVIDA FISH FARMS

1. Compliance with EMMP environmental mitigation measures is above 57%. The greatest compliance rate is noted in technical assistance for aquaculture pond equipping and preparation for fish farming, at 91%. This is followed by site design and selection, cleaning and weeding with minimal loss of primary or secondary production forests, with 82%. The average compliance rate of fish farm operation and maintenance in accordance with best aquafarming and biosecurity practices was 64%.
2. Enabling factors are the strategies developed by fish farmers, such as fish farm disinfection, cleaning and protection, training sessions, and the location of fish farms in previously disturbed land —not in primary forests.
3. Limited understanding of manuals or forms delivered by DEVIDA. There is a low educational level and paternalism by local authorities. No progress was made in training on environmental issues. It is not clear if solid waste is segregated in the designated spaces. There is no worksheet on this topic. The PORI-DEVIDA team does not have a specialist in environmental issues for the fish farms.
4. Fish farmers highlight DEVIDA's role as the main partner and acknowledge the training, services and materials they provide. The role of local water authorities (ALA) is important because of the permits or support they provide. None of the fish farmers interact with SERNANP, SERFOR or municipalities.

5. Fish farms allow women to perform productive activities close to their homes without requiring any physical effort in some of the production processes, especially in fish farming and feeding. Men usually participate in fish farm outfitting and extraction, but only alongside agricultural duties.
6. Fish farmers have the manual and the forms with recommendations from the DEVIDA technical assistant. In addition, DEVIDA started addressing environmental issues after PAMA approval. The forms delivered by DEVIDA are not fully applied because a specialist is needed for monitoring environmental issues.
7. The fish farmers interviewed stated that they are not aware of environmental mitigation measures or supervision results. DEVIDA technical personnel believe that there is an internal ECR with fish farmers' work on learning fish control, feeding, as well as the cultural change processes in aquaculture management.

RECOMMENDATIONS

ALLIANCE FOR DIGITAL AND FINANCIAL SERVICES (CR3CE ALLIANCE)

FOR CEDRO

1. Review the new internet provider's compliance with Peruvian regulations and environmental mitigation activities in the municipality towers, as well as their infrastructure capacity regarding technical aspects and electrical power backup such as solar-rechargeable power banks. It is also important for municipal telecenter managers to learn the tower maintenance plan, and to mitigate environmental risks in physical locations and natural resources.
2. Define agreements with the company to comprehensively adopt a responsible practice in the implementation and maintenance of tower signposting for safety and the prevention of risks such as electrical hazard. New municipal leadership is an opportunity to implement, together with the operating company, the technical strategies to apply minimum signposting standards.
3. Train municipalities on the adequate interrelation between offices with common ground in environmental monitoring and include them in new agreements with municipalities.
4. Reach agreements with new municipal leadership that they will implement, together with the company operating the towers, the minimum solid waste management regulations in their area. It is highly advisable to coordinate with the regional government's environmental direction office and the environmental health office, which have established protocols for polluting chemical and solid waste detection.
5. Categorize municipalities in order to define telecenter characteristics. If municipalities are ultimately responsible for implementation, it is necessary to identify which municipal management office is in charge and assign an available budget for this task. MEF has classified province and district municipalities according to the percentage of urban or rural population which can be revisited for this purpose.
6. Improve agreements between CEDRO and municipalities to have guidelines for environmental risk management, including the responsible Ministry as well.
7. Carry out awareness and advocacy actions related to environmental care with authorities and municipal officials linked to telecenters. If possible, users should also be considered, and areas with better environmental management should be implemented in all municipal structures.

8. Create communication campaigns on solid waste management, waste segregation, water conservation, plants for afforestation, electrical hazards of masts, etc. aimed at the general public (e.g., short videos to be used at telecenters).

FOR MUNICIPALITIES

1. Include telecenters in the municipal structure and the Annual Operating Plan, therefore ensuring budget allocation.
2. Develop and implement a waste disposal management plan for electronic devices at the telecenters, as well as for the other municipality departments.
3. The very interesting potential of partner committees recognized by municipalities should be publicized more by the alliance and public bodies as a task carried out by citizens that creates value for environmental protection. They constitute an example of how various grassroots, corporate, and public stakeholders participate together.
4. Create better social media campaigns publicizing the services provided by telecenters. Telecenter fan pages can include environmental topics, apart from promoting the virtual literacy and financial education courses that telecenters provide. Training through videos or short videos could be given to raise awareness of the general public, telecenter users, and municipal officials.
5. Regarding training organization, it is important for municipalities to have a detailed and progressive training plan for environmental issues involving management of various municipal issues, particularly telecenters. An agreement should provide evidence that CEDRO will make a greater effort in relation to awareness and advocacy actions aimed at authorities and municipal officials on environmental protection topics.

FOR TELECENTERS

1. Regarding computers: Computer equipment should be renewed, and annual maintenance should be included. If possible, municipalities should procure laptops as these are easier to use, and the conditions for a safety use.
2. On electricity: Telecenters should include, at a minimum, a good voltage stabilizer because the electrical system is unstable and electrical discharges are frequent during rainy periods. Adequate cable gutters are required for electricity wires to prevent electrical hazard for attendees or visitors.
3. An aspect related to environmental protection habits that is not often mentioned is that broken equipment should be placed in safe recycling zones.
4. On infrastructure and basic service equipment:
    a. Provide adequate maintenance and renewal of infrastructure to complement the renewal of electrical systems in telecenters.
    b. Create physical spaces for special children in telecenters or municipalities, to avoid electrical and electronic environmental risks. In addition, it could be an educational space for them.
    c. Establish adequate infrastructure and protocols for restrooms and water quality, which are still absent in most cases.
    d. Improve signage for solid waste containers and install them where they are absent.

e. Prepare the premises to operate as a library that allows complementary educational services, especially for children.

f. Improve internet service and tower operation. In fact, several municipalities are making arrangements for other internet transmission systems.

5. Organizational management:
    a. Coordinate environmental topics with the municipality environmental management office or determine its role.
    b. Provide more space for citizens to participate in partner committees so that these have more significant roles at telecenters. A complementary recommendation would be to have partner committees exchange experiences, focusing on those which have been successful. Those which do not have this committee are advised to reactivate it.
6. Regarding training for individuals who attend telecenters:
    a. Continue with training sessions on solid waste for visitors.
    b. Provide training on environmental topics to children, considering that they attend in large numbers. This is an opportunity to achieve gradual changes in households.
    c. Include adult women in the training sessions, so that they relate the topic to their own social, family or work-related programs.
    d. Develop online courses on computer operation.
    e. Perform solid waste segregation campaigns.
7. Adapt schedules based on women's and men's needs given that telecenter managers work only during normal office hours.
8. Generate an exchange of telecenter experiences at a regional level.

FOR USAID

1. It is advisable for telecenters to be part of environmental monitoring processes because several items they implement have high-risk factors which may have negative effects on human beings. Therefore, it is necessary to check the actual conditions to implement monitoring, possibly using virtual methodologies, with USAID.

ALLIANCE FOR COFFEE EXCELLENCE (CAFE)

FOR TECHNOSERVE

1. Review the environmental mitigation measures of the EMMP more exhaustively, especially the indicators, selecting those that refer to practices rather than activity indicators.
2. Consider more specific indicators regarding what is intended to be achieved for compliance with environmental mitigation measures.
3. Continue with the dissemination of the EMMP with the stakeholders involved in the promotion of the coffee production chain through participation in regional technical roundtables, as well as public and private institutions that are linked to the coffee production chain to improve the level of compliance with environmental mitigation measures.
4. Continue carrying out awareness campaigns on the environmental mitigation measures set forth in EMMP.

5. Regarding environmental mitigation measures:
    a. Continue CAFÉ Alliance work with NGO Campo Limpio to improve solid waste (pesticide container) collection, because, in both Huánuco and Ucayali regions, most of the producers interviewed claimed that the service is not available.
    b. Share results of using vetiver technology for adequate management of honey water with all entities related to the coffee production chain.
    c. Continue awareness raising actions for producers in relation to coffee pulp management by means of organic fertilizer production, given that many producers have composters that are not operational.
    d. Strengthen producer capacity by training them on the adequate use of pesticides in relation to those approved by PERSUAP.
6. Regarding strategies developed:
    a. Organize theoretical-practical training sessions on the varieties of trees associated with coffee, and topics including climate change, adequate chemical use, environmental protection, landfills, timber tree planting, and waste management.
    b. Use digital media (WhatsApp) to receive technical assistance from qualified professionals who can teach and become familiar with producers with the goal of generating change.
    c. Implement a processing plant for coffee washing and drying, rainwater harvesting tanks, small farm animals to obtain manure and prepare compost, soil analysis to apply the fertilizers required for farming, waste bins and mini-landfills to build community habits, latrines, model plots, solid waste transportation, and empty containers.
    d. Help farmers establish associations, so that the association regulations encourage them to change their ways of working and leverage the benefits of being part of an organization.
    e. Partner with municipalities in implementing techniques for agrochemical waste management.
    f. Disseminate information on vetiver infiltration wells for honey water management in coffee.
    g. Widely promote the implementation of environmental mitigation through leaflets.
    h. Execute projects with counterpart contributions from producers, to value their support in implementing environmental mitigation measures.
    i. Organize internships in other regions with successful producers, so producers observe and replicate their implementation of environmental mitigation measures.
    j. Involve a business association in export chains that demand compliance with sustainable environmental measures and provide services such as certifications to more profitable and sustainable chains.
    k. Encourage the business association to be involved in compliance with environmental measures and introduce better markets that pay a good price for sustainable managed coffee.

FOR USAID

1. Promote joint work with public and private entities involved in coffee production to identify mitigation measures that unify criteria and indicators that respond to USAID and Peruvian legislation regulations.

2. Make sure that the implementing partners include environmental mitigation activities in their annual work plans and that their indicators are contained in their monitoring and evaluation plans and are also reflected in the field.

PERU CACAO ALLIANCE - STAGE II

FOR PALLADIUM

1. Review and improve the formulation of the Environmental Monitoring and Mitigation Plan by sharing it with the technicians in each area, entering real data on microclimate, soil, and productivity. Then, based on that information, prepare the environmental mitigation measures.
2. Review and improve the formulation of indicators so that the report is in line with work carried out in the field.
3. Monitor progress in the implementation of environmental measures, differentiated by stakeholders: small producers, medium-sized producers, and associations.
4. Disseminate and analyze the results of the internal and external ECR with area teams from Peru Cacao Alliance.
5. Develop work strategies to strengthen and expand the role of women in the implementation and monitoring of compliance with environmental measures.
6. Regarding environmental mitigation measures:
    a. Indicator formulation should be analyzed before joining them with "AND" as a condition to validate a measure.
    b. Infiltration ditches can be implemented on the coast, but they do not make sense in the Amazon jungle region. Drainage ditches are built in these areas.
    c. Coordinate with SENASA for pest control in new cacao varieties.
    d. Review tree species that are assigned to each area before including them in the EMMP, taking the soil and climate of each area into consideration.

FOR USAID

1. Promote coordinated work with government entities (MINAM, MINAGRI, DEVIDA) to identify mitigation measures that unify criteria and meet USAID and Peruvian legislation regulations.
2. Work should be better coordinated. There are initiatives, but they are isolated. There should be an Environmental Roundtable that brings together all initiatives and analyzes the most relevant ones to then make proposals to the Ministries of Economy, Agriculture, the Environment, and the Reforestation programs.
3. Strengthen the capacities of alternative development partners in relation to Regulation 216 as an important input for Environmental Monitoring and Mitigation Plans, identifying indicators and objectives.

FOR DEVIDA

1. Promote spaces for national and regional consensus with participation of public institutions (MINAGRI, MINAM, SENASA, INIA, DEVIDA, and regional governments), the private sector, USAID partners, and other relevant stakeholders (UNDP) to unify criteria and identify environmental mitigation measures.

2. Generate an environmental monitoring system to follow up on compliance with environmental mitigation measures agreed upon by consensus.
3. Update Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) and share it with stakeholders in each region.

PORI-DEVIDA FISH FARMS

FOR DEVIDA

1. Establish connections between fish farmers and market for sale of aquaculture products, partnering with Huánuco's regional government to create a market for aquaculture production.
2. Implement a greater number of ponds or enlarge the existing ones given their potential for generating income for families.
3. Hire personnel with environmental expertise to provide advice on the value chain and fish farm production.
4. Train field personnel on environmental issues, since they advise fish farmers on production issues, providing them with better guidelines.
5. Provide better support for creation of associations to allow fish farmers to access better technical assistance and services in the local and even international aquaculture market.
6. Regarding EMMP:
    a. Identify another measure to monitor landscape or natural resource restoration or impact mitigation.
    b. Promote well-defined certification goals among fish farmers.
7. Regarding fish farms:
    a. Ensure adequate reforestation work, both in the surrounding areas of the fishing arm (such as nearby areas including the dwelling site), and farms for smaller animals.
    b. Implement additional control systems in fish farm drains before reaching the course of the spring.
    c. Train fish farmers on the preparation of fish food so that they learn to prepare food based on their own resources (fruits, maize, cassava).
    d. Promote a conditional revolving fund to maintain the shared support and savings system. This fund will be initially managed by DEVIDA and a committee formed by men and women, considering that fish farms are managed by both genders. Gradually, this fund may be transferred to this committee or placed in a local service cooperative with a managing committee.
    e. Solid waste management and handling:
        i. Prepare a training and solid waste management plan that includes materials such as shovels and simple wheelbarrows to transport waste, considering a pilot intervention to several households.
        ii. Establish a more suitable procedure for all organic waste under a circular economic framework. Fish farmers should also be aware of it to ensure the collection of this waste and the reduction of their costs.

f. Water:

    i. Water quality is important, so it is recommended to establish measures to maintain oxygen levels with artificial waterfalls and to keep pH levels stable so as not to affect the fish. This is also important because the water will later be diverted to cultivation areas or downstream.

g. Plant vetiver grass in discharge channels to complete the treatment system. Also, use efficient microorganisms (MME) to treat wastewater. Regarding the safe use and management of pesticides, it is necessary to coordinate activities such as cacao, sanitation, and other institutions to strengthen the joint management of this issue.

FOR PUBLIC ENTITIES

1. It is important to reach an agreement with the Ministry of Production and the National Water Authority (ANA), which is a body attached to the Ministry of Agriculture and Irrigation, to achieve not only certifications but also specialized advice for fish farms, taking into consideration other experiences in the Amazon region of Loreto: National Fisheries Development Fund (FONDEPES), Peruvian Amazon Research Institute (IIAP).

FOR MUNICIPALITIES

1. Reach agreements with municipalities regarding inorganic solid waste management and increase their budget allocation by the MEF.
2. Sign agreements with municipalities, since this area must foresee the risks resulting from a larger number of fish-farm-related businesses (restaurants, recreational facilities, etc.), the use of different types of materials that could affect both the natural resources and the pressure on the plots of lands. Also, reach agreements on the use of telecenters to obtain training such as to improve the educational level, as well as virtual literacy and communication.
3. Promote compliance with regulations by the National Water Authority (ANA).

PURPOSE AND QUESTIONS

PURPOSE

The purpose of the Environmental Compliance Review (ECR) from USAID's Alternative Development Office is to analyze the rate of compliance with environmental mitigation measures. These measures are identified in the Environmental Monitoring and Mitigation Plans (EMMPs) of the activities implemented by CR3CE Alliance, Cacao Alliance, CAFE Alliance, and the Operation Plan for Institutional Strengthening of DEVIDA (PORI by its Spanish initials). Another aim is to provide recommendations for increasing successful compliance with environmental measures.

Specific Objectives

To determine the rate of compliance with environmental mitigation measures in the alternative development projects included in their respective EMMPs.

To identify factors that facilitate or prevent compliance with environmental mitigation measures.

To prepare recommendations for increasing the compliance rate and the sustainability of the progress made to date.

The stakeholders that will use the results of this study are USAID, the implementing partners of alternative development activities, and DEVIDA.

STUDY QUESTIONS

The questions to be answered are the following:

Table 1: Study questions

QUESTIONS	FOLLOW-UP QUESTIONS
What is the level of compliance with environmental mitigation measures included in the EMMPs of alternative development activities?	What is the rate of compliance with EMMP mitigation measures in alternative development activities? What factors facilitate or prevent compliance with environmental mitigation measures from EMMPs?
To what extent can the involved stakeholders contribute to a greater level of compliance with EMMP mitigation measures?	What role do USAID, implementing partners, and beneficiaries play in improving compliance with EMMP measures? What are the roles of men and women in environmental practices?
What alternatives contribute to increasing the level of compliance with the environmental mitigation measures included in EMMPs?	What alternatives can be implemented in the short, medium and long term to achieve a greater level of compliance with EMMP measures? What mechanisms are in force to follow up on the implementation of the alternatives proposed? To what extent are the recommendations made in the internal ECR from the last year and the external ECR implemented?

BACKGROUND

USAID's Alternative Development Office oversees the following activities: Cacao Peru Alliance - Stage II (Cacao Alliance), Alliance for Coffee Excellence (CAFE Alliance), Alliance for Digital and Financial Services (CR3CE Alliance) and The Operational Institutional Reinforcement Plan (PORI) by DEVIDA. The above-mentioned activities should comply with environmental procedures 22 CFR 216 by USAID (referred to as Reg. 216) and those from the Peruvian government. To this end, the above-mentioned activities create annual Environmental Monitoring and Mitigation Plans (EMMPs) which identify potential adverse impacts and propose measures to prevent or mitigate such impacts. Reg. 216 requests annual monitoring of compliance with the environmental mitigation measures, both by the activity teams and external entities, such as this revision.

The revision includes the following projects[1]:

Alliance for Digital and Financial Services (CR3CE Alliance), executed by the Center of Information and Education for Drug Abuse Prevention (CEDRO) in the Huánuco, San Martín and Ucayali regions. The purpose of this project is to contribute to the modernization and diversification of local markets by expanding internet services, strengthening information technology (ICT) competencies, and understanding the supply and demand of financial services. The fourth year EMMP (2021) proposes monitoring and advocacy actions in company *Internet para Todos* (IPT) for compliance with prevention and environmental mitigation measures in spaces where communication towers are installed and specific actions with municipalities are arranged. EMMP environmental mitigation measures from 2021-2022 are oriented to preventing environmental impact of telecommunication towers and telecenters.

The **Alliance for Coffee Excellence (CAFE Alliance)** is implemented by TechnoServe. Its objective is to support coffee farming households in the regions of San Martín, Huánuco and Ucayali, so that they manage their plots and non-agricultural businesses in a more profitable manner by increasing licit income and preventing a return to planting coca. The 2021 EMMP is oriented around creating a coffee

[1] The word 'project' will be hereinafter used to refer to what USAID usually considers an activity.

production base that is safer and more sustainable by restoring degraded land, preventing deforestation, and improving farmers' ability to mitigate and adapt to climate change.

Peru Cacao Alliance - Stage II (Cacao Alliance) is executed by Palladium in the San Martín, Huánuco, Ucayali and Pasco regions. Its objective is to support 24,000 households from rural areas in overcoming poverty, and to integrate them in the legal economy through cacao farming. Their strategies are increasing productivity, promoting private investment, and strengthening commercial, technological and financial markets. The year 5 EMMP considers mitigation measures that enable the increase in production and productivity of crops while countering the effects of climate change (such as precipitation decrease and temperature increases), and attempting to mitigate environmental effects such as soil erosion, inorganic waste, pollution of bodies of water, etc.

Institutional Reinforcement Operational Plan (PORI by its Spanish initials), implemented by DEVIDA and present in Huánuco, Junín, San Martín and Ucayali regions. Its purpose is to help DEVIDA in the gradual reduction of coca production in favor of licit income generation after forced eradication. The 2021 EMMP of productive components and implementation of basic modules and minor equipment is aimed at identifying the potential environmental impact generated by various activities. It recommends preventive, control and mitigation measures in villages/sectors and/or native communities who are willing to live from licit cultivations in a peaceful and sustainable environment. Activities are located within the intervention area of the Comprehensive and Sustainable Alternative Development (DAIS by its Spanish initials) program. The productive activities included are coffee, cacao, citrus fruits and pineapple, beekeeping, and aquaculture. For this study, only the environmental mitigation measures related to the aquaculture productive chain were reviewed.

METHODS AND LIMITATIONS

DESIGN

MITIGATION MEASURES INCLUDED IN THE STUDY

The study analyzed four environmental mitigation measure plans. Each of them includes several environmental measures and indicators, as shown below. A total of 79 environmental measures and 80 indicators were reviewed. In the case of the PORI EMMP, only the measures related to aquaculture were included. The measures and their indicators can be found in Annex D.

Table 2: Activities by Number of Environmental Mitigation Measures and Indicators

PROJECT NAME	LOCATION	EMMP PERIOD	NUMBER OF ENVIRONMENTAL MEASURES	NUMBER OF INDICATORS
CR3CE Alliance - Educational services	San Martín, Huánuco, Ucayali	Year 4 EMMP	9	17
CAFE Alliance - Productive	San Martín, Huánuco, Ucayali	Year 4 EMMP	20	25
Cacao Alliance - Productive	San Martín, Huánuco, Ucayali and Pasco	Year 5 EMMP	40	29

PROJECT NAME	LOCATION	EMMP PERIOD	NUMBER OF ENVIRONMENTAL MEASURES	NUMBER OF INDICATORS
PORI - Aquaculture	Huánuco	2021	10	11
Total			79	80

Source: Assessment Design and Work Plan. Environmental Compliance Review. 2022.

PERIOD

The review period of compliance with environmental measures is the EMMP period, as shown on Table 2.

GEOGRAPHICAL FOCUS

The geographical focus comprised the areas where the projects take place: San Martín, Ucayali, and Huánuco. The Pasco department was not included due to transportation difficulties and the time required to gather data from the other areas, apart from the low number of farmers present in Pasco.

DATA COLLECTION TECHNIQUES AND INSTRUMENTS

CR3CE ALLIANCE

Document review: The Environmental Monitoring and Mitigation Plan (EMMP), project documents (description, intervention context, strategies), and the internal and external ECRs were analyzed.

Non-participant observation: The application of environmental mitigation measures proposed for raising towers and telecenters was verified. To this end, a checklist was used to record the review findings.

In-depth interviews: Interviews were held with key informants such as: i) individuals in charge of telecenters at municipalities; and ii) members of the CR3CE technical team, in charge of executing the project in the intervention areas and Lima. The interviews provided opinions and an assessment of: a) causes and factors determining the level of compliance with EMMP measures; b) causes and factors hindering compliance with mitigation measures; and c) compliance with recommendations from the latest internal and external reviews.

CAFE ALLIANCE

Document Review: The main project documents (description, intervention context, strategies), the external ECR, and the Environmental Monitoring and Mitigation Plan were analyzed.

Survey: The survey was administered to a sample of coffee producers from the intervention regions. A structured questionnaire was prepared, including questions that gathered information to help estimate the level of compliance with environmental measures.

In-depth Interviews: In-depth interviews were conducted with two groups of stakeholders: a) farmers from the intervention regions; and b) technical teams responsible for executing the Lima and intervention area projects. The interviews were individual or in groups, depending on the type of call. For the interviews, different guides were prepared for producers and the technical team. The interviews

helped gather deeper knowledge of: a) the causes and factors that determine the level of compliance with EMMP measures, and b) the causes and factors hindering the level of compliance with mitigation measures. In the case of the technical team responsible for this project, the interviews helped elaborate on the causes for the level of compliance with recommendations from the last two internal revisions. In addition, the interviews inquired about stakeholders' contribution to the improvement of compliance with EMMP measures.

CACAO ALLIANCE

Document review: Project documents (description, intervention context, strategies), the internal and external ECR, and the Environmental Monitoring and Mitigation Plan.

Survey: It was aimed at cacao producers from the project intervention zones. A questionnaire was prepared, including questions that gathered information to help estimate the level of compliance with EMMP measures.

In-depth Interview: Interviews were aimed at farmers from the regions within the project scope. These were individuals or groups. An interview guide was created for the purpose of performing in-depth interviews. The interviews helped gather deeper knowledge of: a) the causes and factors that determine the level of compliance with EMMP measures; and b) the causes and factors hindering the level of compliance with mitigation measures.

PORI

Document review: An analysis of the Environmental Monitoring and Mitigation Plan, and the information from the fish farmers' databases.

Survey: The survey was administered to people responsible for the aquaculture modules within the intervention zone. A questionnaire was prepared, including questions that gathered information to help estimate the level of compliance with EMMP measures.

In-depth interviews: Interviews were aimed at individuals who have aquaculture modules. The interviews helped gather deeper knowledge of: a) the causes and factors that determine the level of compliance with EMMP measures; and b) the causes and factors hindering the level of compliance with mitigation measures. An interview guide was created for the purpose of performing said in-depth interviews.

A methodology summary for these projects can be found in the matrix found in Annex E.

INSTRUMENTS

Annex H includes the following data collection instruments used in this study:

- Interview guide for telecenter leaders - CR3CE
- Interview guide for COFFEE farmers
- Interview guide for CACAO farmers
- Interview guide for aquafarmers - PORI
- Interview guide for COFFEE, CR3CE, PORI technical teams

- Checklist for towers - CR3CE
- Checklist for telecenters - CR3CE
- Survey for CACAO farmers
- Survey for COFFEE farmers
- Survey for aquafarmers - PORI

In addition, interviewees completed an informed consent form at the beginning of each interview (Annex I), and a contact guide.

QUANTITATIVE SAMPLE

To prepare the sample of cacao, coffee and aquaculture producers, the following procedure was considered: definition of the target population, preparation of the sampling design, definition of the sampling frame, calculation of sample size, and sample selection.

The design of the sample of cacao, coffee and aquaculture was probabilistic, two-staged, stratified, and systematic for all three cases mentioned. The sample size required was 165 cacao producers, 160 coffee producers, and 131 aquaculture producers.

For all three producer profiles—cacao, coffee and aquafarmers—the values of latitude and longitude of producing units became geo-referenced standardized points. With them, it was possible to create six maps (using Google Earth) with the geo-referenced location of the population and the sample of cacao, coffee and aquaculture producers.

Table 3: Expected sample and actual sample

REGION	COFFEE FARMERS		CACAO FARMERS		AQUAFARMERS	
	EXPECTED SAMPLE	ACTUAL SAMPLE	EXPECTED SAMPLE	ACTUAL SAMPLE	EXPECTED SAMPLE	ACTUAL SAMPLE
Huánuco	70	77	32	35	131	131
San Martín	87	106	95	98	0	0
Ucayali	3	7	27	27	0	0
Pasco	0	0	11	13	0	0
Total	160	190	165	173	131	131

Note re. aquafarmers: In this case, only two provinces are considered: Huamalíes and Leoncio Prado de Huánuco

Annex F has a detailed explanation of the sample.

QUALITATIVE SAMPLE

CR3CE ALLIANCE

- **Towers**: The sample for site observation is intentional based on the location and level of accessibility of intervention areas. From the list provided by the CR3CE Alliance, a selection was made under two criteria: accessibility and population density (inhabited and uninhabited areas).

- **Telecenters for observations**: The sample for observation is intentional. Selection took place according to geographical location, based on the list provided by the CR3CE Alliance. In-depth interviews with the individuals responsible for telecenters took place in each selected telecenter.
- **Telecenters for interviews:** The sample for interviews to telecenter managers was random. Selection took place considering the list provided by the CR3CE Alliance. It is important to highlight that an interview could not take place in the Monzón area because the municipality decided to close the service "due to lack of resources".

Table 4: Observations in towers and telecenters - CR3CE Alliance

REGION	TOWERS		TELECENTERS	
	SCHEDULED OBSERVATIONS	ACTUAL OBSERVATIONS	SCHEDULED OBSERVATIONS	ACTUAL OBSERVATIONS
San Martín	5	5	5	5
Huánuco	5	7	5	5
Ucayali	5	4	5	5
Total	15	16	15	15

Table 5: Interviews in telecenters

REGION	SCHEDULED INTERVIEWS			ACTUAL INTERVIEWS			TOTAL PEOPLE INTERVIEWED
	MANAGERS	TECHNICAL TEAM	TOTAL SCHEDULED	MANAGERS	TECHNICAL TEAM	ACTUAL TOTAL	
San Martín	5	1	6	5	1	6	8 (1)
Huánuco	5	1	6	5	1	6	6
Ucayali	5	1	6	7	1	8	8
Lima	0	1	1	0	2	2	2
Total	15	4	19	17	5	22	24

Note: (1) A group interview to managers took place in San Martín

CAFE ALLIANCE

The team contacted the regional project manager before the interviews with farmers and arranged the meeting time and place keeping in mind that the premises should be safe and suitable for the occasion. The interviewed stakeholder may have belonged to a farmers' association or cooperative, or an independent farmer. Efforts were made to include men and women, as well as male and female leaders.

The sample was intentional and was linked to the application techniques and the selection criteria for informers: intervention areas and their status as a consolidation area or new intervention area.

Table 6: Qualitative sample - CAFE Alliance

REGION	SCHEDULED INTERVIEWS			ACTUAL INTERVIEWS			TOTAL PEOPLE
	PRODUCERS	TECHNICAL TEAM	TOTAL SCHEDULED	PRODUCERS	TECHNICAL TEAM	ACTUAL TOTAL	
San Martín	4	1	5	7	2	9	9
Huánuco	4	1	5	7	1	8	12 (1)

REGION	SCHEDULED INTERVIEWS			ACTUAL INTERVIEWS			TOTAL PEOPLE
	PRODUCERS	TECHNICAL TEAM	TOTAL SCHEDULED	PRODUCERS	TECHNICAL TEAM	ACTUAL TOTAL	
Ucayali	4	1	5	4	0	4	4
Lima	0	1	1	0	1	1	1
Total	12	4	16	18	4	22	26

Note: [1] A group interview to producers took place in Huánuco

The communities where the interviews with farmers took place were selected according to the following criteria:

- Accessibility: Visits took place in the communities that could be accessed by land.
- Travel length: The time spent arriving at each community had to be a maximum of two hours from the closest city, in order to perform fieldwork and return to the team accommodation on the same day.
- Safety: As these are alternative development areas, communities with significant numbers of coca farmers were ruled out. However, coca crops were found in some of the places visited. For safety reasons, the project's technical team was also in attendance.
- Participation in the team: The list of farmers provided by the implementing partners was used.

The farmer selection is explained below:

- The project's technical team issued the call for interviews. In a random manner, producers in the area were called for interviews.
- A list of associated and non-associated individuals was requested, and a similar number of men and women were called.
- The group interviews included five producers dedicated to coffee farming. Then, the producers' responses were classified into two categories: measure compliance and non-compliance.

CACAO ALLIANCE

Before the interviews, efforts were made to contact the individual in charge of the project's regional team, but this was not possible as the project had already been closed. Farmers were located in an independent manner, and the interview time and place were arranged with them, so that the interviews would take place in safe and suitable locations. Interviewees included males and females who were part of an association or co-operative or were independent.

The sample was intentional and was linked to the application techniques and the selection criteria for informers: intervention area and its location as consolidation area or new intervention area.

Table 7: Qualitative sample - Cacao Alliance

REGION	SCHEDULED INTERVIEWS			ACTUAL INTERVIEWS			TOTAL PEOPLE INTERVIEWED
	PRODUCERS	TECHNICAL TEAM	TOTAL SCHEDULED	PRODUCERS	TECHNICAL TEAM	ACTUAL TOTAL	
San Martín	4	0	4	10	1	11	11
Huánuco	4	0	4	12	1	13	13
Ucayali	4	0	4	12	1	13	13
Total	12	0	12	34	3	37	37

Community selection took place according to the following criteria:

- Accessibility: Visits took place in the communities that could be accessed by land.
- Travel length: The time spent arriving at each community had to be a maximum of two hours from the closest city, in order to perform fieldwork and return to the team accommodations on the same day.
- Safety: As these are alternative development areas, those communities with significant numbers of coca farmers were ruled out.
- Participation in the team: The list of farmers handed in by the implementing partners was used. The telephone numbers listed were not up to date, making it difficult to locate the farmers.
- The selection of farmers took place through associations or independent farmers.

PORI

In accordance with the work plan, the team contacted the DEVIDA personnel responsible for each zone. The interview took place after arranging the time and place. Generally, it took place next to the fish farms and very close to the farmers' homes. Efforts were made to include both males and females among the interviewees.

The sample for the qualitative studt was random, and showed intentional zonal representation based on application techniques and the intervention areas in Huánuco.

Table 8: Qualitative sample – PORI

CONTEXT	SCHEDULED INTERVIEWS			ACTUAL INTERVIEWS			TOTAL PEOPLE
	PRODUCERS	TECHNICAL TEAM	TOTAL SCHEDULED	PRODUCERS	TECHNICAL TEAM	ACTUAL TOTAL	
Huánuco	6	0	6	7	1	8	16 [1]
Total	6	0	6	7	1	8	16

Note: [1] A group interview of the technical team took place in Huánuco.

Fish farm selection took place according to the following criteria:

1. Accessibility: Visits took place in locations that could be accessed by land or by river.
2. Travel length: The time spent arriving at each community had to be a maximum of two hours from the closest city, in order to perform fieldwork and return to the team accommodations on the same day.
3. Safety: As these are alternative development areas, those remote places with significant numbers of coca farmers were ruled out.

Aquafarmer selection took place as explained below:

1. Participation in the team: The list of aquafarmers was requested from PORI, and later updated because the original one included municipal fish farms.
2. Selection was random, according to geographical location and the existence of an aquaculture unit.
3. Efforts were made to achieve balance between the number of men and women, but some individuals could not be located.
4. The group interview took place with the Huánuco PORI team and a member of DEVIDA's environmental department from Lima.

ESTIMATION OF INDICATORS

The level of compliance with environmental mitigation measures by the EMMP was calculated considering the percentages achieved in each measure, according to the responses to the questionnaires or the observation instrument. In various cases, the level of compliance was determined through the average values of responses. Annex G details the calculations made in this regard. Another reference point was the analysis matrix transcribed according to the questions by projects.

STRENGTHS AND LIMITATIONS

The main strengths of this study are the following:

- The mixed methodology provided complementary information and made data triangulation possible. The sample for the quantitative study was representative of all producers of every crop, and the surveys had a high degree of completion. The qualitative techniques had a high completion rate, and the expected number of interviews were conducted.
- The surveys were applied with suitable technology by installing specific applications in the researchers' smartphones and tablets so that virtual reports were issued in real time.
- The field team piloted the interview guides, adapting them for coffee farmers and cacao farmers.
- At the PORI fish farms, producers were very receptive, and the surveys were completed with no rejection or any major inconvenience.

The limitations were the following:

- The main challenges for the field operation were village accessibility and, especially, the coffee farmers' sample dispersion. Replacements had to be identified, because, on arrival to the villages,

informants could not be located as they had emigrated or were away. In the case of cacao, the field operation also faced challenges due to the sample dispersion and the absence of producers due to the New Year, when they usually travel to visit relatives.

- There were also limitations regarding the locations of the coffee farmers, cacao farmers and fish farmers to be interviewed, because of their work and because they were in very remote plots, or not present at the time. In addition, the beneficiary registry did not include up-to-date telephone numbers, so the data had to be updated upon arrival.
- Regarding fish farms, the sample selection had to be changed by using the latest version of the list that was kept at DEVIDA's zonal office in Huánuco. Traveling to these locations/villages was complicated, considering the routes and accessibility to the farms.
- In San Martín, two members of CAFE Alliance's technical team attended interviews. This was not possible in Ucayali because they had not been working there in the last year.
- Regarding telecenters, some managers could not be located. In addition, the telecenter premises provide other services through the manager, especially in relation to bank transfers for the general public. Several closed telecenters were found in Monzón because the municipality decided to close them "due to lack of resources".
- Rain and the weather resulted in blocked transportation roads and prevented interviews from taking place in more remote areas. In addition, heavy rain had affected Ucayali.
- The riskiest situation took place due to the social unrest that began in December, while the surveys were being applied. For this reason, the fieldwork was suspended. Lack of safety, violence and blocked highways hindered the traveling of field personnel. Work was resumed in January in order to complete the sample selected. This situation caused a schedule delay.

FINDINGS

ALLIANCE FOR DIGITAL AND FINANCIAL SERVICES (CR3CE ALLIANCE)

The CR3CE project has two components: digital connectivity and financing service tool access and use in alternative development areas (CEDRO, 2017). However, operational telecenters were handed over to municipalities during the second half of 2017. Bearing this in mind, CEDRO does not assume any responsibility and, therefore, has not allocated any budget to environmental management or remediation actions. In relation to the communications network used during the Digital Inclusion Program (2012-2017), which resulted in an EMMP for that project, this network was acquired by telecommunications companies during the CR3CE Alliance. Therefore, the network's environmental responsibility fell to these companies.

However, the CR3CE Alliance continued with some environmental mitigation and monitoring actions "related to the operation of communication lifting towers, and activities at telecenters managed by their respective municipalities" (CEDRO, 2022), assuming a role as advisors and technical assistants for municipalities. It is important to highlight that, in general, almost all municipalities had an agreement with the CR3CE Alliance valid until 2022. Regarding masts, CEDRO performs advocacy actions with the companies in charge of the communication network, so that they implement environmental protection measures when installing new towers.

Consequently, CEDRO conducts monitoring actions as leader and manager of the CR3CE Alliance in relation to the operating company's environmental care practices in the communication tower, the protection of buffer zones, water care, solid waste management (electronic and non-electronic), among other things. Regarding operational telecenters, monitoring efforts verify if adequate practices are taking place regarding solid waste management (electronic and non-electronic), water care, environmental protection, among others.

According to the databases provided for this study, there are a total of 78 towers in Huánuco, San Martín and Ucayali. Telecenters are in the same regions, and Huánuco has the largest number as can be noted in the table below.

Table 9: CR3CE Alliance. Communication tower and telecenter location and number

REGIONS	TOWER NUMBER	TELECENTER NUMBER
Huánuco	29	15
San Martín	23	12
Ucayali	26	12
Total	78	39

Source: CR3CE database 2022

It is important to remember that both towers and telecenters are mostly located in populated spots in rural areas.

COMPLIANCE WITH ENVIRONMENTAL MEASURES

Study questions:

1. *What is the level of compliance with the mitigation measures from the EMMP?*
   - *1.1. What is the compliance rate?*
   - *1.2. What factors facilitate or prevent compliance with environmental mitigation measures from EMMPs?*

Summary of findings:

- FINDING 1: Compliance with environmental mitigation measures from the EMMP for lifting towers and relay masts reached an average satisfaction rate of 68%. Measures related to the adequate location of towers and masts show a compliance rate of 100%. Maintenance of plants for afforestation compliance reached 94%. Solid waste management compliance reaches 41%. The lowest compliance rate is noted in signposting measures, with 3%.
- FINDING 2: The average rate of compliance with EMMP environmental mitigation measures in telecenters is 52%. The highest rate of compliance is found in protection of the environment (69%), particularly, in energy efficiency compliance. The lowest compliance rate is found in water care, electronic waste, and organic/inorganic waste management, recording 49%, 48% and 43% respectively.
- FINDING 3: The greater degree of responsibility for compliance with environmental mitigation measures falls upon municipalities, such as the entities that manage telecenters. This also applies to the CR3CE Alliance as advisors to municipalities for compliance with quality standards, and for implementing complementary environmental management mechanisms and procedures, where several interinstitutional agreements are currently in place.
- FINDING 4: Factors hindering compliance with environmental measures are: lack of training in mitigation measures/energy efficiency/water, lack of knowledge of environmental protocols, insufficient support for equipment and premise maintenance, limited solid and electronic waste segregation, telecenter management not coordinating with municipality management, staff turnover, and insufficient budget for solid waste management.
- FINDING 5: Enabling factors for compliance with environmental measures include telecenter manager capacity and responsibility, and telecenter manager efforts in solid waste management, as well as basic equipment and internet service access.

The CR3CE Alliance's EMMP has nine environmental mitigation measures and 17 associated indicators. Six of these measures are related to communication towers and relay masts, while three are related to telecenters. Compliance analysis is carried out separately for towers and telecenters.

LIFTING TOWERS AND RELAY MASTS

FINDING 1: Compliance with environmental mitigation measures from the EMMP for lifting towers and relay masts reached an average satisfaction rate of 68%. Measures related to the adequate location of towers and masts show a compliance rate of 100%. Maintenance of plants for afforestation compliance reached 94%. Solid waste management compliance reaches 41%. The lowest compliance rate is noted in signposting measures, with 3%.

There are six environmental mitigation measures for towers and relay masts, with 12 associated indicators. Table 10 shows the level of compliance with each environmental mitigation measure, followed by a graph summarizing the data. Information is only available for five out of the 12 indicators because no distinction was made between new and already installed masts. In addition, mitigation measure 5 could not be observed because, during fieldwork, no working teams were present to demonstrate the proper use of protocols for the use of safety and protection equipment.

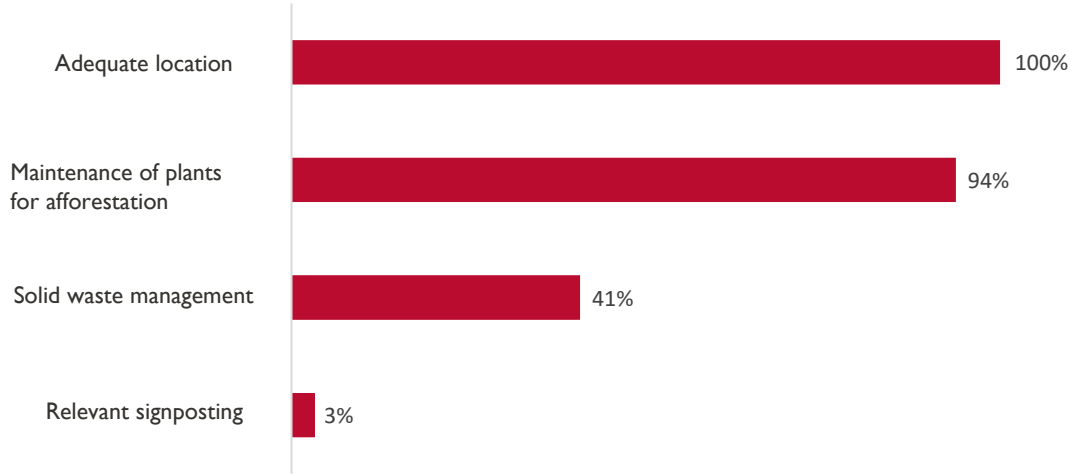
Table 10: CR3CE Alliance. Lifting towers and relay masts. Compliance with environmental mitigation measures.

NO.	MITIGATION MEASURE	INDICATOR	COMPLIANCE %
Adequate location			
1	Application by Yachay (operating company) of recommendations for not affecting the landscape (use of protected or maintenance areas) in the lifting towers of its telecommunications network.	Percentage of new lifting towers installed outside protected or maintained areas	(*)
		Percentage of lifting towers installed outside protected or maintained areas	100%
Maintenance of plants for afforestation			
2	Application by Yachay (operating company) of recommendations to prevent lifting towers from its telecommunications network from affecting the landscape (indiscriminate pruning or felling of trees).	Percentage of new lifting towers whose maintenance does not involve indiscriminate pruning or felling of trees	(*)
		Percentage of lifting towers whose maintenance does not involve indiscriminate pruning or felling of trees	94%
3	Application of recommendations by Yachay to prevent the lifting towers from its telecommunications network from affecting the landscape (activities affecting the vegetation cover).	Percentage of new lifting towers where vegetation cover is maintained during maintenance and installation	(*)
		Percentage of lifting towers where vegetation cover is maintained during maintenance and installation	88%
Relevant signposting			
4	Application by Yachay of signposting protocols (waste management and people safety) in lifting towers from its telecommunications network.	Percentage of new lifting towers including signposting according to protocol	(*)
		Percentage of lifting towers including signposting according to protocol	3%
5	Application of protocols by Yachay for safety equipment use (harness and helmet) during installation or	Percentage of new lifting towers whose installation followed protocols for safety and protection equipment use	(**)

NO.	MITIGATION MEASURE	INDICATOR	COMPLIANCE %
	maintenance actions for the lifting towers from its telecommunications network	Percentage of lifting towers whose installation followed protocols for safety and protection equipment use	(**)
Solid waste management			
6	Application of protocols by Yachay for the collection and disposal of paint containers and other materials used (thinner, turpentine, etc.) in the installation or maintenance of the lifting towers from its telecommunications network.	Percentage of new lifting towers whose maintenance followed protocols for the collection and disposal of paint containers and other materials used	(*)
		Percentage of lifting towers whose maintenance followed protocols for the collection and disposal of paint containers and other materials used	41%

Note: (*) Not calculated (**) Not observed
Source: Environmental Compliance Review Survey (ECR) 2022

Graph 1: CR3CE Alliance. Communication towers and relay masts. Compliance with environmental mitigation measures according to topic.



The fourth year EMMP (2021) proposes monitoring and advocacy actions to the firm *Internet para Todos* (IPT) for the compliance with prevention and environmental mitigation measures in spaces where communication towers are installed, and specific actions with municipalities are arranged.

The situation of environmental mitigation measures is presented below:

- **Adequate location**

This measurement has two indicators, both of which reach a compliance level of 100%, as confirmed by in situ observation. In other words, none of the observed towers is located within protected or buffer zones in Natural Protected Areas (ANPs).

Table 11: CR3CE Alliance. Adequate location

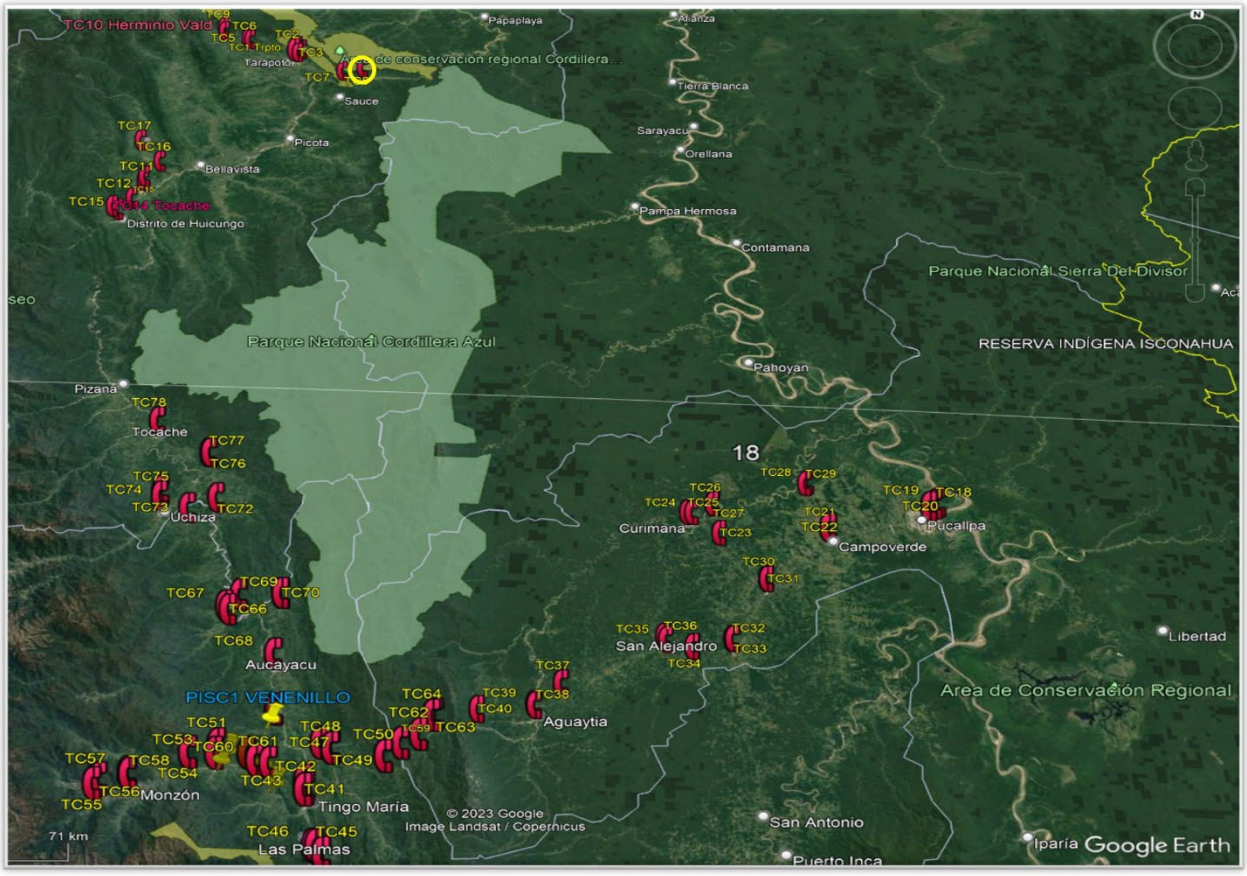
OBSERVED ASPECTS	COMPLIANCE %
Adequate location	100%
Tower is not installed in a buffer zone, protected area, or riparian ecosystem	100%

OBSERVED ASPECTS	COMPLIANCE %
The tower is installed in a previously disturbed area (in other words, not in a pristine zone)	100%

When reviewing the geo-referenced map based on the data delivered by CEDRO, no lifting towers or relay masts are noted in Natural Protected Areas (ANPs) such as the Alto Mayo Protected Forest, Cordillera Azul National Park, Tingo María National Park, or Bosque Montano de Carpish Regional Conservation Area (ACR). However, there is a tower installed in the ACR Cordillera Escalera de San Martín: Nuevo Lamas.

The CR3CE Alliance team reported that this is a tower installed by Yachay Telecomunicaciones, in coordination with the Nuevo Lamas community located at the entrance of the ACR. Yachay installed this tower in the first quarter of 2019 and stopped operating in it that year around August. The telecommunications equipment was removed. When the transfer process of the Yachay towers to the new partner Internet para Todos (IPT) started, the tower (which no longer had any equipment inside) was observed by IPT and was not included in the network currently in use. For this reason, the list of towers has not been updated yet, and this tower was reported as currently being operational. In fact, it has not been so since 2019. The locations can be seen in the map below, which is geo-referenced.

Map 1: CR3CE Alliance. Geo-referenced towers



The installation of lifting towers and relay posts was conducted in previously disturbed areas.

- **Maintenance of plants for afforestation**

This measurement also reaches an excellent level of compliance, with 94% on average. Compliance conditions are shown below:

Table 12: CR3CE Alliance. Maintenance of plants for afforestation

OBSERVED ASPECTS	COMPLIANCE %
Maintenance of plants for afforestation	94%
The lifting tower and relay mast are not located in an area subjected to indiscriminate pruning or felling	100%
The lifting tower is not installed less than 50 meters away from rivers or water sources	88%

The lifting towers and relay masts are not located in areas subjected to indiscriminate pruning or felling, meaning a 100% compliance rate. This indicator was analyzed during the previous revision, and, in principle, the towers are being kept in the same places where they were installed. The fieldwork evidenced that, in Ucayali, several towers did not work due to lack of maintenance, because they had been affected by electrical discharges during storms, or because there was no electricity supply, and they lost their purpose for communication by transmitting data over the Internet. The managers of affected telecenters did not know whether they would return to their jobs, or if they would have to find another Internet operator.

The second indicator states that the lifting tower cannot be installed less than 50 meters away from rivers or water sources. In this case, although the compliance level is satisfactory on average, 88%, the survey identifies two towers located less than 50 meters away. These towers are called Tocache and Hermilio Valdizán. However, this information was compared with its georeferential location and as can be noted in the enclosed maps, it can be concluded that the Tocache tower is located one kilometer away from the river, while the Valdizán tower is located 200 linear meters away from the river.

Towers close to rivers.

Hermilio Valdizán tower

Tocache tower

Since municipalities have removed several towers such as Lamas, which is now closer to the center of Lamas, it is important to update the georeferential data as has been done in other locations from San Martín and Ucayali.

- **Relevant signposting**

This mitigation measure shows a compliance rate of only 3% of towers. This measurement is made up of several variables, as can be noted in the table below.

Table 13. CR3CE Alliance. Relevant signposting

OBSERVED ASPECTS	COMPLIANCE %
Relevant signposting	3%
Lifting towers have a board saying "Authorized personnel only" or "Do not enter".	0%
Lifting towers have a board saying "Do not drop litter"	6%
Lifting towers have a board saying "Electrical hazard"	6%
Lifting towers have a board saying "Ground well"	0%

The near absence of signposting in towers evidences the lack of monitoring by OSIPTEL and IPT's compliance with protocols. The restrictions imposed during the COVID-19 pandemic probably influenced the lack of application of measures, and greater demands. Only 6% of towers have a board saying, "Do not drop litter" or "Electrical risk". The other boards, "Do not enter" and "Ground well" have not been placed on any of the towers visited.

During the visit to the Lamas province municipality, the tower was seen behind the Social Development Management office. It includes signposting, but incomplete. It also had water tanks on its base (as can be seen on the photograph below). During other visits to telecenters in rural areas, these had almost no signposting, confirming the findings of other tower observations.

In addition, according to CEDRO's latest report from 2021(CEDRO, 2022), it became evident that only 28-30% of towers had signposting. According to the indicator evidence, until said date the company had not yet implemented the measures required to overcome this situation.

Photo 1: Communication tower

Lamas. Tower and water tanks

Lamas. Signposting

Alto el Sol. Scarce signposting

- **Solid waste management**

The solid waste management indicator reaches an average compliance level of 41%. The first item for this indicator is not finding paint or other containers (thinner, turpentine, etc.) around the lifting tower or relay mast, with a compliance level of 81%. However, only 19% of the towers showed no traces of

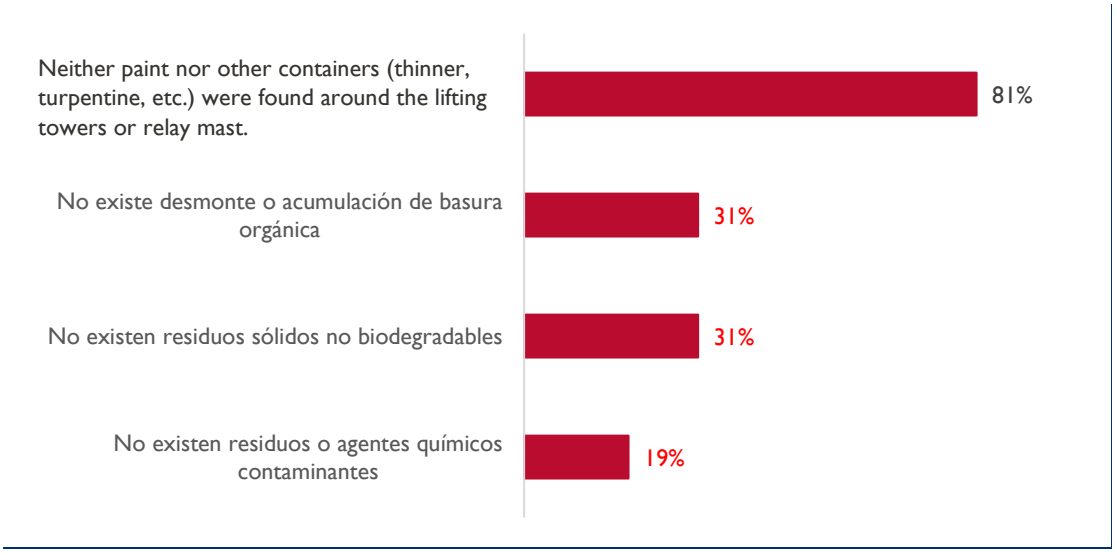
paint or polluting chemicals. This is a matter for concern, especially in rural Amazon region areas, because these can cause serious harm to the health of people and that of local animals.

The other two elements which are not very satisfactory are: the non-degradable solid waste and of construction debris or accumulated organic waste. The compliance rate in this case is only 31% of towers.

Table 14: CR3CE Alliance. Solid waste management

OBSERVED ASPECTS	COMPLIANCE %
Solid waste management	41%
There is not any non-biodegradable solid waste	31%
There are no residues of polluting chemical agents	19%
There are no construction debris or accumulated organic waste	31%
Neither paint nor other containers (thinner, turpentine, etc.) were found around the lifting towers or relay mast.	81%

Graph 2: Compliance with mitigation measures for solid waste in towers



This situation may be due to the absence of maintenance and conservation measures, such as grown weeds and the accumulation of various types of solid waste due to the same reason. In addition, when the rainy season arrives in Amazon jungle areas, weeds proliferate and people use those places as a waste dump.

FINDING 2: The average rate of compliance with EMMP environmental mitigation measures in telecenters is 52%. The highest rate of compliance is found in protection of the environment (69%), particularly, in energy efficiency compliance. The lowest compliance rate is found in water care, electronic waste, and organic/inorganic waste management, recording 49%, 48% and 43% respectively.

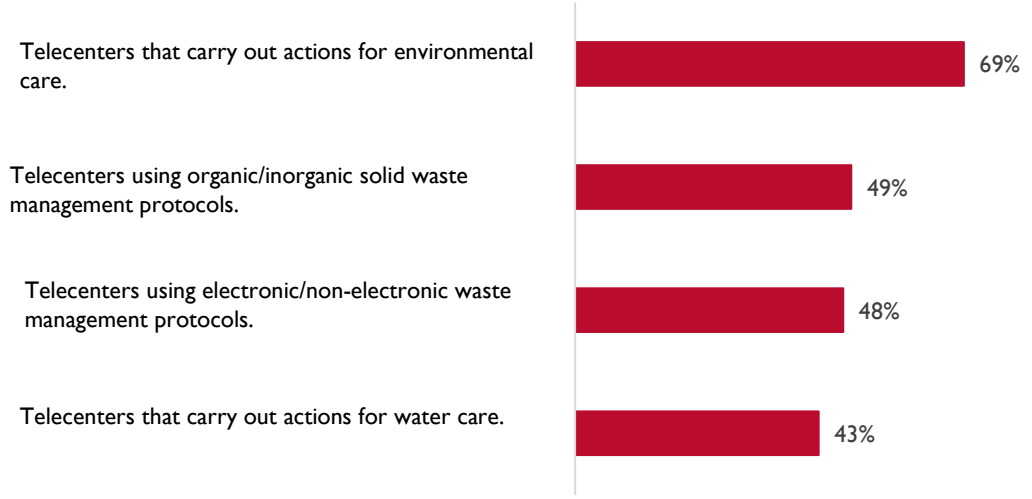
For the analysis, the mitigation measures were grouped by areas linked to environmental impact, namely: i) organic/inorganic solid waste management; ii) electronic and non-electronic waste maintenance and management; iii) water care; and iv) environmental care. The Table below shows the environmental mitigation measures of telecenters.

Table 15: CR3CE Alliance. Telecenters. Compliance with environmental mitigation measures.

NO.	MITIGATION MEASURE	INDICATOR	COMPLIANCE %
1	Application of solid waste management protocols (organic and inorganic) at telecenters by municipalities	% of telecenters using solid waste management protocols (electronic and non-electronic)	49%
2	Application of solid waste management protocols (electronic and non-electronic) at telecenters by municipalities that manage telecenters	% of telecenters using solid waste management protocols (electronic and non-electronic)	48%
3	Development of actions for water care by municipalities that manage telecenters	% of telecenters which develop actions for water care	43%
4	Development of actions for environmental care by municipalities that manage telecenters	% of telecenters which develop actions for environmental care	69%

The mitigation measures per area were calculated as the average of their individual components. The best figures for compliance were related to environmental care (69%). All other measurements are below 50% as can be noted in the graph below.

Graph 3: CR3CE Alliance. Telecenters. Compliance with environmental mitigation measures according to topic.



- Solid waste management

The organic and inorganic solid waste management means that telecenters implement a solid waste classification and management. It is worth remembering that municipalities receive a monetary prize by the Ministry of Economy and Finances (MEF) if they improve their solid waste management under the Ministry of the Environment's (MINAM) technical standards.

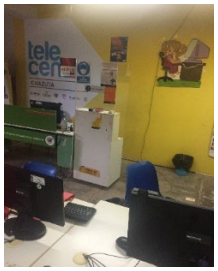
Table 16: CR3CE Alliance. Telecenters. Organic and inorganic solid waste management

OBSERVED ASPECTS	COMPLIANCE %
Organic/inorganic solid waste management	49%
The municipality has protocols for solid waste management at the telecenter	62%
The telecenter has a protocol for the removal of construction debris or waste in its surroundings	40%
There is a solid waste bin	58%
Organic and inorganic waste is segregated	64%
Plastic and/or glass waste is recycled	47%
The manager has received training in recyclable waste management	46%
The telecenter has some agreements with the local government or private entities for the collection and final disposal of solid waste for recycling	27%

As can be seen in the table above, the level of compliance with these criteria amounts to 49%. This level is not very satisfactory, but it is consistent with the qualitative analysis based on managers' statements. An exception to this is the Tarapoto Province Municipality, which has a solid waste management unit and a public cleaning sub-unit. However, according to the telecenter manager, it did not segregate the waste that the telecenter would deliver.

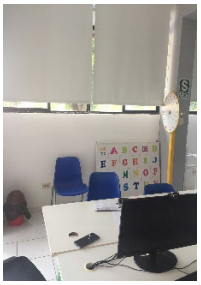
Most managers admit that there is inadequate support from the municipality's environmental commission or management office. Regarding the municipalities visited, the managers stated that they strive to manage solid waste with no prior training. A total of 62% of managers know that the municipality has a protocol for solid waste management (including those from the telecenter).

Use of buckets to segregate waste at telecenters

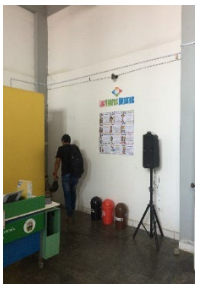


Chazuta (1 bucket)

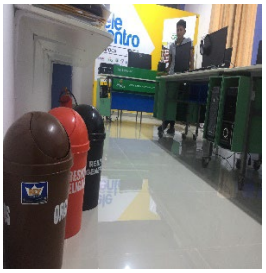
San Alejandro (2 buckets)



Neshua (1 bucket)



Uchiza (3 buckets)



Huipoca (3 buckets)

A total of 64% of managers make an effort to monitor the separation of organic and inorganic solid waste. Nevertheless, only 50% of telecenters have at least one bin for solid waste. Exceptionally, some have two or more bins or buckets—basically due to the manager's actions as can be seen in the photographs below. During the interviews, they stated that many of these bins were lost during the pandemic, but the municipality has not provided any replacements yet.

Managers make an effort to separate waste, but then the public waste collection service does not separate organic and inorganic waste. In some cases, they state that there are agreements with an individual or entrepreneur interested in solid waste collection for recycling purposes. However, only 27% of managers acknowledge the existence of formal agreements between municipalities for the collection and disposal of the segregated waste.

All this can be added to the lack of knowledge about protocols to remove construction debris or accumulated waste. Managers know that this task is the public service or environmental department's responsibility. However, given that telecenters mainly depend on the social development department, there is no adequate coordination on the issue.

- Electronic and non-electronic waste maintenance and management

The compliance rate with this measure amounts to 48%, which is rated unsatisfactory. This has been verified during the interviews with managers, who pointed out the absence of an Electronic Equipment Maintenance Plan. Maintenance only takes place when the equipment is not working. On many occasions, it is managers themselves who repair it or contact the municipality's or CR3CE Alliance's maintenance unit.

Table 17. CR3CE Alliance. Telecenters. Electronic and non-electronic waste maintenance and management

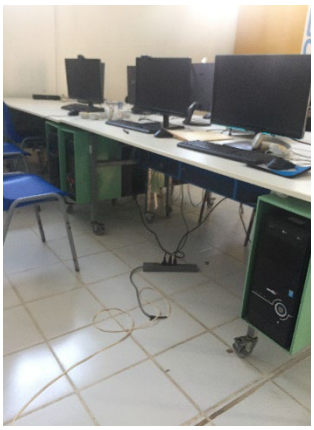
OBSERVED ASPECTS	COMPLIANCE %
Electronic and non-electronic waste maintenance and management	48%
There is electronic solid waste (equipment and devices) in the telecenter	40%
There are procedures for decommissioned electronic equipment and/or devices	31%
The telecenter has a maintenance plan for electronic equipment and/or devices	46%
Criteria used for decommissioning electronic equipment and/or devices when they break confirmed by the municipality	74%

Another key aspect is the lack of maintenance of equipment. In different locations, interviewees have mentioned that, because of their age, electrical connections for equipment are not adequate, and there is risk of short-circuit or electrocution for participants and children in attendance.

A total of 74% of telecenters have criteria to decommission a piece of equipment and/or an electronic device as confirmed by the municipality, and only 31% have procedures for managing decommissioned equipment and devices. This is consistent with the statements of managers, who claim that they do not know the final destination of this equipment. Some state that the maintenance unit sends them to a warehouse until the municipality decides whether they can be reused.

Electronic equipment in telecenters.

Cholon, Paraíso. Good module organization



Curimana. Loose electrical connections

Campo Verde. Loose electrical connections. High presence of children.

Visitor and children

- Water care

This is a measure directly linked to a resource that is seemingly abundant in the Amazon region, yet it does not necessarily meet the conditions to preserve public health. According to managers, water is stored in tanks which are managed and operated by the municipality, and whose maintenance is supervised by an agent from the local health center. This supervision was more frequent during the pandemic, when there was more attention paid to water management and quality.

In several rural areas where there are large palm crops and water comes from wells, the managers stated that it is best to use bottled water. They did not elaborate on the matter.

In this regard, managers should also be trained in water care management. However, this is only the case in 27% of telecenters. Training and protocol facilitation depend on the municipality. Only 20% of telecenters have protocols for water care.

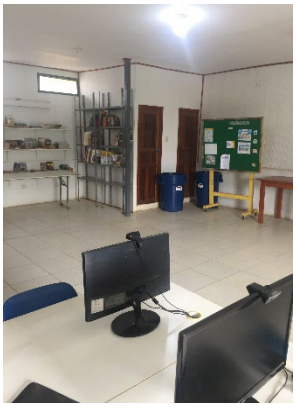
Table 18: CR3CE Alliance. Telecenters. Water care

OBSERVED ASPECTS	COMPLIANCE %
Water care	43%
The telecenter has a protocol for water care	20%
Water faucets are closed when not in use	67%
Toilets work well (there is no loss of water)	60%
The manager has been trained in water care	27%

Province municipalities had better conditions to maintain faucets and toilets at telecenters, in the same way as some rural municipalities which have renovated restrooms. However, others do not have these facilities, or they are of common use for the entire municipality premises.

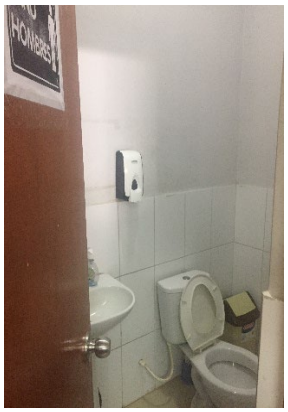
Faucets and toilets at telecenters.

Chazuta (open faucet)



Campo Verde (toilet out of order, buckets full of water for toilets)

Uchiza (toilet out of order, buckets full of water)



Tarapoto (well-equipped restroom) Social Development Service

When they are close to the restrooms, managers make an effort to ensure that faucets are closed or that toilets do not lose water, as noted in this indicator that reached 67%.

- Environmental care

The CR3CE EMMP has various measures to protect the environment. Those which enjoy the highest compliance rates are linked to controlling electricity use when there is no work or when the telecenter is empty (switching off lights and equipment). We also verified that the vegetation cover around the telecenter has not been affected. Interviews also evidenced better protection of the plant environment, especially in places where the managers were female.

Table 19. CR3CE Alliance. Telecenters. Environmental care

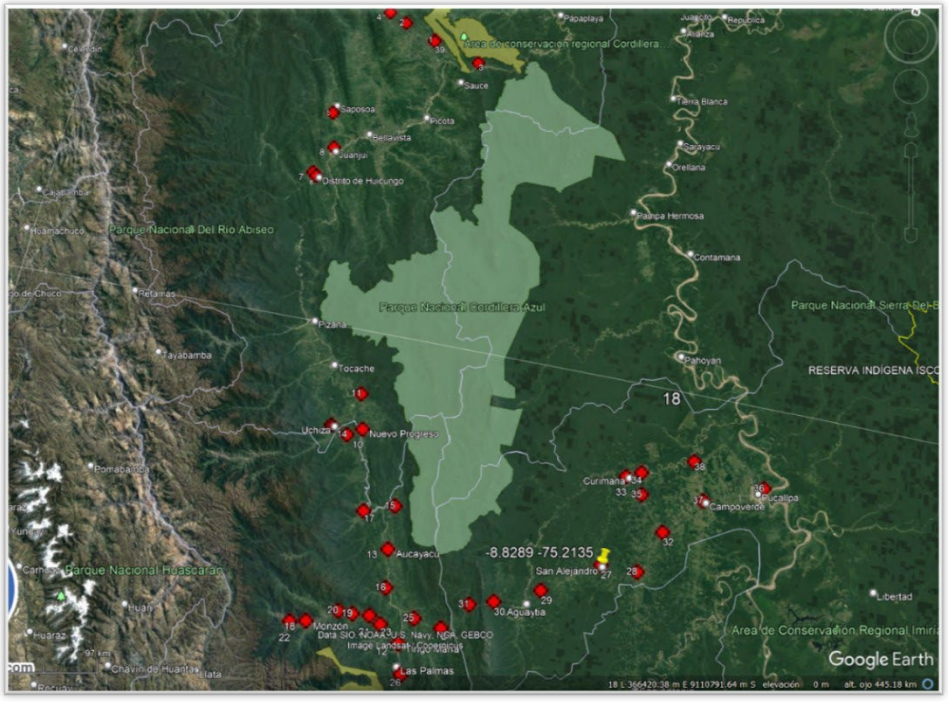
QUESTIONS	COMPLIANCE %
Environmental care	69%
The vegetation cover surrounding the telecenter has NOT been affected	87%
The telecenter is not located less than 50 meters away from rivers or water sources.	13%
Ground wells are located 50 meters away from riverbanks and 20 meters away from ravines	53%
The ground wells are installed in safe locations (under concrete or gardens)	60%
The lights (lightbulbs, fluorescent tubes, spotlight LED bulbs, others) remain on only when the telecenter equipment is in use	93%
The lights are switched off when exiting a room that will not be used	100%
Computers, printers, and photocopiers are switched off when leaving work	100%
The power supply is switched off when leaving the office	47%

The indicator with the lowest compliance rate is telecenter location: only 13% are far enough from rivers or water sources. The rest are located less than 50 meters away. The location of ground wells is

better rated: 53% are located 50 meters from riverbanks and 20 meters away from ravines. The following map can reveal how close telecenters and rivers are located.

The georeferenced map shows that telecenters are outside environments with vegetation cover, either in populated areas or towns.

Map 2: CR3CE Alliance. Georeferenced telecenters



The georeferenced data needs updating because, during interviews, teams learned that some municipalities have relocated telecenters. This is the case of Lamas, Uchiza, and San Alejandro. The latter's main square location was verified. It is no longer close to the riverbank as the georeferenced database indicates. The map above shows this difference.

Map 3: Georeferenced location of San Alejandro telecenter

ENABLING AND HINDERING FACTORS

FINDING 3: The greater degree of responsibility for compliance with environmental mitigation measures falls upon municipalities, such as the entities that manage telecenters. This also applies to the CR3CE Alliance as advisors to municipalities in compliance with quality standards, and for implementing complementary environmental management mechanisms and procedures, where several interinstitutional agreements are currently in place.

In 2020, CEDRO signed agreements with municipalities for a two-year period, with the purpose of "ensuring optimal and adequate operation of telecenters". These agreements propose a shared responsibility with the CR3CE Alliance, and there are commitments undertaken for "*telecenter management and operativeness*", to "*comply with the quality standards established in the Telecenter network, created and co-managed by CEDRO*" and to perform "*monitoring and evaluation of progress and results at telecenters*".

According to the agreement, and as confirmed by interviews, municipalities are responsible for the maintenance of telecenter infrastructure, equipment, basic services (electricity, water supply), and internet, as well as finding a person to be in charge. On the other hand, CEDRO is responsible for providing technical assistance for the operation of telecenters and environmental implementation. However, as stated above, the Alliance does not have sufficient funds to implement these actions.

The person in charge of the telecenter is a "manager" (concept used in previous sections). The individuals called "responsible persons" or "managers" go beyond these roles because of the tasks and roles they undertake. They respond, in a responsible and concerned manner, to different situations (even becoming banking agents) which certainly go beyond the responsibility of a manager in a general sense. They also manage environmental mitigation measures, even when these measures have not been fully explained to them. Furthermore, most of them are unaware of the agreements between CEDRO and municipalities.

FINDING 4: Factors hindering compliance with environmental measures are: lack of training in mitigation measures/energy efficiency/water, lack of knowledge of environmental protocols, insufficient support for equipment and premise maintenance, limited solid and electronic waste segregation, telecenter management not coordinating with municipality management, staff turnover, and insufficient budget for solid waste management.

The interviewees mentioned several limitations, which are related, and can be summarized in the following seven points:

- Lack of training in mitigation measures/energy efficiency/water.

Several telecenter managers stated that they have not received any training on EMMP topics. Others mentioned that such training did take place in previous years, but was extremely fast and superficial. Managers believe that this happens because municipalities' environmental management offices perform this task.

This is a truly restrictive factor for managers to act on their own initiative, and to be able to transfer knowledge to telecenter users.

- Lack of knowledge of mitigation measures or environmental protocols.

Municipalities are unaware of the EMMP, and many do not have an approved budget to implement some of these measures.

Municipal officials seem to be unaware of the benefits of implementing environmental mitigation measures. The reasons for this lack of awareness, also mentioned by managers, is the lack of interest by the municipalities' environmental management office—which lacks cross-sectional directives on environmental matters—and the limited coordination between the social management office—which telecenters depend on—and the management office in charge of environmental mitigation measures. The delegation of municipal functions does not favor coordination in these matters.

- Insufficient support for equipment and premise maintenance

Managers believe that municipalities provide little or no support for the maintenance of equipment and premises. This results in managers having to undertake several functions: apart from management, they arrange for equipment repairs, keep premises clean, help deliver training courses, and assist course participants.

- Limited solid and electronic waste segregation

Telecenter managers and CEDRO professionals mentioned that the population's low level of culture or environmental awareness in relation to solid waste management should be considered. This affects the intervention because it concerns public stakeholders and people in general.

Before the pandemic, solid waste segregation at telecenters was a common practice, and it continued in a few telecenters during the pandemic, especially as part of public health demands.

Municipalities do not segregate the solid waste that was originally segregated by managers into different waste bins. Managers stated that, in spite of their efforts for segregating waste, in the end municipalities collect and place solid waste in a single place. Other municipalities have agreements with recycling entrepreneurs to collect solid waste and sell it, even to the municipality itself.

Few district or province municipalities have an approved Solid Waste Management Plan (PMRS or PIGARS, by its Spanish initials)[2], in response to MINAM and the Municipal Incentive Plan(MINAM, 2017) demands. In fact, only three out of six province municipalities where the interviews were conducted have their own PIGARS. Regarding district municipalities where the interviews were conducted, only three out of eleven have their own PMRS[3].

It was a surprising fact that municipalities performed little or no management of electrical or electronic waste. All managers mentioned that the broken equipment goes to the Assets section - a room that has been equipped by the municipality itself where all types of damaged electronic equipment go. However,

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[2] The creation and implementation of solid waste management plans is a competency of district municipalities, as set forth in Section 10. "On the Role of Municipalities", Legislative Decree No. 1065 amending Law No. 27314, General Solid Waste Act. Source: Solid Waste Management Plan, MINAM.

[3] A search was carried out on the municipality website, and they cannot be found, or only the creation or assessment resolutions are available. MINAM was enquired about this, but they asked to consult the website.

it is not a properly established place approved by MINAM. In addition, it should be the municipality that decides on this matter because several companies perform the segregation and recycling of electrical and electronic equipment (WEEE).

- Telecenter management not coordinating with municipality management.

A recurring topic in the interviews with telecenter managers was the lack of knowledge regarding the agreement between municipalities and CEDRO (over 60% of interviewees). Those who know about it only read the opening section quickly but have not read the annexes. The regional responsible persons at CEDRO mentioned that municipalities do know about the agreement, but it is unknown if they share it with the managers.

Only the Tarapoto municipality manager evidenced knowledge about this agreement. He also mentioned that the agreement includes environmental topics in the annexes, especially biosecurity protocols for equipment and basic services. Indeed, Annex 2 includes a section entitled "General recommendations for telecenters," where these points are mentioned. Other telecenter managers were enquired about the annexes but they did not know about them.

- Staff turnover

Permanent turnover of the manager role was evidenced in several telecenters. In other cases, the manager fulfilled several roles, or there was one manager for several telecenters. As a consequence, managers have multiple functions and concerns related to the premises, the equipment and the courses on offer, and less time to become acquainted with environmental measure requirements.

- Insufficient funds for environmental and solid waste topics

Some managers stated that the municipality did not have enough financial resources to support their work. CEDRO professionals in Lima stated that neither the municipalities nor the Alliance have funds for these tasks. It is worth mentioning that telecenters were transferred to municipalities in the second half of 2017, and the CR3CE Alliance work plan does not include any activities related to environmental management (monitoring, equipment maintenance, technical assistance, specialized personnel, among others).

However, when verifying budget allocation on the MEF website, it was found that almost all of the 17 municipalities visited have allocated at least 1% of their budgets for this purpose. An exception is the Mariscal Castilla province municipality, which oversees the Juanjuí telecenter, and is now building premises in the La Victoria neighborhood with community resources.

FINDING 5: Enabling factors for compliance with environmental measures include telecenter manager capacity and responsibility, and telecenter manager efforts in solid waste management, as well as basic equipment and internet service access.

The managers identified four important factor that will allow for compliance with environmental measures:

- Responsibility and skills of the telecenter manager.

During the interviews, it became clear that the managers have the capacity to be good facilitators and that they have highly developed management skills. The CR3CE Alliance team pointed out that the

telecenter managers ideally are people with highly developed interpersonal skills. However, this depends on the municipalities, as they are in charge of hiring.

Nevertheless, a professional manager in environmental issues was found. In fact, among the candidates interviewed there were professionals in the environmental and health fields who were very much aware of the importance of monitoring environmental issues in telecenters, but they always stated that this topic should be part of the environmental management of the municipality.

- Efforts the manager makes to correctly process solid waste.

The managers make an effort to adequately segregate solid waste. Some telecenters have at least one garbage can for organic and inorganic waste that is visible for all attendees or which are large containers. The managers pointed out that they do not produce large amounts of organic waste, as they are not allowed to bring their own food. In some cases, they mentioned that they do not have garbage cans. Actually, they say they used to have garbage cans which were stolen, and so far, they have not been replaced.

Some managers stated that the municipalities have protocols for solid waste management prepared by the environmental or public services management, but that they do not know them and if they do, they often do not apply them. Another positive element are the agreements between municipalities and entrepreneurs for the segregation of solid waste, which allows for more adequate treatment of solid waste by telecenters.

Another important aspect is the standard on waste segregation taught to all members of the public who attend training workshops or who simply visit the telecenter. Some telecenters had signs for this, but others did not.

- Basic implementation of equipment and internet service

The municipalities have implemented basic computer and internet equipment that allows them to work sufficiently. The manager recognizes that equipment maintenance is limited and only occurs when requested and not on a preventive basis.

In practice, the manager performs equipment maintenance as part of his personal, but not institutional, work plan. In addition, this is possible because the manager himself is also a computer or systems technician or engineer in some of the municipalities.

- Municipality - CEDRO Agreement

Finally, another facilitating aspect is the agreement between the municipality and CEDRO, as it provides sustainability to the activities the telecenter performs. However, as we have mentioned above, they do not know it or they know it only partly.

STAKEHOLDERS INVOLVED

Study question:

2. *To what extent can the stakeholders contribute to a higher level of compliance with the EMMP mitigation measures? What is the percentage of compliance?*
   - 2.1. *What is the role of USAID, implementing partners and beneficiaries in improving compliance with the measures of the EMMP?*
   - 2.2. *What is the role of men and women in environmental practices?*

Summary of findings:

- FINDING 6: The key stakeholders involved in compliance with environmental mitigation measures are municipalities, partners committees, and public bodies related to healthcare. The CR3CE Alliance has a limited role in environmental issues.
- FINDING 7: Women play an important role in telecenter management, in partner committee actions, as training course participants, and as individuals responsible for cleaning and solid waste collection. Men play roles as telecenter decision-makers, in management, or in issues dealing with equipment or information technology.

FINDING 6: The key stakeholders involved in compliance with environmental mitigation measures are municipalities, partners committees, and public bodies related to healthcare. The CR3CE Alliance has a limited role in environmental issues.

The people interviewed mentioned the provincial or district municipality, the alliance committees, and the health sector as the stakeholders that contribute to environmental issues.

- **Municipalities**

The municipalities assume a central role in implementing the telecenters. It is evident that they are mainly responsible for providing equipment, premises, and internet service for operation of the telecenter.

The managers themselves consider that the telecenters provide vulnerable people with services in digital literacy and training in digital issues, as well as the use of computers and the internet. They do not consider the centers to be related to environmental issues or that monitoring of environmental measures is required. The reason for this may be that they are unaware of the competencies that municipalities have in this area. The municipalities do not incorporate environmental mitigation protocols or measures in the telecenter, especially in water management, nor in the management of the electrical and electronic equipment. A possible explanation for this is that the water services for the telecenter and for other bodies of the Municipality are not exclusive. In two cases they mentioned that they had the supervision of the Regional Health Directorate to ensure the quality of the water services.

The municipality has not played a good role in the management of electrical and electronic equipment. The telecenters have maintained the same installation since their set-up several years ago. The computer

cables are deteriorated and represent a high risk to the public, especially for children accompanying their mothers.

In some cases, the provincial municipalities have offices specialized in computers and can support the telecenters. In most cases, it is the manager who assumes responsibility for the maintenance of the equipment, making physical adjustments to the electronic components of the computers. The Patrimony Unit of the municipality intervenes when the equipment is decommissioned. As we have mentioned above, these agencies do not have electronic recycling areas or agreements with companies the MINAM recognizes for this purpose. Only the Municipality of Tarapoto mentioned that it has an office responsible for equipment and maintenance, as other municipalities in major cities also have in some cases.

To deal with environmental issues, many municipalities have an environmental management office, which is the office that provides telecenters with containers for solid waste. They also have environmental protocols and guidelines in place, but the telecenter managers are not aware of them and therefore do not apply them. The cleaning units of the municipalities have bags for solid waste, which they deposit in a public garbage truck. In addition, these units support recyclers to collect solid waste or deliver it directly to them. The environmental management also organizes the training cleaning staff.

It is important to note that the role of the municipal management in terms of the environment is not very well known. Some district municipalities do not have responsible management, but others have made good progress, such as the Municipality of Irazola. This municipality has a Public Services and Environmental Management Department that carries out environmental activities with social objectives.

Both the managers and the regional and Lima coordinators of the CR3CE Alliance have little information regarding the public budget allocated for telecenters (especially those located in more remote population centers). This lack of information impacts the service the telecenter provides, not only because of infrastructure and equipment or personnel issues, but also because the municipality decides whether to close the telecenter for budgetary reasons, as they indicated in Monzón. We only found one case where the manager was very familiar with the budget allocated to the telecenter, as he had worked in the budgetary unit of the municipality.

One can find out the budget allocated to the telecenter if it appears in a budget line. This is the case of the Provincial Municipality of Coronel Portillo, which includes in its annual operating plan for 2022 the overall budget[4] for the telecenter in the town of Callaría, which operates in the municipal library. We also found a case where the municipality transferred the responsibility for the operation of the telecenter -from the premises to the maintenance of equipment and basic services- to the neighborhood organization. The neighborhood committee is building an ad hoc facility, whereas the telecenter operates in a family house.

The managers show some disappointment because they feel that the municipalities do not link their social programs with the telecenters, even though one of their purposes is to facilitate access to digital literacy for women's organizations.

[4] Educational Activities in the Library of Callaría with an annual budget of approximately PEN 11,000. Source: POI multianual 2022, Management of Planning and Budget and rationalization MP of Coronel Portillo, 2019

- **Partners Committee**

In some of the telecenters, partner committees were set up in the early years of their implementation, which over time have gained importance and a good level of participation. The partners committees have different roles such as supporting the operation, promoting events, and even seeking funds for the telecenter. During the visits, it became clear that in most of the telecenters there is an active partners committee and that it is also recognized by municipal resolution[5]. The managers and coordinators of the CR3CE Alliance confirm this fact. It was also evident that the partnership committee does not intervene in environmental matters.

A good number of the partners committees consist only or mostly of women, which shows the efforts women make to participate and how they rely on telecenters to meet their own family, work, and financial needs.

Interviews also confirmed that a lot of businessmen, producers and women producers are members of the partner committees, and even carry out actions to raise funds. For example, there is a women's partners committee that obtained support from OLANSA, OSEPU, and INDOLMESO, all palm oil companies in Ucayali, which donated computer equipment to the telecenter. Other committees where women and men participate as cacao farmers are raising funds through their activities or in the participatory budget. There is participation of cacao farmers, municipal officials, women's and youth organizations. We only found one case where the partners committee consists of only employees of the municipality, and it is therefore not really a space for citizen participation.

In a few cases, the partner committee was no longer active because of a lack of participation of its members. However, the managers believe it is important to reactivate it.

The municipalities recognize the partners committees and it has a very interesting potential, which the Alliance and the municipalities should further highlight, as a citizen project and a creator of public value. It is an example of participation of different stakeholders, grassroots organizations, entrepreneurs, and public bodies.

- **CR3CE Alliance**

The CR3CE Alliance is recognized as the main driving force in the telecenters. In interviews, local CR3CE managers and coordinators agreed that the current role of the Alliance is to follow up on the attendance of the population to digital and financial literacy courses in telecenters.

In a few cases they mentioned the support the Alliance provides in maintaining the telecenter or in supervising proper use of water and toilets. They mentioned that the Alliance does not provide training in environmental mitigation measures. Some managers said that there was training on environmental issues before 2020, but none after that. During the interview in Lima with their representatives, they mentioned that they had no budget for this work.

It is important to note that the CR3CE Alliance has other financial inclusion activities for women and that they use the telecenters to carry out the corresponding training processes.

[5] In some cases, this resolution is from the library Partners Committee, as in the case of the Provincial Municipality of Huánuco, where the telecenter is not located on the municipality premises. Council Agreement 28-2021-MPHCO/O

- **Other stakeholders**

The health center has an important role in solid waste management and has a functional direction on the subject, but it does not exercise its role adequately in coordination with the municipality. It is also worth mentioning the interventions of the Health Directorates on sanitation issues such as water quality and basic hygienic services.

Other bodies the interviewees mentioned include the Community Committee of La Victoria in Juanjuí, which provides economic resources for the operation of the telecenter. This committee is building a special place for the telecenter, in an important effort of community participation. The UGEL-Lamas, which has an agreement with the Municipality.

FINDING 7: Women play an important role in telecenter management, in partner committee actions, as training course participants, and as individuals responsible for cleaning and solid waste collection. Men play roles as telecenter decision-makers, in management, or in issues dealing with equipment or information technology.

The contribution of women to environmental mitigation measures in the telecenters is important, but the municipality and other bodies have not included them in training processes. In telecenters, women play the role of managers and also carry out environmental mitigation actions. Men are more visible as telecenter managers as well as when they work in other areas of the municipality.

In almost all of the interviews, it became clear that women are responsible for the cleaning and segregation of solid waste, both in telecenters and in municipalities. Despite this, they do not receive training in environmental practices, and if they do, the manager is unaware of this practice. The regional coordinators of the CR3CE Alliance also recognize this role of women in telecenters. Men are more involved in IT issues or equipment maintenance - especially if there is no responsible IT office. We consider that the participation of men, even young men, in the telecenters and in training actions is limited because most of them are farmers who need to go out to the fields during most of the day.

Among women, attendance in the telecenters has been relatively high, especially in recent years[6]. From 2021-2022 8,832 people attended the Telecenters, 54% of which were women. In terms of age groups, 22% were between 6 to 14 years old, 41% between 15 to 29 years old, and 33% were between 30 to 59 years old. In terms of occupation, 18% were housewives, 56% were students and 12% were farmers. The manager specifies that women with children need to take their children with them when they attend, because their husbands work as shopkeepers or farmers and they do not have childcare support. In other words, the domestic role of caring for the family does not limit their training or their public role in organizational activities, such as the partners committees.

In other cases, women play a more important role, when they assume responsibilities in social reproduction and also go out to play their economic production role throughout the day. This is a point of tension that can affect environmental mitigation practices that benefit themselves and the children who accompany them to telecenters. This discussion about roles caught the attention of the managers during in-depth interviews, as they had not thought about it before.

[6] CEDRO database analyses, 2023.

In general, there is a lack of adequate schedules so that a more equitable participation does not mean an overload for women. However, it is important for the digital training processes on environmental issues for both genders to continue. The training of women in environmental issues is a benefit for telecenters, and also for the families and the community.

ALTERNATIVES TO INCREASE THE LEVEL OF ENVIRONMENTAL COMPLIANCE

Study question:

3. *What are the alternatives that contribute to increasing the level of compliance with the environmental mitigation measures included in the EMMP?*
    - 3.1. *What are possible alternatives to implement in the short, medium, and long term to achieve a higher level of compliance with the measures included in the PMMA?*
    - 3.2. *What are the follow-up mechanisms for the implementation of the alternatives presented?*
    - 3.3. *What is the quality of the presentation of the recommendations in the internal ECR conducted last year and from the external ECR implemented?*

Summary of findings:

- FINDING 8: Monitoring mechanisms related to environmental issues are extremely weak because regional CR3CE managers and coordinators are unaware of them, and municipalities are not responsible for this task.
- FINDING 9: Most telecenter managers are not aware of progress in compliance with environmental measures (ECR). Regional CR3CE staff responsible for them claim that this task is conducted in Lima, and do not know the results.

For the answer to Question 3.1 we refer to the recommendations section.

FINDING 8: Monitoring mechanisms related to environmental issues are extremely weak because regional CR3CE managers and coordinators are unaware of them, and municipalities are not responsible for this task.

The managers of the municipalities, nor the regional coordinators of the CR3CE Alliance know about the mandate to implement environmental monitoring and mitigation mechanisms. The regional coordinators mentioned that they basically monitor the virtual education courses that take place in the telecenters. The CR3CE Alliance lacks the budget to carry out environmental management or mitigation activities and they do not have a mandate to force local government entities to implement these actions.

The technical team of the CR3CE Alliance in Lima mentioned that they carry out annual environmental monitoring using the format they receive from USAID. It is important to transfer this responsibility to the municipalities in charge of the telecenters. In addition, their participation will serve to validate results and strengthen the Alliance. However, this should be part of a framework of greater coordination with the environmental management or unit.

Both CEDRO regional and Lima managers mentioned that this work requires a budget and specialists, which are currently lacking.

FINDING 9: Most telecenter managers are not aware of progress in compliance with environmental measures (ECR). Regional CR3CE staff responsible for them claim that this task is conducted in Lima, and do not know the results.

During the interviews, both telecenter managers and the regional managers of the Alliance indicated that they are not aware of the annual recommendations of the ECRs.

In Lima, the managers indicated that they carry out environmental monitoring annually, but not all recommendations are implemented because it is not their responsibility to do so. In addition, third parties were in charge of conducting the ECRs - referring to the monitoring of the towers, and the monitoring conducted by MELS and which helped define the responsibility of the municipalities (CEDRO, 2022).

In the case of internal ECRs, these have reviewed municipalities' antennas; they have not included telecenters in this monitoring.

ALLIANCE FOR COFFEE EXCELLENCE (CAFE)

The *Peru Coffee Alliance* or CAFE Alliance Project is a public-private partnership that seeks to increase the incomes of small coffee farmers so that they have sufficient income to avoid having to return to growing coca leaves. CAFE supports farmers to improve productivity and enter the specialty coffee supply chain, which pays a premium for high quality beans.

The CAFE Project has been working on environmental mitigation measures in coffee cultivation in coordination with associations, cooperatives and public-private institutions, with the aim of incorporating sustainable production practices, so that their farms are more resilient and productive.

The total population of CAFE Project producers is 7,839, 53% of which live in the San Martín region, 42.6% in Huánuco, 2.8% in Amazonas, and 1.6% in Ucayali, as the following table shows:

Table 20: CAFE Project. Population of coffee growers.

REGION	NUMBER OF PRODUCERS	PERCENTAGE
Amazonas	219	2.8
Huánuco	3,343	42.6
San Martín	4,154	53.0
Ucayali	123	1.6
Total	7,839	100.0

Source: Cacao Alliance. List of participants 2022

COMPLIANCE WITH ENVIRONMENTAL MEASURES

Study question:

4. *What is the level of compliance with the mitigation measures presented in the EMMP?*
   - *4.1 What is the percentage of compliance?*
   - *4.2 What are the factors that facilitate or impede compliance with the mitigation measures in the EMMP?*

Summary of findings:

- FINDING 10: The rate of compliance with environmental mitigation measures in the CAFE Alliance project reached its highest average in reforestation and erosion control (63%) and solid waste management (61%). Water conservation and management (32%) reported the lowest rate of compliance.
- FINDING 11: Factors facilitating compliance with environmental mitigation measures are: the existence of entities that address environmental issues, the strategies developed by the CAFE Alliance for capacity strengthening, and having a specialist in environmental issues on the team.
- FINDING 12: Hindering factors for compliance with environmental measures are related to the high implementation costs, lack of interest, and insufficient awareness.

FINDING 10: The rate of compliance with environmental mitigation measures in the CAFE Alliance project reached its highest average in reforestation and erosion control (63%) and solid waste management (61%). Water conservation and management (32%) reported the lowest rate of compliance.

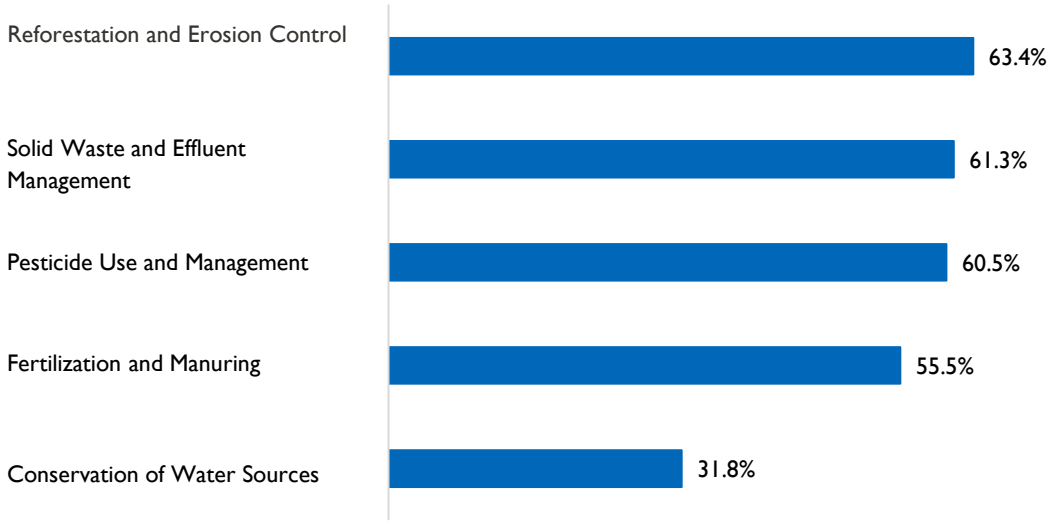
The EMMP for fiscal year 2021 for the Alliance for Coffee Excellence consists of 20 environmental mitigation measures and 25 associated indicators[7]. To analyze compliance with the measures, this study groups the measures according to the areas of the corresponding production chain where environmental impacts can potentially be generated: i) pesticide use and management[8], ii) fertilization and manuring, iii) reforestation and erosion control, iv) management of solid waste and effluents, and v) conservation of water sources. We calculated the level of compliance for each of the five areas as an average of the indicators that constitute it and we analyzed them using the results of the corresponding EMMP indicators.

[7] Measure 7, on implementing the use of cover crops and the use of mechanical means for weed control, was the only measure that does not have a measurement indicator. The indicator presented in the EMMP belonged thematically to measure 6, Management and final disposal of containers containing pesticide residues.
[8] According to the definition of the Food and Agriculture Organization of the United Nations (FAO), a pesticide is any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human and animal disease, AND unwanted species of plants or animals.

The following graph shows that, in general, the measures in relation to three of the five areas we assessed showed similar scores, all slightly above 60%. These areas are the following: (i) reforestation and erosion control, with a compliance percentage of 63.4%, which mainly involves training actions on soil conservation; (ii) solid waste and effluent management, with 61.3%, which involves a mitigation measure on the management and final disposal of containers with pesticide residues; and (iii) use and management of pesticides, which achieved an average compliance of 60.5% and consists of measures related to training and application of knowledge on the use of pesticides, application of integrated pest management (MIP) and use of personal protective equipment for the safe use of pesticides; the latter were the measures that achieved the highest level of compliance.

On the other hand, the area with the lowest relative compliance (31.8%) was conservation of water sources, due to the fact that most of the producers did not implement awareness campaigns on water contamination or did not carry out the correct management of coffee water or de-pulping waste, as established in the measures for conservation of water sources.

Graph 4: Alliance for Excellence in Coffee. Compliance with mitigation measures according to areas.



Source: Environmental Compliance Review Survey (ECR) 2022

The following table presents the level of compliance for each of the mitigation measures and the results by indicator. It should be noted that measures 10, 15 and 25 could not be observed, measure 7 did not have a measurement indicator in the EMMP, and measures 9 and 13 have the same indicator.

Table 21: Alliance for Excellence in Coffee. Compliance with Environmental Mitigation Measures.

NO.	MITIGATION MEASURE	INDICATOR	% OF COMPLIANCE
Pesticide Use and Management			**60.5%**
1	CAFE will ensure that assistance in the acquisition or use of pesticides (including training or technical assistance in the use	Percentage of participants trained in safe use of pesticides	52.1%

NO.	MITIGATION MEASURE	INDICATOR	% OF COMPLIANCE
	of pesticides), will be provided as described in the PERSUAP guidelines.	Percentage of trained participants applying safe use of pesticides.	11.1%
4	Apply the principle of Integrated Pest Management.	Percentage of participants trained in Integrated Pest Management	50.5%
		Percentage of trained participants applying integrated pest management.	99.0%
5	Mandatory use of protective equipment for the application of pesticides.	Percentage of participants trained and using basic mandatory equipment for pesticide application.	98.4%
20	Train farmers on the short- and long-term health risks due to practices they need to avoid, such as: lack of adequate protective equipment (gloves, eye protection, aprons, boots); improper storage of pesticides; improper disposal of pesticide containers or blowing out clogged nozzles with the mouth.	Percentage of participants trained in at least 1 of the following items: (i) use of basic protective equipment. (ii) improper storage of pesticides. (iii) improper disposal of pesticide containers.	52.1%
Fertilization and Manuring			**55.5%**
2	For fertilizer training, CAFE must ensure incorporation of the Fertilizer Management Plan.	Percentage of participants trained in fertilization planning	44.7%
		Percentage of trained participants who apply fertilization planning.	72.9%
3	The preparation of organic fertilizers (solid and/or liquid) will be a priority in farmer training events, as well as the incorporation of green fertilizers (manure, compost) to improve soil quality.	Percentage of participants trained in organic fertilizer preparation.	55.3%
		Percentage of trained participants who incorporate the use of organic fertilizers in the soil of their farms.	(*)
8	Train farmers in the correct use and application of fertilizers and pesticides.	Percentage of participants trained in the correct use and application of fertilizers according to a fertilizer plan and pesticide use as a last option.	44.7%
		Percentage of trained participants who apply the correct use and application of fertilizers according to a fertilizer plan and pesticide use as a last option.	72.9%
9	Reinforce the production of organic fertilizers from coffee pulp waste.	Percentage of participants trained in the production of organic fertilizers from coffee pulp waste.	45.3%
14	Implement the construction of small deposits to dispose of de-pulping waste.	Percentage of participants trained in coffee pulp management (composting).	52.6%
15	Strengthen the production of organic fertilizers (compost bins) from coffee pulp and other harvest residues.	Percentage of participants trained in the production of organic fertilizers from coffee pulp waste.	(*)
Reforestation and Erosion Control			**63.4%**
7	Implement the use of cover crops and the use of mechanical means to control weeds.	(**)	
11	Provide ongoing training in soil management and conservation.	Percentage of participants trained in soil management and conservation.	63.2%

NO.	MITIGATION MEASURE	INDICATOR	% OF COMPLIANCE
17	Provide intensive training to farmers on the different forms of soil conservation, establishing maximum slopes where coffee can be planted.	Percentage of participants trained in different forms of soil conservation, establishing maximum slopes where coffee can be planted.	63.2%
18	Implement the installation of slow-forming terraces, contour farming, and living or dead containment barriers. Each conservation measure must be in accordance with slope inclination.	Percentage of trained participants that implement at least one form of soil conservation, establishing maximum slopes where coffee can be planted.	76.8%
19	Cover the soil with a layer of mulch using coffee waste such as leaves, leaf litter, branches, etc.	Percentage of trained participants that cover the soil with pruning residues from coffee plants.	50.5%
Solid Waste and Effluent Management			**61.3%**
6	Handling and final disposal of containers (bottles, bags, cans) that contain pesticide residues.	Percentage of participants trained in the management and final disposal of containers.	43.2%
		Percentage of trained participants who manage to collect, at minimum, pesticide containers.	79.3%
Conservation of Water Sources			**31.8%**
10	Implement awareness-raising campaigns on the implications of water pollution	Number of awareness campaigns implemented on the implications of water pollution.	24.7%
12	Organize awareness campaigns on pesticide and water pollution and how to avoid them.	Number of awareness campaigns implemented on pesticide and water pollution and how to avoid them.	25.3%
13	Provide training and monitoring on environmental management of honey water, as well as the best way to treat de-pulping waste.	Percentage of participants trained in the production of organic fertilizers from coffee pulp waste. (***)	45.3%
16	Implement the construction of small canals and infiltration wells to channel honey water and avoid contamination of aquifers.	Percentage of participants trained in treating wastewater and avoiding contamination of aquifers.	(*)

Note:
(*) Indicator not calculated
(**) The indicator established in the EMMP: Percentage of trained participants who manage to collect, at minimum, pesticide containers. It is not related to Measure 7, but to Measure 6; for this reason, it is now the second indicator associated with that measure.
(***) This indicator does also apply to Measure 9.
Source: Environmental Compliance Review Survey (ECR) 2022

- **Use and Management of Pesticides**

This topic involves four environmental mitigation measures whose average compliance is 60.5%, with highest levels of compliance for measure 4, which refers to the application of MIP, and measure 5, on the use of basic equipment for pesticide application among trained producers, 99% and 98% respectively. The interviews showed that these results are largely associated with the fact that the CAFÉ Alliance provided MIP training during the field days so that producers have different ways of controlling the pests that attack coffee crops so that chemical control is the last option. Among the different controls that growers have used are cultural control, pruning management, shade management and the removal of the last diseased fruits, also known as coffee stubble, as well as biological controllers such as Beauveria. In

addition, producers that participate in organic programs do not use pesticides which causes their coffee production to be more sustainable.

Below are the findings of each of the measures evaluated in this area:

Measure 1. Technical assistance or training for the acquisition or use of pesticides according to the PERSUAP guidelines. This measure consists of two indicators, the first of which is training in the safe use of pesticides, which reached 52.1%. This percentage represents the producers who spontaneously declared having received training on issues related to safe use of pesticides. The second indicator reflects the achievement in the application of PERSUAP-approved pesticides among farmers trained in the safe use of pesticides. This obtained a result of 11.1%, mainly due to the fact that the producers mentioned not using chemicals, which is an example of positive behavior in terms of environmental protection.

Measure 4. Application of integrated pest management (IPM). The first indicator, the percentage of farmers trained in IPM, achieved 50.5% compliance. The second indicator, proportion of trained producers who reported applying IPM, reached 99%; the actions linked to IPM are: shade management (cultural practices) 86.8%, pruning management (cultural practices) 81.1%, crop association (cultural practices) 62. 1%, manual removal of weeds or pests (mechanical control) 61.6%, use of resistant varieties (genetic control) 43.7%, use of living barriers (cultural practices) 36.3%, use of traps (ethological control) 32.6%, use of *beauveria* and/or *trichoderma* (biological control) 19%.

Measure 5. Mandatory use of protective equipment for pesticide application. 98.40% of the farmers who were trained use at least one of the following PPE accessories: rubber boots 95.3%, plastic to cover their backs so it does not come into direct contact with the backpack or cape 50%, mask that covers their mouth and nose 45.8%, glasses to cover their eyes 39.5%, gloves (plastic, not cloth) 34.7%. Only 1.6% of producers do not use any PPE accessory because they do not think it is necessary.

Measure 20. Training farmers on short- and long-term health risks due to practices that should be avoided in the handling of pesticides. In this regard, 52.1% of the farmers surveyed mentioned having received training on one of the following topics: safe use of pesticides 35.3%, health and environmental risks due to pesticide use 39%, use of personal protective equipment 33.2%, proper disposal of containers with pesticide residues 43.2%.

- **Fertilization and Manuring**

This area involves the implementation of six mitigation measures, for which we calculated an average level of compliance of 55.5%. This set of measures focuses on the training of producers and the practical application of the fertilizer management plan or composting plan, on the preparation of organic fertilizers (composting), especially from coffee pulping, and on the correct use of fertilizers and pesticides.

In this regard, the scope of training in most of the topics on fertilization and manuring reached less than 50% of producers, and among those trained, more than 70% applied what they had learned. Training in the correct use and application of fertilizers according to a manuring plan reached 44.7% of producers, and among those trained, 72.9% have applied a fertilization plan.

On the other hand, training in the production of organic fertilizers from coffee waste reached 45.3% of producers. In the interviews conducted, the interviewees positively recognized that the CAFÉ Alliance developed training and awareness workshops on climate-smart agriculture through the installation of compost bins, preparation of organic fertilizers such as compost, preparation of biofertilizers, among others. They also recognized the need to raise awareness among producers who have a compost bin so that they can make better use of coffee pulp and other harvest residues.

The following are the findings of each of the measures in this area:

Measure 2. Project trainings should include a manuring management plan. This measure refers to (i) the percentage of farmers trained in fertilizer management plans, 44.7%, who reported having received training over the past year in the preparation of a Fertilizer Management Plan or Fertilizer Plan (2 to 3 manurings per year). On the other hand, among those trained, 72.9% reported applying their Fertilizer Management Plan. Among those who did not apply a fertilizer plan, 40.5% said this is because they do not think it is necessary, 24% said they do not know how to apply it and 20.3% said they do not have enough money to do so.

Measure 3. Training in organic fertilizer preparation. For this measure, the training indicator reached 55.3%, which constitutes producers who mentioned having received training in at least one of the following two topics: (i) Use of compost bins and compost preparation: 52.6%, or (ii) Preparation and use of biofertilizers (organic fertilizers): 45.3%. On the other hand, it was not possible to determine the result of the second indicator of this measure on incorporation of the use of organic fertilizers on farms due to measurement difficulties.

Measure 8. Training in the correct use and application of fertilizers and pesticides. Regarding training, the first indicator reveals that 44.7% of farmers received training in the preparation of a Fertilizer Management Plan or Fertilizer Plan (2 to 3 manurings per year). Meanwhile, the second indicator shows that 72.9% of those who received training say they apply their fertilizer plan. Finally, some of those who do not apply the plan stated that this is mainly because they do not consider it necessary (41%).

Measure 9. Training in the production of organic fertilizers from coffee pulp waste**.** Compliance with this measure was 45.3%, which represents the percentage of farmers who stated that they had received training in the preparation and use of biofertilizers (organic fertilizers). On the other hand, most of the producers who do not apply organic fertilizers on their plots mentioned that this is because they do not have enough time (34%) or because they do not consider it necessary or useful (32%).

Measure 14. Implementation of small deposits to dispose of de-pulping waste. The indicator is not relevant for this measure. It refers to producers trained in the management of coffee pulp (composting). In this regard, 52.6% of interviewees said that they had been trained in the management of coffee pulp (composting). However, 51.1% of producers do not have a compost bin and 48.4% do not use a compost bin during the harvest, basically because they do not consider it necessary (39%), because they do not have money (32%), or because they do not have time (32%).

Measure 15. Production of organic fertilizers (compost) from coffee pulp and other harvest residues. This indicator refers to the percentage of trained participants who apply the production of organic fertilizers from coffee de-pulping waste. Although 55.3% of producers reported having received training in organic fertilizers from coffee pulping residues, it was not possible to determine what proportion of these producers actually apply organic fertilizers due to measurement difficulties. However, during the interviews it was possible to identify different levels of application of organic fertilizers per region. For example, in the San Martín area most of the associated producers apply organic fertilizers such as compost or island guano because they belong to an organic program; on the other hand, in the Huánuco and Ucayali areas they usually use synthetic fertilizers such as molimax together with compost, because the soils are no longer as fertile as before, as they stated.

- **Reforestation and Erosion Control**

We identified five environmental measures in this area (Measures 7, 11, 17, 18 and 19), but it was only possible to calculate the level of compliance for four of them. In the case of Measure 7, the indicator was more closely related to Measure 6. As a result, compliance in this area from four measures is 63.4%, with Measure 18 linked to the application of different forms of soil conservation (according to its indicator) being the one that recorded the greatest progress, namely 76.8% of compliance. This result is associated with the emphasis the Alliance places on training farmers in soil management and conservation, so that they use as few chemical products as possible that can degrade the soil, such as herbicides for weed control. As a result, farmers mostly use mechanical control, which can be through the use of motor mowers or machetes.

Likewise, the farmers interviewed mentioned that the CAFE Project has promoted the use of containment barriers, either living, such as planting trees in and around the plot, or dead barriers, such as pruning debris, which most producers dispose of between the coffee rows to serve as fertilizer and improve the physical characteristics of the soil, and contour farming. The Alliance has also promoted the use of different types of shade trees in the area, such as temporary shade using bananas or permanent shade using different varieties of timber trees such as tornillo, mohena, Ecuador laurel tree, Glandular Nakedwood, capirona, ice-cream bean, the increase of the availability of organic matter in the soil, the capture carbon dioxide, conservation of water and biodiversity, and the protection of soils from erosion.

Below are the findings for each of the measures evaluated:

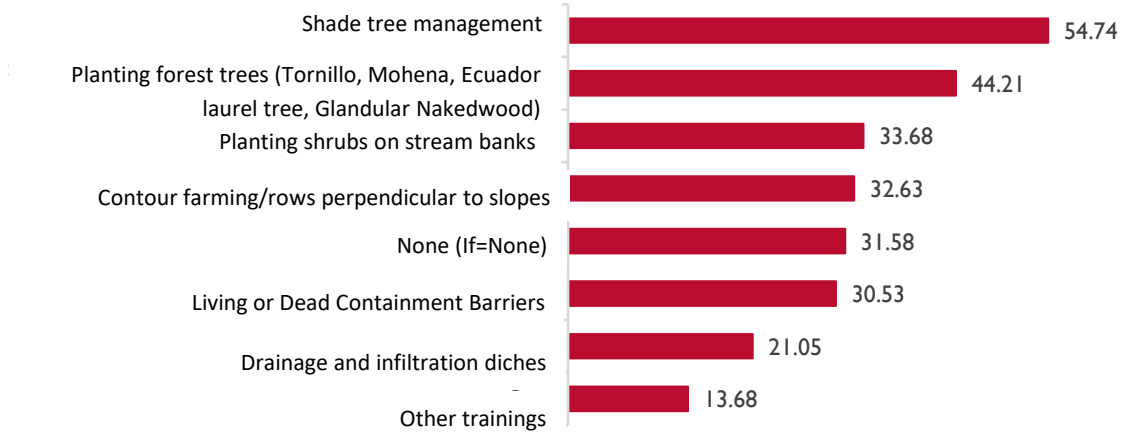
Measure 7. This measure does not have an indicator associated with its proposal to implement the **use of cover crops and the use of mechanical means for weed control.**

Measure 11. Training in soil management and conservation. This measure reached 63.2%, representing the percentage of farmers who indicated having received training on one of the following six topics in the last year: (i) Living or dead containment barriers: 30.5%, (ii) Contour farming/rows perpendicular to slopes: 32. 6%, (iii) Drainage and infiltration ditches: 21.1%, (iv) Shade tree

management: 54.7%, (v) Shrub planting on stream banks:33.7%. (vi) Forest tree planting (tornillo, mohena, Ecuador laurel tree, Glandular Nakedwood): 44.2%. See the graph below.

Measure 17. Intensive training on the different forms of soil conservation, establishing maximum slopes where coffee can be planted. In this regard, an indirect approximation of the compliance achieved for this measure is 63.2%, which represents, as in measure 11, the percentage of producers trained in some of the different forms of soil conservation, given that there is no information available on the slopes of the land. As we have shown in the graph below, the topic in this area that they remembered most, with 54.7%, was training in shade management.

Graph 5: Alliance for Excellence in Coffee. Trainings the Project has conducted over the past year.



Measure 18. Installation of slow-forming terraces, contour farming, and living or dead containment barriers, according to the slope inclination. However, the indicator specifies that trained participants are sought to implement at least one of the different forms of soil conservation, establishing maximum slopes where coffee can be planted. In this line, the level of compliance with this indicator reached 76.8%, which represents farmers who reported having installed forest trees such as Ecuador laurel tree, mohena, and tornillo, among others, which help soil erosion because it provides organic matter and prevents leaching of nutrients by maintaining the topsoil layer.

Measure 19. Training in mulching the soil using coffee waste. This measure has achieved a coverage of 50.5%, which is the percentage of trained farmers who dispose of organic waste from their plots between the coffee rows.

- **Solid Waste and Effluent Management**

This area includes only one EMMP measure, which is **Measure 6, management and final disposal of containers (bottles, bags, cans) containing pesticide residues.** In this regard, 43.2% of producers reported having received training on proper disposal of containers with pesticide residues and out of these, 79.3% manage to safely collect at least the pesticide container, either in containers or sacks

specifically selected for such use: 26.8%, by delivering them to the Campo Limpio company: 6.8%, or by burying them: 54.2%.

This level of application largely depends on three factors highlighted by the farmers interviewed: (i) some farmers place them in containers or bags to deliver to SENASA, which is the body that performs this task, especially in the Ucayali region, (ii) usually farmers belonging to an association or cooperative have micro sanitary landfills within their plots where they bury containers and individual farmers sometimes burn these types of hazardous solid waste. (iii) CAFÉ Alliance made agreements with the company Campo Limpio to carry out the collection, which reaches certain parts of the area of intervention.

On the other hand, 38.76% of producers dispose of their waste in any type of container, in recycling containers or in water sources, as most of them consider that they have always had the same practice (68%), while 24% do not consider it risky.

- **Conservation of Water Sources.**

The conservation of water sources has four associated environmental measures, which are measure 10, 12, 13, and 16. However, indicators could only be calculated for the first three of these measures, estimating an average progress for this area of 31.8%, which makes it the thematic area with the least progress. This is mainly due to the fact that interviewees do not acknowledge having participated in awareness campaigns on the implications of water pollution or pesticide contamination of water courses, as we can conclude from the indicators for measures 12 and 13.

On the other hand, although there is no quantitative information on the indicator for Measure 16, the proportion of trained participants who treat wastewater and avoid contamination of aquifers, interviews with producers show that they received training on these issues and some of them are taking care of water because they have become aware of the importance of taking care of water and the effects of not taking care of it that could lead to the drying up of water sources. This awareness of water care becomes evident from the fact that some even plant trees near water sources or maintain them and avoid deforestation. In addition, the Alliance installed vetiver grass as a mitigation measure for the adequate management of coffee water in plots of land of producers who expressed interest in the three regions where the project intervenes. In this regard, the producers highlighted that this is a good environmental mitigation measure for coffee waste and to avoid soil contamination.

Below are the findings of each of the measures we have evaluated:

Measure 10. Implementation of awareness campaigns on the implications of water pollution. Only 24.7% of producers interviewed said they remember that the project has launched communication or information campaigns on the subject. However, although this indicator does not show good progress, 76.3% of producers mentioned that they maintain vegetation at the headwaters of natural water sources and 76.3% maintain a zone free of any crops for at least 5 m (or 50 m in the case of rivers) on each side of natural water sources, which reflects some awareness of the importance of conserving water sources.

Measure 12. Awareness campaigns on the contamination of water courses with pesticides. The results of the survey show us that only 25.3% of farmers recall having participated in the campaigns the project conducted over the past year.

Measure 13. Training and monitoring in the management of honey water and pulping residues. The project achieved 45.3% progress in the production of organic fertilizers from coffee pulping residues; this represents the proportion of producers who reported having received training in the preparation and use of biofertilizers (organic fertilizers). On the other hand, we can tell from the interviews that a good part of the producers do not prepare organic fertilizers with the coffee pulping residues because they simply leave them inside the plot. Among the main reasons for this were: (i) producers do not consider it necessary to prepare the fertilizers (34%) or (ii) they do not consider it necessary or useful (32%).

Measure 16. Construction of small canals and infiltration wells to conduct honey water and prevent contamination of aquifers. Its indicator is the percentage of trained participants who treat wastewater and prevent contamination of aquifers. In this regard, although there is no information available to estimate compliance with this indicator. From the surveys we can tell that 43.16% of the producers implement the construction of small canals and infiltration wells to conduct the honey water and avoid contamination of aquifers, also, based on the field interviews we know that producers are using vetiver grass as an environmental mitigation measure against water and soil contamination, which the Alliance installed in the plots of producers who expressed interest, which allows them to purify water without any risk to living beings living near this type of technological constructions.

FACILITATING AND LIMITING FACTORS

FINDING 11: Factors facilitating compliance with environmental mitigation measures are: the existence of entities that address environmental issues, the strategies developed by the CAFE Alliance for capacity strengthening, and having a specialist in environmental issues on the team.

Three factors were identified that facilitate compliance with environmental mitigation measures:

- **Interventions by different institutions**

In the area where the CAFE Project has intervened, there are other institutions involved in Good Agricultural and Environmental Practices in coffee cultivation, including SENASA, DEVIDA, the municipalities, the Regional Government, the Regional Environmental Authority (ARA, by its Spanish initials) and the United Nations Development Program (UNDP). All of them provide training to promote organic farming and environmental care, which reinforces the knowledge among farmers of the environmental measures they receive from the CAFE Project, as has been confirmed during the interviews.

Likewise, some private companies were identified, such as PERHUSA, which is the one most recognized by the farmers because of their commitment to the CAFE Project for the commercialization of coffee and because they provide training in environmental measures through field technicians. In addition, Campo Limpio operates in Ucayali and collects empty pesticide containers free of charge.

- **Strategies developed by the CAFE Project**

Some activities developed by the CAFE Project have been effective in increasing the knowledge of farmers and their practices in terms of environmental measures, such as theoretical and practical training, technical assistance and permanent follow-up by the productive and environmental technical team.

The development of internal and external audits by the projects also helps to improve compliance with environmental mitigation measures.

The CAFE Project has chosen to promote a form of savings called ÚNICA which most of the farmers recognized as beneficial, because it promotes formalization (use of accounting books of the subscription as shares and of the loans granted to its partners). This intervention is a way of raising awareness about savings and credit and directly supports awareness among farmers and prevents them from migrating to other crops (including illicit crops) and possible deforestation. They use the credits as grants for the purchase of fertilizers.

Another strategy is a new technology for the adequate management of honey water from coffee cultivation through the installation of vetiver grass. The Alliance is sharing this technology with other institutions so that they can include it in the organic package.

- **Institutional Factors**

The CAFE Project has an environmental specialist in the field who trains all staff on environmental issues. Environmental monitoring is carried out by project technicians (environmental advisors, production advisors, and community trainers) three times a year. This helps ensure compliance with the measures.

FINDING 12: Hindering factors for compliance with environmental measures are related to the high implementation costs, lack of interest, and insufficient awareness.

Among the limiting factors for compliance with environmental measures are the following:

- **Economic factors**

Economic factors are a limiting factor for compliance with environmental measures, as they generate additional costs for implementation, such as the purchase of materials, labor, inputs, and equipment for carrying out cultural practices in coffee cultivation. The investment for the implementation of environmental measures does not lead to the farmers obtaining a higher price for the sale of their coffee, and therefore the coffee growers do not see a profitability for adequate management through the implementation of environmental mitigation measures for coffee.

Another additional cost is soil analysis, and most farmers use synthetic fertilizers without performing this analysis, which generates an additional cost. In addition, the use of organic fertilizers is slow to decompose and absorb, and farmers prefer to have higher production and see the results in the shortest possible time.

It is worth mentioning that the CAFE Project is working together with farmers to make compost from coffee pulp and harvest residues to minimize these costs and encourage them to work in a sustainable manner. In addition, they are articulating to more demanding markets in environmental issues so that they can obtain a better sales value for the product.

- **Institutional Factors**

The Environmental Monitoring and Mitigation Plan implemented by the CAFE Project and approved by USAID contains measures in very generic terms. It also included nonoperational indicators and lacked established targets. This makes it hard to analyze the planning, monitoring and compliance related to the plan. For example, 2 environmental mitigation measures have the same indicator (Measure 9 and Measure 13) and one measure has no relation at all to the indicator, which may be due to a typing error (Measure 7).

In the interviews with the CAFE Project area teams, it became evident that some of them are unaware of the internal and external ECRs, including the recommendations. However, during 2020 and the restrictive mobilization measures due to the COVID 19 pandemic, the technical team was only able to provide technical assistance and follow up on compliance with environmental measures by phone or WhatsApp.

- **Other factors**

The limited time the producer has to implement the environmental measures because it is additional work they have to do, such as composting, collecting organic waste, and implementing infrastructure. This situation gets worse if they own more than one plot. In addition, many farmers do not have much space in their homes to implement environmental mitigation technologies (such as a compost bin).

There are farmers who do not take an interest in environmental issues and who are not aware of good environmental practices because there is no public body to regulate, supervise, and demand sustainable agriculture. The aforementioned public bodies are not very consistent in raising awareness of good environmental practices. As a result, farmers have little information on the proper use of pesticides, care for the environment and the production of organic fertilizers.

Some farmers continue to grow coca leaf in Alto Huallaga and are reluctant to change crops because they are not as profitable as coca leaves, which became clear in Rupa during the field work.

Finally, there is little associativity in coca-growing areas (Tocache, Huánuco, and Ucayali), which is why they do not work with organic and sustainable regulations, and therefore there is no control in the conservation areas, they do not receive incentives for the implementation of good environmental practices, and this leads to non-compliance with the environmental mitigation measures.

STAKEHOLDERS INVOLVED

Study question:

5. *To what extent can stakeholders contribute to a higher level of compliance with the EMMP mitigation measures? What is the percentage of compliance?*
   - *5.1 What is the role of USAID, implementing partners and beneficiaries in improving compliance with the measures of the EMMP?*
   - *5.2 What is the role of men and women in environmental practices?*

Summary of findings:

- FINDING 13: The stakeholders involved in environmental mitigation measure implementation are: SENASA, DEVIDA, municipalities, the Regional Government, the Regional Environmental Authority (ARA by its Spanish initials), the United Nations Development Program (UNDP), and private companies.
- FINDING 14: Women perform both domestic and agricultural tasks, including environmental mitigation measures.

FINDING 13: The stakeholders involved in environmental mitigation measure implementation are: SENASA, DEVIDA, municipalities, the Regional Government, the Regional Environmental Authority (ARA by its Spanish initials), the United Nations Development Program (UNDP), and private companies.

As we have mentioned above, the farmers we interviewed mentioned that they had received training from SENASA, ARA (only in San Martín) and the UNDP. They have also received training from DEVIDA in Huánuco and Ucayali, on good agricultural practices and environmental care. In Ucayali, SENASA collects solid pesticide waste (empty containers). In Rupa Rupa, the municipalities are delivering forest tree seedlings to minimize soil erosion. All of these awareness-raising and training interventions are having an impact on the knowledge and application of environmental mitigation measures among farmers. It was also positive that the CAFE Project shares its EMMP with the regional government and municipalities because it allows them to incorporate actions towards the same objective.

The CAFE Project plays an important role by hiring environmental advisors who are responsible for providing training through Field Schools, technical assistance, reinforcement visits, field days, the implementation of good agricultural practices, and climate-smart agriculture. They also validated new technologies such as the use of vetiver grass for honey water management and the installation of demonstration plots with an organic and sustainable approach, which can result in organic certifications. As a result, producers are accessing more demanding markets and can obtain a higher economic value for their product.

FINDING 14: Women perform both domestic and agricultural tasks, including environmental mitigation measures.

According to the interviews conducted, it is evident that machismo still persists in the area and many farmers mention that women only carry out domestic work. However, they recognize the intervention of women in productive work and environmental measures (especially in collecting solid waste, organic and inorganic waste, and in applying inputs for the compost bin).

> *"The women clean and collect waste, apply materials for composting, fertilize and control weeds with a weed control machine, control weed and harvest coffee. The difference is the time, because men dedicate 100% of their time to these activities, while women dedicate more of their time to household work (cooking, childcare)." (Producer from San Martín)*

The CAFE Project has worked to empower women. In the areas we visited, we found out that women have become more proficient in agricultural activities and in the implementation of environmental measures within their cultivations. Female farmers are grateful because now they also participate in the negotiation of their product thanks to the awareness-raising and training in economic empowerment they have received from the gender area.

> *"The roles of men and women are similar and few people mention that they are different because they carry out different activities and functions within coffee cultivation. In some cases, women only perform domestic activities in the home, as machismo still exists". (Producer from Huánuco).*

ALTERNATIVES TO INCREASE THE LEVEL OF ENVIRONMENTAL COMPLIANCE

Study questions:

6 *What are the alternatives that can lead to an increase in the level of compliance with the environmental mitigation measures included in the PMMA?*

6.1 *What are the alternatives we can recommend for implementation in the short, medium, and long term to achieve a higher level of compliance with the PMMA measures?*

6.2 *What are the mechanisms for monitoring the implementation of the alternatives presented?*

6.3 *How can we qualify the presentation of the recommendations presented in the internal ECR which took place last year and from the external ECR in use?*

Summary of findings:

- FINDING 15: Monitoring mechanisms to learn the rate of compliance with environmental mitigation measures were the technical assistance provided to producers, and the internal inspections conducted by ACE Alliance technical personnel. These monitoring activities confirmed a compliance rate above 60%.
- FINDING 16: The technical advisors are not aware of the internal ECR recommendations. However, specialists in environmental issues and project leaders know these results because they are responsible for preparing the environmental compliance report. The recommendations given by the external ECR were implemented in part.

For Question 6.1 we refer to the recommendations section.

FINDING 15: Monitoring mechanisms to learn the rate of compliance with environmental mitigation measures were the technical assistance provided to producers, and the internal inspections conducted by ACE Alliance technical personnel. These monitoring activities confirmed a compliance rate above 60%.

One of the mechanisms for monitoring the implementation of the environmental measures is the technical assistance provided by the technical advisors of the CAFE Project until October 2022 and the environmental advisors who provided support until 2021. Field technicians also made on-site visits to each farmer to evaluate the level of compliance with each environmental mitigation measure. Each technical advisor or field supervisor collected the information on a monthly basis according to the goal of farmers they had established previously (approximately 30 farmers), and each farmer had 3 scheduled visits during a period of one year in which they received recommendations if, for some reason, it became clear during the first or second visit that they had not met the goals for implementation of the environmental mitigation measures.

The technical advisors and environmental specialists used technical assistance forms for the evaluation, which they filled out visually. They then sent these forms to the environmental specialist or coordinator so that they could upload the information to the CFC digital platform which Technoserve manages. This information helped the technical team to visualize progress made in the implementation and to incorporate the different issues at each production stage when providing technical assistance.

During the implementation, the CAFE Project also performed three internal inspections, including environmental mitigation measures, at the beginning, at the intermediate stage and at the end. According to the statements of the technical team, they obtained a compliance rate of over 60%.

FINDING 16: The technical advisors are not aware of the internal ECR recommendations. However, specialists in environmental issues and project leaders know these results because they are responsible for preparing the environmental compliance report. The recommendations given by the external ECR were implemented in part.

According to the interviews we conducted, the technical advisors do not know about the internal ECR, but the project manager and the environmental coordinator, who is in charge of reporting the internal compliance reports to USAID, do.

In relation to the recommendations of the external ECR, the CAFE Project completed the socialization of the EMMP with DEVIDA, who are intervening in the Monzon and Rupa areas. These meetings took place virtually in 2020 due to pandemic problems resulting from COVID 19, and in person in 2021, where they also met with other allied partners such as municipalities, Campo Limpio, producer associations and FONCODES. At the meetings, the CAFE Project shared experiences and presented its environmental proposal.

The technical team also evaluated the level of compliance with the environmental mitigation measures in the field, but they believe that rather than evaluating compliance with each measure, it would be better to evaluate their effectiveness, which they plan to do in 2023 and 2024.

PERU CACAO ALLIANCE – PHASE II

The Peru Cacao Alliance - Phase II project is a public-private partnership which is aimed at integrating rural families living in poverty into a competitive economy. It aims to increase the income of 24,000 families in San Martín, Huánuco, and Ucayali by 30%. One of the components of the project is to improve the quality of the cacao and provide access to high-value markets.

The total population of Cacao Alliance producers is 15,674 and it is distributed among four departments: Huánuco (19.3%), Pasco (6.5%), San Martín (57.7%), and Ucayali (16.5%).

Table 22: Cacao Alliance - Producer Population.

REGION	NUMBER OF FARMERS	PERCENTAGE
Huánuco	3,026	19.3

REGION	NUMBER OF FARMERS	PERCENTAGE
Pasco	1,021	6.5
San Martín	9,037	57.7
Ucayali	2,590	16.5
Total	15,674	100.0

Source: Cacao Alliance. List of Participants - 2022

COMPLIANCE WITH ENVIRONMENTAL MEASURES

Study questions:

7. *What level of compliance with the mitigation measures does the EMMP present?*
   - *7.1 What is the percentage of compliance?*
   - *7.2 What are the factors that facilitate or limit compliance with the mitigation measures in the EMMP?*

Summary of findings:

- FINDING 17: The project had an average rate of compliance with environmental mitigation measures above 40% in 7 out of 8 themes of its EMMP. The measure associated with the greatest relative progress is pesticide management, 74%, while the one with the lowest rate was water source conservation, 7%.
- FINDING 18: Factors facilitating compliance with environmental measures are: presence of other institutions strengthening producer capacity for environmental mitigation measures and strategies developed by the Peru Cacao Alliance.
- FINDING 19: Factors hindering compliance with environmental mitigation measures are related to farmers' financial problems preventing implementation, lack of inter-institutional coordination, several weaknesses in the formulation of EMMP indicators, and farmers' practices.

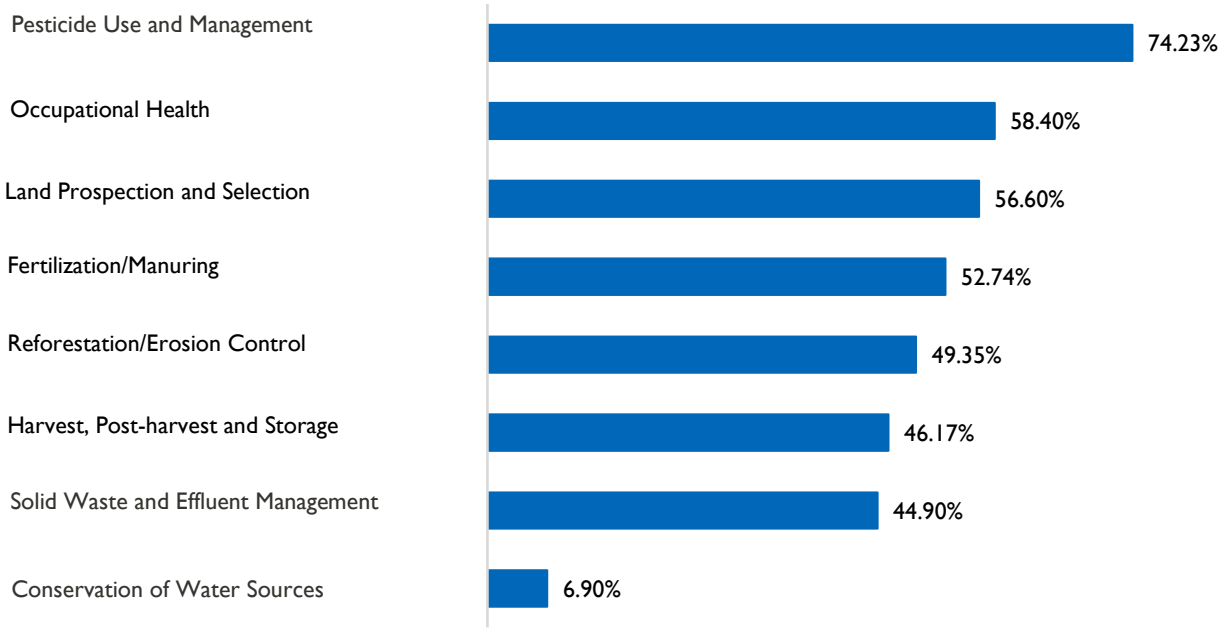
FINDING 17: The project had an average rate of compliance with environmental mitigation measures above 40% in 7 out of 8 themes of its EMMP. The measure associated with the greatest relative progress is pesticide management, 74%, while the one with the lowest rate was water source conservation, 7%.

The 2021 EMMP of the Peru Cacao Alliance - Phase II includes 40 environmental mitigation measures. Only one of these measures remained unobserved, which is the last measure of the mitigation plan related to verifying that each subgrantee must develop its own EMMP to identify environmental impacts, as well as include prevention, mitigation and control measures, in accordance with USAID and Peruvian

environmental regulations. Likewise, for the purposes of analysis in the study, we grouped the mitigation measures into eight thematic areas according to the potential problems that may arise in the cacao production chain. The areas are as follows: i) harvest, post-harvest and storage, i) pesticide use and management, iii) fertilizers and manure, iv) reforestation and erosion control, v) solid waste and effluent management, vi) water source conservation, vii) land prospecting and selection, viii) occupational health.

As we have shown in the graph below, the average result of compliance per area is diverse. However, 7 out of 8 thematic areas show an average compliance above 40%. The three areas with the highest compliance were Pesticide Use and Management (74.2%), largely associated with the good progress of the measure on IPM implementation (99.4%); Occupational Health (58.4%); and Land Prospecting and Selection (56.6%). Conservation of water sources, in contrast, showed the lowest progress result (6.9%).

Graph 5: Peru Cacao Alliance – Phase II. Compliance with Environmental Mitigation Measures



The following table specifies the results of compliance for each measure observed through the results of its indicators and the average compliance for each of the eight thematic areas. We have presented the analysis within the same logic.

Table 23: Cacao Alliance. Compliance with Measures

NO.	MITIGATION MEASURE	INDICATOR	EMMP GOALS	% COMPLIANCE
Harvest, Post-harvest and Storage				**46.17%**
	Centralized Processing Module			

NO.	MITIGATION MEASURE	INDICATOR	EMMP GOALS	% COMPLIANCE
1	The centralized cacao processing module needs to be at a distance of more than 50 meters from a non-floodable watercourse with a high-water table.	% of centralized cacao processing modules built in compliance with USAID Environmental Guidelines and Directives and Peruvian regulations.	82%	43.2%
2	The fermenter boxes, whether rectangular or in stairways, must not be in direct contact with the ground, for which a collection system will be implemented with gutters for the evacuation of mucilage that transports the residue to containers for later use, septic tanks or pretreatment ponds (effluent stabilization).			
3	Toilet facilities must be operational (latrine or septic tank), at a distance of 30 meters from the processing center in the case of a latrine and 20 meters in the case of a septic tank.			
4	Installation of at least one container and garbage can for solid waste (garbage segregation), which they need to temporarily deposit in strategically selected locations (warehouses) for later final disposal.			
5	Storage must be in a suitable place. Farmers must stack the sacks of cacao beans on wooden pallets, preventing the beans from being exposed to direct contact with the floor.			
6	Revegetation of the outside areas of the cacao processing module.			
7	Technical talks by the organization on the operation and maintenance of the module and cacao processing to its members, complying with differentiated quality standards, as well as current environmental regulations.	% of organizations that implement technical talks on the operation of the MBC in compliance with differentiated quality standards, as well as current environmental regulations	60%	58.5%
	Familial Processing Module			
12	Implementation of artisanal septic tanks or the implementation of a collection system for the treatment of "honey water".	% of farmers that take environmental care into account in the implementation of familial processing modules.	35%	62.96%
13	If water sources are present, avoid contamination with "honey water".			
14	Use of polyethylene blankets for drying to avoid contamination of the cacao beans with the soil and/or cement slabs.			
15	Designate a site or area for bean storage to avoid microbiological decomposition due to damage or contamination, reducing the risk of breathing unpleasant odors from this process.			

NO.	MITIGATION MEASURE	INDICATOR	EMMP GOALS	% COMPLIANCE
16	Compliance by farmers with technical specifications, which include: Upon conclusion of the seedling production stage in the nurseries, clean the entire nursery (cane, slats, boards and biodegradable bags), place it in a specific location next to the cacao plot for subsequent decomposition. Collection of environmental liabilities (wires, plastic containers, polyethylene bags, rashell mesh and others), which need to deposited in sacks and transferred to a temporary warehouse for final disposal.	% of farmers who have nurseries and take environmental care into account in the production of seedlings.	30%	20%
Pesticide Use and Management				**74.2%**
17	Implementation of integrated pest management (IPM) based mainly on biological, cultural, physical and mechanical control, with pesticide application as the last option.	% of farmers applying Integrated Pest Management (MIP).	60%	99.4%
19	Use of personal protective equipment when applying chemicals, since these chemicals adhere to the body through the pores of the skin, eyes, nose, and mouth.	% of farmers who use personal protection equipment	60%	88.4%
20	Locate safe areas for pesticide preparation (including herbicides), equipment and material washing. These areas should be away from water sources.	% of farmers who prepare and clean (triple washing) pesticide containers in safe areas.	30%	81.3%
21	Perform "triple washing" of spraying equipment and reuse of wash water in the sprayed crop.			
38	Periodic maintenance of equipment to avoid leaks and unnecessary fuel and lubricant expenses.	% of farmers who carry out periodic maintenance of fuel equipment for agricultural use.	80%	27.8%
Fertilizer Fertilizers/Manuring				**52.74%**
8	Implement an exclusive area for storing lubricants or fuel, out of the reach of children.	% of fertigation systems comply with USAID Environmental Guidelines and Directives and Peruvian Regulations	75%	40%
9	Temporary disposal of waste from polluting fertigation containers, oil and lubricant residues, fuel containers, flammable materials and others in strategically specific locations for such purpose (warehouses), for later disposal.			
10	Promote reforestation with species from the area around the water system catchment area, in this case through a water well for fertigation.			
11	Technical talks to members/farmers on the operation and maintenance of the fertigation system, in compliance with the required environmental and technical regulations.	% of partners/farmers trained in the operation and maintenance of the fertigation system in compliance with current environmental regulations.	60%	19.7%

NO.	MITIGATION MEASURE	INDICATOR	EMMP GOALS	% COMPLIANCE
18	Weed control based on cultural management (use of mulch, shade, cover and others), with minimal use of herbicides listed in the PERSUAP guidelines.	% of farmers that do not use herbicides	75%	99.4%
24	Composting of crop residues in shaded areas and applying ash for the decomposition process of the cob and covering with plastic, leaf litter or banana leaves.	% of farmers who compost crop residues in small piles.	30%	35.8%
33	Protection of the soil with dead mulch, using leaf litter, weed residues, pruning residues, decomposing trunks, plantain pseudostems and other plant debris found around the plot.	% of farmers using dead mulches	95%	68.8%
34	Implementation of the use of the technological innovation promoted by the ACP: Integral Nutrition and Opportune Pruning - (NIPO)	% of farmers who apply the NIPO technique (Integrated Nutrition and Opportune Pruning)		96.5%
Reforestation / Erosion Control				**49.35%**
22	Perform excavations (test pits) to determine the level of soil compaction, water table, verification of bioindicator plants, soil analysis and slope of the land.	% of farmers that conducted soil prospecting.	30%	52.0%
28	Use living vegetation barriers (*erythrina* and/or planting of forest trees) to prevent undermining of the marginal strip.	% of farmers that implement live containment barriers in plots near rivers and streams.	50%	50.8%
29	Installation of living barriers with species such as: grama grass, vetiver grass (*Vetiveria zizanioides*), *erythrina*, coral bean, living fence, swamp immortelle (Erythrina sp), ice-cream bean, pacay, shimbillo (*Inga edulis*), bolaina timber (*Guasuma crinita*), capirona (*alycophyllum spruceanum*), Glandular Nakedwood (*Clubrina glandulosa*) and chuncho pine (*Schizolobium amazonicum*).	% of farmers that have living barriers on plots with slopes greater than 20%.	30%	71.4%
30	Installation of dead barriers, using weed residues, remains of pruning branches, decomposing trunks, banana pseudostems and other plant remains that are found in the surroundings of the plot, against the slope.	% of farmers have dead barriers on plots with slopes greater than 20%.	35%	52.4%
31	Implementation of infiltration ditches, with measurements of 50 cm wide x 40 cm deep, which will allow the stability of the soils, will be recommended on slopes greater than 20%.	% of farmers with infiltration ditches on plots with slopes greater than 20%.	30%	24.3%
32	Soil protection based on calisia (*Callisia repens*), canavalia (*Canavalia ensiformis*) and others.	% of farmers with living cover implemented.	30%	23.1%
36	Verify the existence of plots with established agroforestry systems, as permanent shade, boundary, at the foot and head of the plot.	% of farmers have forest species as permanent shade, boundary, at the foot and head of the plot.	60%	85.0%

NO.	MITIGATION MEASURE	INDICATOR	EMMP GOALS	% COMPLIANCE
37	If plots with shallow soils (due to the presence of water and high water table) and floodable soils are identified, drainage ditches must be opened to evacuate excess water from the plots.	% of farmers who have drainage ditches on plots with a tendency to waterlogging.	50%	35.8%
Solid Waste and Effluent Management				44.9%
23	Safely collect inorganic waste used in agricultural activities (plastics, sacks, wood, etc.), collect them in sacks and/or cylinders, garbage cans, and store them in a temporary warehouse or suitable environment for their final disposal.	% of farmers have an adequate location to dispose of solid waste used in agricultural activities.	50%	17.9%
25	Waste (pesticide containers) should be safely collected in tarpaulins, sacks, boxes or bags and transferred to a duly identified temporary storage center that complies with the storage standards the competent authorities (bodies responsible for recycling) have established for such purpose.	% of farmers who collect empty pesticide containers and take them to temporary collection centers.	35%	71.9%
Conservation of Water Sources				**6.9%**
35	"Sowing and harvesting water" is the collection of rainwater before it is lost in order to use it for agriculture, human consumption, animal husbandry, irrigation of forest plantations, among others. It is also an option to have more water in the dry season.	% of farmers adopting the technique of planting and harvesting water.	20%	6.9%
Land Prospecting and Selection				**56.6%**
26	Avoid cutting down and/or burning primary forests or secondary forests older than 5 years, especially during land preparation for cacao cultivation.	% of farmers who have their plots located in secondary forests less than 5 years old.	60%	59.4%
27	Under no circumstances should any intervention take place in Natural Protected Areas (NPA), Permanent Production Forest (PFP) or Forest Concessions (FC).	% of cacao farmers who respect protected or restricted areas.	99%	53.8%
Occupational Health				**58.4%**
39	Implementation of an occupational health plan, which will contain programs of 5-minute technical talks, which will be the responsibility of the field technicians who will use this space to make farmers aware of the risk to their health of being directly exposed to pesticides and about the biosafety protocols established in the framework of the COVID 19 pandemic.	% members who have received technical talks on occupational health.	30	58.4%
40	Each subgrantee must develop its own EMMP to identify environmental impacts, as well as include prevention, mitigation and control measures, in accordance with USAID and Peruvian environmental regulations in place.	% of subgrantees have an EMMP.	Not complied with	

Source: Environmental Compliance Review Survey (ECR) 2022

- **Harvest, post-harvest and storage**

This area included 12 environmental mitigation measures: 7 measures related to the centralized processing modules (measures 1, 2, 3, 4, 5, 6, 7) and 5 measures related to the familial processing modules (measures 12, 13, 14, 15, 16). The average level of compliance with the measures associated with this area is 46.2%. However, the levels of compliance vary significantly between measures.

The table above shows the two main areas of this field; the measures associated with centralized processing modules and the measures on family processing modules. Regarding the centralized processing modules, the first indicator (associated with six of the seven measures) refers to modules built in compliance with USAID guidelines and directives and Peruvian regulations. This had a compliance level of 43.2%, below the established target of 82%. As discussed below, although the interviewees correctly referred to several of the characteristics that the centralized modules of the associations to which they belong must comply with, there is not a high level of compliance with all the characteristics simultaneously.

On the other hand, with respect to the familial processing modules, the indicator associated with four of five measures refers to the percentage of farmers who take environmental care into account in the implementation of modules, which reached a compliance of 62.96%, above its target value of 35%. The results within the indicator show different levels of compliance according to characteristics, with the measures associated with adequate storage and drying achieving the best results and the one on avoiding contamination with honey water showing the least progress.

Centralized Processing Module

This area covers Mitigation Measures 1 to 7 of the EMMP. The questions that form part of the calculation of the two indicators associated with these seven measures were addressed to interviewees who declared that they belong to an association and that their association has a centralized benefit module (26% of interviewees). It is important to note that the measurement of these indicators is indirect, as it takes the declarations the respondents made during the interviews, rather than the observations resulting from the visits to centralized modules.

Measures 1 to 6 relate a series of characteristics that centralized modules[9] must comply with, such as: (1) the module must be located at a distance greater than 50 meters from a watercourse, (2) The fermenter boxes must not be in direct contact with the ground, (3) Toilets must be operational at a distance of 30 meters from the beneficiation center or 20 meters in septic bath, (4) They must have at least one container and garbage can for solid waste, (5) They must stack the sacks of cacao beans on wooden pallets, so the beans are not directly exposed to direct contact with the ground, (6) Revegetation of the outside areas of the cacao processing module.

The following Indicator aggregates all of these measures: % of Centralized Cacao Processing Modules built, comply with USAID Environmental Guidelines and Directives and Peruvian regulations. Operationally, this means that the modules must simultaneously meet the following characteristics: (1) distance from the nearest watercourse where the centralized module is located, more than 50 meters: 80.5%, (ii) the fermenter boxes are located on a cabinet: 61%, (iii) in the centralized processing modules

[9] See table 23 for a precise description of the measures.

that have toilets (including latrines), these are located more than 50 meters away: 41. 5%, (iv) The centralized module has at least one solid waste container: 90.2%, (v) The centralized module has a storage place and the bags with cacao beans are stacked avoiding contact with the ground: 82.9%, (vi) There is vegetation, trees and green areas in the surroundings of the centralized module: 75.6%.

It becomes clear that some aspects score relatively high in terms of compliance, such as the fact that most of the centralized modules have solid waste garbage cans or storage places where the bags of beans do not come into contact with the ground. However, the simultaneous compliance of these six aspects required by the indicator is only 43.2%, below the target of 82%. In other words, the modules of the farmers' associations surveyed comply with several of the measures, but do not comply with all six measures simultaneously.

The final measure listed here, **Measure 7**, the indicator referring to organizations that implement technical talks on the operation of the MBC in compliance with differentiated quality standards, as well as current environmental regulations, scored 58.5%, which represents the percentage of producers belonging to an association with a centralized processing module that between 2021 and 2022 received training in operation and maintenance of the centralized module. This result was close to its goal of 60%. The interviews conducted showed a recognition of the work done by the Cacao Alliance, especially in terms of the steps to follow in cacao production, taking care of the environment.

Familial Processing Modules

Measures 12, 13, 14, 15, and 16 are related to aspects that the Familial Processing Module must comply with. In this regard, Measures 12 to 15 are associated with the following indicator: percentage of farmers take environmental care into account in the implementation of family benefit modules. In terms of measurement, this means that: (i) disposal of mucilage waste is through gutters into septic tanks (10%) or through gutters into pretreatment wells (5%), (ii) grain drying occurs using polyethylene sacks (69.4%) or pallets (7%), and (iii) there is a secure storage area: an exclusive warehouse with ventilation (84.9%) or an exclusive warehouse with protection against rain (90.9%), or rodent control (69.7%) is available.

The average result for these three aspects that make up the indicator is 62.96%, which is above the target of 35%. This reflects good progress in the knowledge among farmers of environmental care in post-harvest processes. The safe collection and treatment of honey water is an aspect in the development process.

Finally, with regard to the final measure of this area, **Measure 16**, this seeks to ensure that, once the seedling production stage in the nurseries is completed, the producers clean the nursery and collect environmental liabilities. This indicator had a result of 20%, which represents the percentage of farmers who have nurseries and take into account environmental care for the production of seedlings, i.e., farmers who reported cleaning the area and disposing of leftover material after seedling production. This result is below the 30% target. A majority of those interviewed stated that they leave the area to be planted.

- **Pesticide use and management**

This topic includes 5 measures: Measures 17, 19, 20, 21 and 38, with an average compliance of 74.2%. This is therefore the area with the highest compliance rate of the EMMP. The measures with the greatest completion in this area are Measure 17, which relates to the percentage of farmers applying IPM (99.4%) and Measure 19, the percentage of farmers using personal protective equipment (88.4%). Both results are much higher than the 60% target set for each of these two measures. Measure 38 was the one with the best progress (27.8%), being the percentage of farmers who reported performing periodic maintenance of fuel equipment for agricultural use, while the goal for this measure was 80%.

> "*...The training I have received has helped me to control pests, I do conventional agriculture, when I use agrochemicals, I put on my clothes and I do it away from home, I disinfect the instruments I use...*"
>
> *Producer from Ucayali.*

Measure 17, Implementation of Integrated Pest Management (IPM). This measure includes the indicator for the percentage of farmers applying IPM, with a target of 60% and the highest result in this area (99.4%). This result suggests that farmers implement some of the following pest management actions:

- Measures referring to cultural control: drains (21.4%), integral nutrition and timely pruning (84.4%), elimination of crop residues (64.2%), weed control (91.3%).
- Biological control measures: parasites (13.9%), predatory insects (16.2%), fungi, bacteria, viruses (29.5%), traps (34.1%), genetic control (34.7%).
- Physical control: machete (92.5%), brush cutter (80.4%), use of high temperatures (9.3%), solarization (30.6%),
- Mechanical control: hand-picking of insects (32.4%), hand-picking of damaged plants (75.1%), removal of insects (18.5%).

The interviews also revealed that producers recognize that Cacao Alliance has been identified as an IPM instiller.

Measure 19, Use of personal protective equipment during the use of chemicals. The indicator for this measure is the percentage of farmers who use personal protective equipment. The target is 60% and the result was 88.4%. This represents the percentage of farmers using any of the following personal protective equipment: eye protection glasses (37%), plastic to cover the back so that it does not come into direct contact with the backpack (20.2%), boots (rubber): 87.9%, plastic (not fabric) gloves (21.4%), clean cloth or mask to cover the mouth and nose (37.6%).

Measures 20 and 21, Preparation of pesticides and the triple rinsing of pesticide spraying equipment. These are associated with the indicator percentage of farmers who prepare and clean (triple rinsing) pesticide containers in safe areas, this result reached 81.3%, which is the percentage of farmers who indicated that the preparation and cleaning of pesticide containers is done under one of the following conditions: (i) in a ventilated environment (with window, mesh, wall space that allows air circulation) (31.3%), (ii) in a place with no access for children and animals (64.1%), (iii) far from a water source (minimum 20 mt) (53.1%), (iv) outside the home (62.5%). This result exceeds the target of 30%, however, it should be noted that this is an indirect result since the question was only applied to respondents who reported using pesticides or agrochemicals.

Measure 38, Periodic maintenance of equipment. The indicator used for this measure deals with the percentage of farmers who carry out periodic maintenance of fuel-fired equipment for agricultural use and has a target of 80%. Based on the results of the interviews conducted, the compliance rate was 27.8%, which represents those who received training on one of the following related topics: (i) Frequency of required equipment revisions (24.9%), (ii) Maintenance instructions required by type of equipment (23.1%), and (iii) Maintenance costs (23.7%). This measurement is indirectly derived from the indicator, as it considers training on the subject and not the statement on effective maintenance of the equipment.

- **Fertilizers and manure**

The average compliance level of the 8 mitigation measures in this area (Measures 8, 9, 10, 11, 18, 24, 33, and 34) was 52.7%. This result is below the target of 75%. Therefore, the results of this indicator should be taken as a reference given that the sample consisted of 5 farmers out of 173 interviewed, the only ones who had a fertigation system. The results of compliance with the measures that make up this theme are diverse. On the one hand, Measure 18 related to the percentage of farmers who do not use herbicides, and measure 34 on the application of Integral Nutrition and Timely Pruning (NIPO) showed the greatest progress, 99.4% and 96.5% respectively, well above their target values of 75% and 65%. Meanwhile, measure 11, associated with technical talks to members/farmers on the operation and maintenance of the fertigation system, had the lowest level of implementation (19.7%), below the target value of 60%.

Measures 8, 9, and 10 have as a joint indicator the percentage of fertigation systems that comply with USAID Environmental Guidelines and Directives and Peruvian Regulations, which reached a compliance level of 40%. This represents the percentage of producers who indicated that they had fertigation and indicated compliance with some of the following conditions in each of these three areas:

For conditions for storing lubricants, fuel and other inputs used in field machinery: (a) the space is fenced with mesh (20%) or (b) the space has a door and is with padlock or hasp, chains (40%) or (c) it is located outside the home in a specific area for this activity (40%).

For the dissipation of oil residues, lubricants, fuel containers, flammable material and others: storage (60%) or final disposal (0%) or backfilling (0%). To protect water recharge areas for fertigation: reforestation in the area (40%) or maintain vegetation (60%).

Measure 11, Talks on the Fertigation System operation and maintenance. A 19.7% compliance was achieved while the goal was 60%, which represents the percentage of partners / farmers trained in the operation and maintenance of the fertigation system in compliance with current environmental regulations and is the percentage of farmers who said that they, their spouses or both received training from the Alliance on any of the following topics: cleaning the fertigation system (12.1%), recording periodic maintenance of the system (12.1%) or reforestation in water catchment areas for the fertigation system (13.3%).

On the other hand, the interviews revealed the farmers' perspective on the talks offered by the Alliance and identified marked positions in this regard. Some farmers recognize and value the need to learn and try to participate, this was mostly evidenced in the area of San Martín. Some other producers do not feel enthusiastic about participating if there are no economic incentives, mostly in the area of Huánuco, where some interventions of coca leaf crop substitution provided incentives for participation.

"…The talks are very important. They helped us to be aware of how to take care of the environment. It was difficult to carry out this change, because the traditional way is easier. Producers do not attend, because they prefer support, for example, to receive fertilizers or the money for the first fertilizer payment…"

Producer from Huánuco.

Measure 18, Weed control through cultural management. A total of 99.4% of farmers did not use herbicides, which is much higher than the target of 75%. This percentage represents the farmers who indicated that they use one of the following weed control methods: manual control - live cover or machete (88.4%), mechanical control - mulching (77.5%), or cultural control - mulch, shade, cover (70%).

Measure 24, Composting. This refers to the percentage of farmers who compost crop residues in small plots. The result achieved was 35.8%, exceeding the target of 30%. This result is the percentage of farmers who indicated any of the following ways of composting: piling crop residues (30.6%), incorporating crop stubble (20.2%), applying ashes (20.2%), covering with leaf litter, banana leaves, others (22.0%), and turning periodically (23.7%).

Measure 33, Soil protection with dead cover. 68.8% of farmers make use of dead cover. However, the target was 95%. This result represents farmers who indicated that they use organic fertilizers/fertilizers, cacao crop residues and dead mulches of any species as a layer on the soil.

Measure 34, Implementation of Integral Nutrition and Timely Pruning (NIPO). 96.5% of farmers reported applying the technique of NIPO. This is the measure with the greatest progress in this area, whose target was 65%. For this indicator, the farmers who reported applying any of the following techniques were considered: (i) pruning of the crop considering the age of the plant (89.6%), soil management and conservation (69.9%), application of organic matter to the soil (72.8%), (ii) pruning of the crop considering the age of the plant (89.6%), soil management and conservation (69.9%), application of organic matter to the soil (72.8%)

- **Reforestation and Erosion Control**

This thematic area includes 8 environmental mitigation measures of the EMMP, Measures 22, 28, 29, 30, 31, 32, 36 and 37, which achieved an average compliance rate of 49.4% but with varying levels of results according to each measure. For example, Measure 36 related to farmers who have forest species as permanent shade, boundary, at foot and head of plot, was the one that achieved the highest level of compliance in the thematic (85%). This percentage is higher than its target of 60%. On the other hand, Measure 57 on promoting the installation of living cover was the one that presented the lowest percentage of compliance with 23.1%, when its goal was 30%.

Measure 22, Carrying out excavations (Test Pits). A total of 52% of farmers carried out field prospecting, which is the percentage of farmers who indicated that they carried out deep excavations (Test Pits) to obtain soil samples. This result is higher than the 30% target established in the EMMP. From the in-depth interviews it was learned that the execution of the Test Pit technique is a technique known by the producers and almost

always executed by the field technicians and sent for analysis, if they have the knowledge of what it is to make a Test Pit, but not everyone can afford the cost of this analysis.

"…the technicians use Test Pits within the plots. They carry out agroforestry for soil conservation…"

Producer from San Martín.

Measure 28, Using live vegetation barriers for containment. A total of 50.8% of farmers implement live containment barriers in plots near rivers and streams. This result is similar to the target of 50%. This represents the percentage of farmers who claim to implement living barriers: grama grass or vetiver grass, *erythrina*, coral bean (*palo vivo*), living fence, swamp immortelle, ice-cream bean, pacay, *shimbillo*. It should be noted that this indicator is indirect because it is based only on the producer's statements and the plots have not been geo-referenced to determine their proximity to rivers and streams.

Measure 29, Installation of living barriers. The indicator for this measure refers to the percentage of farmers who have live barriers on plots with slopes greater than 20%. The level of compliance achieved was 71.4%, higher than the target of 30%. It should be noted that this indicator is indirect since the denominator used was farmers who have infiltration ditches on their plots as a proxy for land with a slope greater than 20%.

Measure 30, Installation of dead barriers. A total of 52.4% of farmers have dead barriers on plots with slopes greater than 20%, this result is higher than the target of 35%. This result is indirect, since the denominator used was farmers who have infiltration ditches on their plots as a proxy for land with a slope greater than 20%.

Measure 31, Implementation of infiltration ditches. A total of 24.3% of farmers have infiltration ditches on plots with slopes greater than 20%, while the target for this indicator was 30%.

Measure 32, Protection of soils with living cover. The indicator for this measure had a compliance rate of 23.1%, farmers who implemented living cover. In terms of the measure, this represents the percentage of farmers who have installed any of the following species: Canavalia (6.4%), Kudzu (17.3%) or *Centrosema* (3.5%). The level of compliance was lower than the target of 30%.

Measure 36, Plots with agroforestry systems. The indicator percentage of farmers with forest species such as permanent shade, boundary, at foot and head of plot, achieved a compliance level of 85%, higher than the target of 60%. This result includes producers who indicated having used any of the following species: Bolaina (49.1%), Capirona (51.5%), Glandular Nakedwood (22.5%) or Pacay (50.9%).

Measure 37, Opening of drains. This is shown in the indicator percentage of farmers who have drains in plots with a tendency to waterlogging, whose level of compliance was 35.8%, less than the target of 50%. The relevance of the indicator should be evaluated according to the type of soil in the rainforest zone, since if the soil is clayey and absorbs water, drains would not be necessary.

- **Solid Waste and Effluent Management**

The average for the 2 measures that make up this thematic area (Measures 23 and 25) was 44.9%. Measure 25, focused on promoting the safe collection of waste (pesticide containers), recorded the highest level of implementation with 71.9%, above the target of 35%. On the other hand, measure 23, related to the safe collection of inorganic waste used in agricultural activities (plastics, sacks, wood, etc.),

had a level of compliance of 17.9%, i.e., below the target of 50%. It should be noted that this indicator is indirect since it measured waste and not collection and refers to the disposal of agrochemical containers.

Measure 23, Safe collection of inorganic waste. It uses the indicator percentage of farmers who have an adequate place to dispose of solid waste used in agricultural activities, with a final result of 17.9%, less than the target of 50%. This result represents the percentage of farmers who indicated that they dispose of containers (bottles, bags, cans) containing agrochemical waste in containers or sacks specifically for their use (16.8%) or that they deliver them to the Campo Limpio company (1.7%). This indicator is indirect since it measures waste and not collection and refers to the disposal of agrochemical containers. On the other hand, in-depth interviews with farmers indicate a trend towards safe waste collection and transfer to a duly identified temporary center in some districts where Campo Limpio is located, and in other cases local authorities have implemented a programmed collection of inorganic waste and harvest residues.

Measure 25, Safe waste collection. The indicator for this measure is associated with the percentage of farmers who collect empty pesticide containers and take them to temporary collection centers, which had a compliance level of 71.9%, i.e., above the target of 35%.

- **Conservation of Water Sources**

This thematic area includes **Measure 35**, where the indicator is the percentage of farmers adopting the technique of planting and harvesting water. The level of compliance achieved for this indicator was 6.9%, below the target of 20%. From the interviews, it is known that most of the farmers indicate that they have not received training in the planting and harvesting of water.

- **Prospecting and Land Selection**

The average level of compliance with the mitigation measures in this area is 55.6%, which is the average percentage of compliance with the two environmental mitigation measures that comprise it, Measures 26 and 27.

Measure 26, Not cutting and burning primary forests or secondary forests older than 5 years. This indicator is the percentage of farmers whose plots are located in secondary forests less than 5 years old and the result was 59.4%, close to the target of 60%. This result represents the percentage of farmers who indicated that, for land preparation and installation of cacao cultivation, they have not cut and burned forests (primary or secondary) older than 5 years old.

Measure 27, Intervention in Natural Protected Areas, Permanent Production Forest or Forestry Concessions. A total of 53.8% of cacao farmers respect protected or restricted areas. This result was estimated as the percentage of farmers who indicated any of the following considerations when choosing the land: (i) the zoning of the area (31.2%), (ii) that the area is not in a protected area, in buffer zones and forest concessions or permanent production forests (12.1%), (iii) that the area is not in a protection zone (24.9%). The result of this indicator is lower than the target of 99%. However, it should be taken as a reference because it is indirect. No coordinates have been taken to validate whether they are in protected or restricted areas.

- Occupational Health

This topic includes Measures 39 and 40, of which Measure 40 on sub-grantees that have EMMP was not observed.

Measure 39, Occupational health plan. This is reflected in the indicator of the percentage of members who received technical talks on occupational health, which reached 58.4% compliance, i.e., above the target of 30%. This percentage represents the fraction of interviewees who stated that they had received talks on health and environmental risks due to the use of pesticides in the last year.

FACILITATING AND LIMITING FACTORS

FINDING 18: Factors facilitating compliance with environmental measures are: presence of other institutions strengthening producer capacity for environmental mitigation measures and strategies developed by the Peru Cacao Alliance.

There are different factors that facilitate compliance with the EMMP:

- Contextual Factors

In the Cacao Alliance intervention areas, public institutions (SENASA, DEVIDA, FONCODES, Fondo Empleo) and private institutions (marketers) provide technical assistance and training on technical issues related to cacao production, which reinforces the knowledge and practices of producers.

> *"FONCODES has taught us how to plant and harvest water." (San Martín cacao Producer)*

> *"Fondo Empleo trained in development of test pits, live containment barriers, honey water management, vegetable conservation in the headwaters." (San Martín cacao producer)*

> *"…Training on environmental mitigation, events and meetings have been held with different organizations that have participated in specific topics, for example SENASA…" (Technical Team)*

Another factor that influences the implementation of environmental mitigation measures by producers is the organic coffee market, which is demanding in terms of environmental care regulations. Cooperatives or companies that are registered have periodic inspections to renew their organic certification, so producers who are associated are obliged to comply with the requirements of having an organic product, in this case cacao. The most vulnerable are the producers who are not associated (in the survey only 32.37% belong to an association).

- Strategies Applied by Cacao Alliance

Cacao Alliance implemented several strategies aimed at strengthening farmers' knowledge and practices that have facilitated the implementation of mitigation measures, such as intensive training and field practice in the agronomic management of cocoa and care of the environment. Another strategy was the formation of technological agents, who are leading farmers in each community trained to provide technical support to farmers. Some of the technological agents have formed companies to meet the demands of the producers for pruning services, cultural activities or disease prevention *in situ*.

The Project has earned the recognition of the producers for its work in the field. In the zone, the work was very well coordinated with Technological Agents. These strategies are demonstrated by the farmers' high level of knowledge of pest management (99.4%) and weed control (99.4%). Integral nutrition and timely pruning (NIPO) scored 96.5%.

In the intervention area of the San Martín Region, the learning results of the Peru Cacao Alliance can be evidenced. However, the impact in Huánuco and Ucayali has been lower due to the budget with the reduction of personnel and the closure of the project.

"…They have received training for the change of mentality by the Cacao Alliance…"

"…The Cacao Alliance has trained the community and provided them with knowledge on integrated organic management, which they can pass on. It is now an incubator…"

San Martín Producers.

"…The Cacao Alliance has started a differentiated work with respect to the crop from the organic point of view and respect for the environment. Any future programs must have the same follow-up…"

Huánuco Producer.

- Farmer Practices

Due to the susceptibility of cocoa, particularly fine flavor strains, to diseases (witches' broom, for example) farmers are switching to the CCN51 cocoa variety, which is more resistant to pests. In some cases, farmers have had to remove all the plants because of their propagation. In the survey applied, 91.9% of the interviewees expressed a predilection for this variety.

"...the entire plot has been attacked by cuarteros plagues and witches' broom fungus. The crop is so affected by diseases that it will have to be cut down. The harvest is very damaged, so the fine-flavor cacao, which is the most affected variety, is going to be grafted. The CCN 51 will be used, as it is more resistant..."

Ucayali Producer.

This situation provides more possibilities for compliance with environmental measures because the fine-flavor variety is delicate and very susceptible to diseases, so they use more chemicals.

FINDING 19: Factors hindering compliance with environmental mitigation measures are related to farmers' financial problems preventing implementation, lack of inter-institutional coordination, several weaknesses in the formulation of EMMP indicators, and farmers' practices.

The limiting factors for compliance with environmental measures identified are the following:

- Economic limitations

To implement environmental mitigation measures, farmers require additional labor or investment. These costs make cocoa production more expensive, especially when farmers have more than one plot. In addition, this investment is not reflected in the price of cacao, and producers receive similar prices for organic or conventional cacao.

> *"... Producers who have 4-hectare plots can manage them using organic techniques. However, those who have larger plots can't do so because they need labor, which is expensive and scarce. The daily wage is 50 or 70 soles. That's why they don't have larger areas, and resort to chemicals."*
>
> *(Ucayali Producer)*

Furthermore, as a consequence of the restrictive measures caused by the COVID 19 pandemic, many producers abandoned their plots, which caused diseases to spread more easily. Also, the cost of organic fertilization compared to conventional fertilization is quite high.

- Lack of Inter-Institutional Coordination

As mentioned above, the existence of several public and private organizations involved in environmental issues is an advantage, but it becomes a difficulty because the lack of coordination causes different messages to be conveyed to producers, generating confusion. This situation was pointed out in the 2020 external ECR.

For example, the messages on living barriers and shade trees. The Alliance promotes the use of living barriers in floodable and non-floodable soils, while other institutions say the opposite. The Alliance promotes the use of shade trees, but other institutions mention that this system should only be recommended in Ucayali (for being very sunny) and not in San Martín.

The lack of coordination between institutions has spread differing information about shade tree planting and in some areas, it has served as a nest of diseases because of indiscriminate planting.

> *"...They have been taught organic agriculture. Therefore, they are aware of the market requirements and have all the varieties of fine flavor cacao in their plots. The living barrier challenges the teaching about the indiscriminate planting that is done in the plots and that is why they attract diseases because cacao does not need a lot of shade..."*
>
> *(San Martín Producer)*

- Institutional

EMMP: Although the formulation of the EMMP followed the format established by USAID, it identified indicators for all the environmental mitigation measures. However, a single indicator is used to assess several measures (Measures 1 to 6 are measured with the calculation of a single indicator, as are

Measures 12 to 15). As the indicators are aggregated with the condition that all conditions are met, it is enough that one of them has low values for the indicator to obtain a low value, not reflecting the progress that may have been made in the other measures.

Differentiation of environmental mitigation measures: Another aspect to note is that the environmental mitigation measures have not been differentiated among the three intervention zones: for example, San Martín has a different altitude than Ucayali and Huánuco; and the identification of the measures for their application should be in accordance with the microclimate of each zone. For instance, the infiltration ditches that are promoted are not a measure that is applicable to all areas or in the jungle, not only is it necessary to know the slope of the soil, but also the type of soil. Fundamentally, they are needed on the coast. This results in non-compliance with a measure that does not apply to the reality of the area.

Human resources. Since this was the last year of project execution, Peru Cacao Alliance did not have any personnel in the field, which was necessary to accompany the farmers, considering that in many cases the plots were abandoned during the pandemic stage by COVID 19. The intervention of the technical assistants has been limited post pandemic and online trainings could not be carried out because the producers did not have telephone lines or internet, because the producers did not answer the phone or because the producers changed cell phone carriers as there are carriers that do not cover all the zones.

- Farmers' Practices

During 2020, due to the measures due to the COVID 19 pandemic, families faced two realities:

1. Farmers living outside their plots lost a lot because there was no labor, they could not leave their population center, because everything was closed. The plots were not taken care of and as a consequence the cocoa crops were full of diseases. That is why they had a low yield in 2021. To combat the pests, they resorted to chemicals whose excessive use has made the pests more resistant.
2. Producers who lived on their farms dedicated themselves full time to them, did not have major losses and were able to get ahead. Then again, when the economy and transportation were closed, they did not have access to fertilizers and other inputs, which also affected the maintenance of their plots. This also affected their ability to cope with existing diseases and new pests.

STAKEHOLDERS INVOLVED

Study Question:

8. *To what extent can stakeholders contribute to a higher level of compliance with the EMMP mitigation measures? What is the percentage of compliance?*
   - *8.1 What is the role of USAID, implementing partners and beneficiaries in improving compliance with the measures of the EMMP?*
   - *8.2 What is the role of men and women in environmental conservation activities?*

Summary of Findings:

- FINDING 20: Several public entities are present in Cacao Alliance's intervention zones, and their intervention reinforces farmers' knowledge of environmental mitigation topics.
- FINDING 21: Women's participation has become more visible, empowering their participation in the process of environmental care.

FINDING 20: Several public entities are present in Cacao Alliance's intervention zones, and their intervention reinforces farmers' knowledge of environmental mitigation topics.

The existence of several institutions working on environmental care and its implications is positive because it strengthens farmers' knowledge and enhances the importance of environmental care. However, as mentioned earlier, there are contradictions in the application of strategies depending on intervention areas, as well as in the contents of the technical packages (regarding living barriers or shade, for example).

The National Agricultural and Livestock Health Service (SENASA), which is part of the Ministry of Agriculture, provides information about fertilizers, but it does not provide technical support to fight diseases, so, in practice, producers do not feel any support.

DEVIDA implements a cacao growing program that is being developed with a technological package used to train cacao farmers.

In cacao trading, the private sector is represented by the company Machu Picchu, which is the largest cacao trader throughout the region and provides technical and storage support to producers. During the pandemic, it was the only company that remained in contact with its associates through its organic program.

FINDING 21: Women's participation has become more visible, empowering their participation in the process of environmental care.

In previous years, the productive role of women was not visible, but the training received from the alliance has helped to revert this situation.

> *"Machismo was strong, but the training has made people value women's participation. They do not only participate in cooking and taking care of the children as it was before. Instead, they participate as equals in the productive process. Now, women take on important positions and they participate in organizations."*
>
> *(producer from San Martín)*

> *"There has been a change: The participation of women has become very important. Women now play a role. They are no longer just housewives. Our wives belong to a women-only organization, and they manage it themselves."*
>
> *(producer from San Martín)*

Both men and women play a similar role in environmental practices. However, women are more careful. In the field of cacao, which is an area that had been denied to them for many years, women now participate in the entire production process and take responsibility for the care of their children, with greater care. For this reason, they associate environmental practices with the care of the family, and there are single mothers who manage their plots alone.

In that sense, women are very active in caring for the environment. They are interested in fending for themselves and not depending on others. There are women cacao farmers who are committed to improving the environment and leaving a legacy to their families.

> *"Women are assuming not only responsibilities within their homes and plots of land, but they are also taking on positions in their associations and even public positions, something that was unheard of in the past, and not only as secretaries of their organizations but also as presidents, leading."*
>
> *(producer from San Martín)*

Husband and wife working on field, doing agricultural chores as equals.

However, while in San Martín and Huánuco people mentioned that women work in a similar way to men in the implementation of environmental measures, in Ucayali they said that men and women carry out different activities:

> *"Mostly, the men do the hard agricultural work, and the women are engaged in harvesting and pruning. I have never seen a lady holding a backpack. She removes the diseased fruit. Men handle the motor mowers while women remove unwanted cacao shoots. Work requiring more strength is done by men, while other tasks are done by women."*
>
> *(producer from San Martín)*

ALTERNATIVES TO INCREASE ENVIRONMENTAL COMPLIANCE

Study question:

9. *What are the alternatives that contribute to increase compliance with the environmental mitigation measures included in the EMMP?*
   - *9.1 What are the alternatives that can be implemented in the short, medium, and long term to achieve higher compliance with EMMP measures?*
   - *9.2 What are the mechanisms for monitoring the implementation of the alternatives presented?*
   - *9.3 How well are the recommendations presented in the internal ECR conducted last year and the external ECR implemented?*

Summary of findings:

- FINDING 22: Compliance with environmental measures is monitored in the Lima office. This internal ECR is shared with technical personnel in order to perfect or deepen fieldwork, but the external ECR has not been shared.

Question 3.1 is presented in the recommendations section.

FINDING 22: Compliance with environmental measures is monitored in the Lima office. This internal ECR is shared with technical personnel in order to perfect or deepen fieldwork, but the external ECR has not been shared.

At the Peru Cacao Alliance, the technicians, the coordinator or supervisor are the ones who collect information and report on the progress of the implementation of environmental measures. This information was collected and processed in Lima by the monitoring area. In addition, there was a business manager who was also responsible for environmental issues. At the regional level, the business manager was responsible for business and the environment.

The internal ECR was conducted through a consultancy and the results were shared with the technicians, but only in the San Martín area. It was not shared in all intervention areas due to lack of personnel - this is not the first time this has happened. Regarding the external ECR, the Cacao Alliance's technical team states that they are not aware of the recommendations and that the Lima office did not share them.

PORI-DEVIDA FISH FARMS

The Multi-Annual Operational Plan for Institutional Strengthening (PORI) of DEVIDA (2018-2022) has "the purpose of supporting DEVIDA in the sustained reduction of coca production after forced eradication."[10]. The work regarding fish farmers is found in Objective 1, which consists of providing

[10] IL527-0426-AD18 Multi-Annual Operational Plan for Institutional Strengthening (PORI) of DEVIDA (2018-2022)

technical assistance conducive to the generation of licit income for participating families (USAID-PERU, 2018). Within this framework, the establishment of fish farms is promoted.

According to information provided by PORI, the "technical assistance in productive diversification through sustainable alternative goods and services in aquaculture, within the scope of the Tingo María area office" generates capacities for the management of value chains based mainly on the production of pacu. The support focuses on storage infrastructure and provision of fingerlings by strengthening production points. The objective is to achieve (a) 300 thousand fingerlings, (b) formalization of the aquaculture unit, and (c) implementation of a waste collection module. Other objectives are to achieve 205,070 m2 of water surface in fish farms and to support with technological inputs, the use of productive inputs, and the protection of the environment and biodiversity (DEVIDA, 2021a)[11].

Considering the database provided by PORI for this study, there are currently 206,730 mt2 of water surface, of which 62,930 mt2 are authorized for aquaculture activities (approximately 30%), all with pacu production. Approximately 547 fish farms are supported, 170 (31%) of which receive advice from PORI, which involves strengthening technical and management aspects. The other 377 (69%) fish farms also receive support from PORI, but not closely.

As can be seen in the following table, of the total 170 fish farms, 97% have the category of Limited-Resource Aquaculture (AREL) and 3% are Micro and Small Aquaculture Enterprises (AMYPE), i.e., they are accredited by the Ministry of Production.

Table 24: DEVIDA-PORI. Type of association with corresponding organizational category, Huánuco

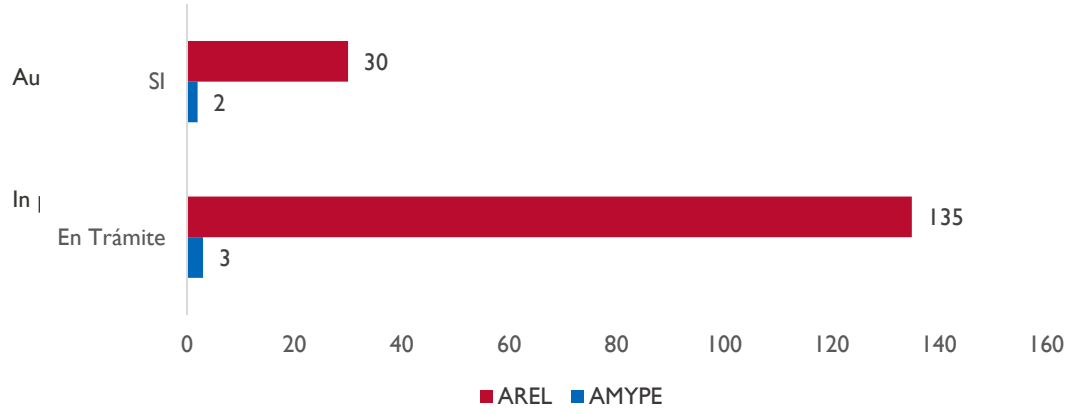
FISH FARM ASSOCIATION CATEGORY	NO.	%
AMYPE	5	3%
AREL	165	97%
Total	**170**	**100%**

Source: Database from 2022 Aquaculture Register, Huánuco Regional Office, PORI

Furthermore, as shown in the following graph, 30 ARELs and 2 AMYPEs have licenses for water use and ANA's comments, which represents 32% of fish farms. The remaining 135 farms (81%) are in the process of obtaining a license.

[11] Source: Report No. 000767-2021-DV-DPM-SDM, DEVIDA Monitoring Sub-Directorate. Report on Environmental Monitoring for PTA "Technical assistance in productive diversification through sustainable alternative goods and services in aquaculture, within the scope of the Tingo María area office."

Graph 6: DEVIDA-PORI. Fish farm associations and water accreditation authorization status



COMPLIANCE WITH ENVIRONMENTAL MEASURES

Study questions:

10. What is the compliance with the mitigation measures presented in EMMP?

10.1 What is the compliance percentage?

10.2 What are the factors that facilitate or hinder compliance with EMMP mitigation measures?

Summary of findings:

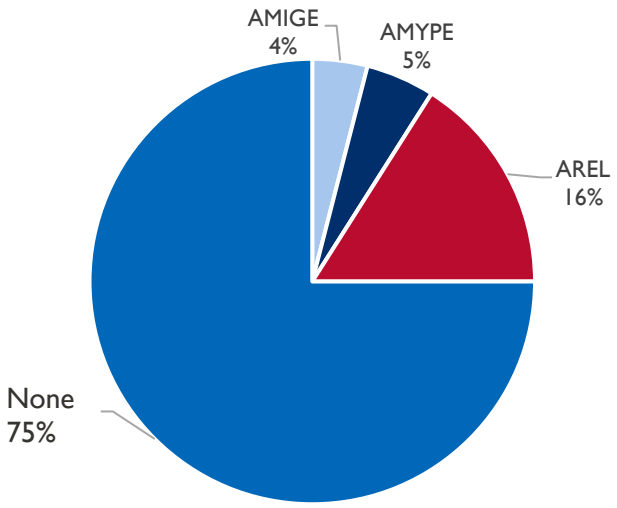
- FINDING 23: Compliance with EMMP environmental mitigation measures is above 57%. The greatest compliance rate is noted in technical assistance for aquaculture pond equipping and preparation for fish farming, at 91%. This is followed by site design and selection, cleaning and weeding with minimal loss of primary or secondary production forests, with 82%. The average compliance rate of fish farm operation and maintenance in accordance with best aquafarming and biosecurity practices was 64%.
- FINDING 24: Enabling factors are the strategies developed by fish farmers, such as fish farm disinfection, cleaning and protection, training sessions, and the location of fish farms in previously intervened land —not in primary forests.
- FINDING 25: Limited understanding of manuals or forms delivered by DEVIDA. There is a low educational level and paternalism by local authorities. No progress was made in training on environmental issues. It is not clear if solid waste is segregated in the designated spaces. There is no worksheet on this topic. The PORI-DEVIDA team does not have a specialist in environmental issues for the fish farms.

CONSIDERATIONS ON INITIAL PHASE IN FISH FARMS

Out of the total number of fish farmers surveyed, it was found that most of the fish farms are not in a specific production category (75%) because they have not applied for production categorization. Those that are categorized are Limited-Resource Aquaculture, AREL (16%), followed by Micro and Small

Aquaculture Enterprises, AMYPE (5%). In addition, among respondents there is a small group of fish farmers who consider themselves in the productive category of Medium and Large Enterprise Aquaculture (AMIGE).

Graph 7. DEVIDA-PORI. Fish farms by production category



Source: 2022 Environmental Compliance Review Survey (ECR)

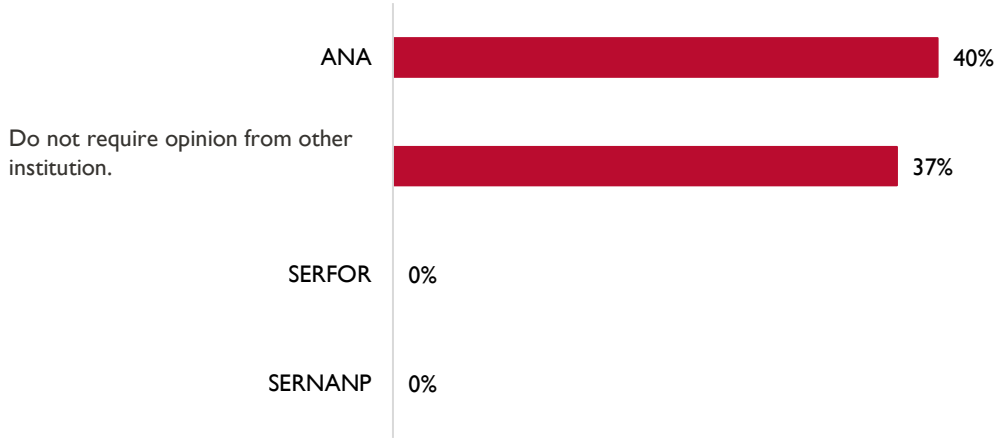
Map 4: PORI. Fish farm. Location of Elí Camacho's fish farm module

In fact, the Medium and Large Enterprise Aquaculture (AMIGE) fish farms are larger than 1,000 square meters, and the project supports fish farmers with fewer resources. The explanation provided by PORI technicians is that the fish farms can have more than 1,000 square meters of water surface, but that support is only provided to one of the 1,000-square-meter fish farms. Upon reviewing the database of project participants, one of the fish farms is categorized as AMYPE. In addition, as can be seen in the geo-referenced map, it is located near an aquaculture center called Villa el Sol de Árabe. This is the company ACUOCOOP with 30 partners. They are modules designed to produce from 1.5 MT/month to 3-5 MT/month of *pacu* and *gamitana* for the market. Each member has between 10 to 15 well-

managed ponds. According to the report, DEVIDA assists them in the management for consolidating their value chain.

Regarding the relationship between fish farms and environmental institutions, 40% of fish farmers said that they only need a favorable opinion from ANA in order to use water resources. Thirty-seven percent consider that they do not need any opinion from another institution. They have no relationship with other institutions, such as SERFOR or SERNANP.

Graph 8: DEVIDA-PORI. Fish farms – relationship of fish farmers with other institutions



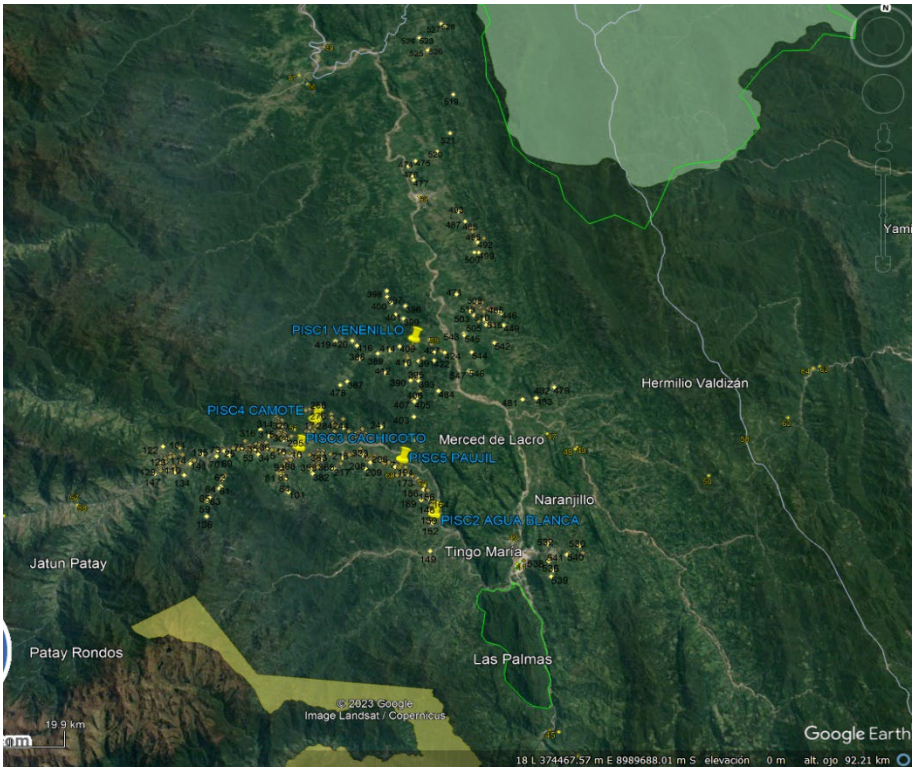
Source: 2022 Environmental Compliance Review Survey (ECR)

It is important to keep in mind that in this rural area the poverty levels are high, education levels are low and there are serious institutional limitations because it used to be an area where drug trafficking and terrorism were present. Progressively, institutions are being installed to support local governments. Now, fish farms are part of the dynamics of the farm and even of the dynamics of the rural household.

Map 5: DEVIDA-PORI. Fish farms – location and NPA

Other aspects mentioned:

- Regarding management instruments: 13% say that they do have such instruments, and 7% say that they have an environmental mitigation plan.
- Natural Protected Areas (NPAs): 62% consider that they do not overlap with an NPA. In fact, there is no evidence of any fish farms overlapping with these protected areas in the entire Huánuco region, as can be seen in the following map. This is the reason for the lack of relationship with SERNANP, which oversees or manages these areas with other institutions.



FINDING 23: Compliance with EMMP environmental mitigation measures is above 57%. The greatest compliance rate is noted in technical assistance for aquaculture pond equipping and preparation for fish farming, at 91%. This is followed by site design and selection, cleaning and weeding with minimal loss of primary or secondary production forests, with 82%. The average compliance rate of fish farm operation and maintenance in accordance with best aquafarming and biosecurity practices was 64%.

PORI's EMMP (DEVIDA, 2021b) for the initial management of fish farms has ten environmental mitigation measures. In this study, for compliance analysis, the measures were grouped into five themes or components as shown in the following table.

Table 25: PORI DEVIDA fish farms. Compliance with mitigation measures, by theme.

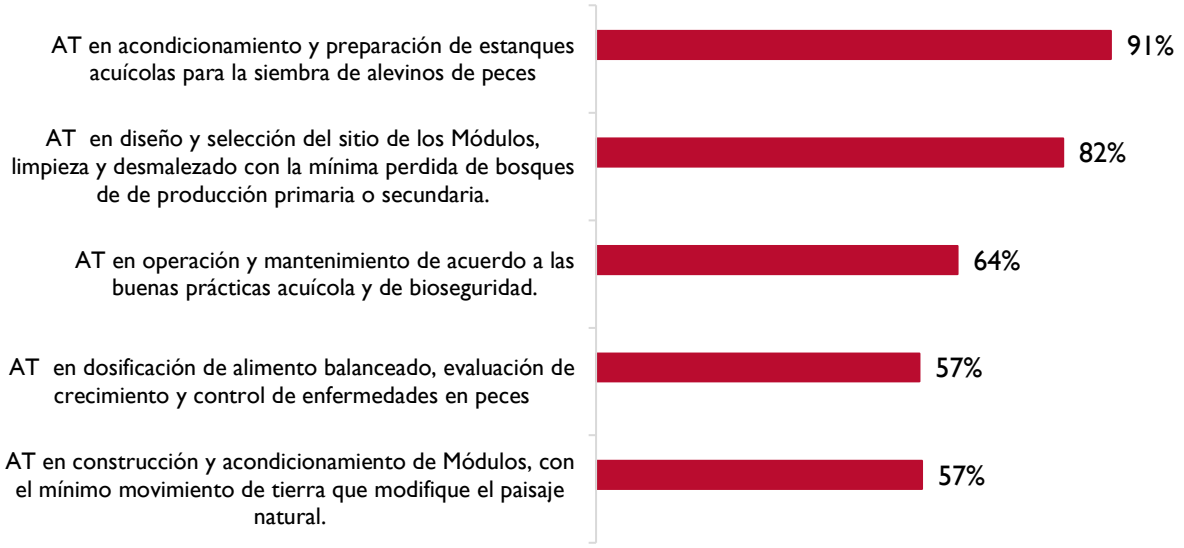
NO.	MITIGATION MEASURE	COMPLIANCE %
1	Technical assistance in design and selection of demonstration module sites, as well as in clearing and weeding with minimum loss of primary or secondary production forests.	82%
2	Technical assistance in construction and outfitting of demonstration modules and family modules, with a minimum of landscape-modifying earthworks.	57%
3	Technical assistance in operation and maintenance of demonstration modules in accordance with good aquaculture and biosafety practices.	64%

NO.	MITIGATION MEASURE	COMPLIANCE %
4	Technical assistance in outfitting and preparing aquaculture ponds for juvenile fish stocking.	91%
5	Technical assistance in feed dosing, growth assessment, and disease control in fish.	57%

Source: 2022 Environmental Compliance Review Survey (ECR)

The following graph shows the compliance percentage from highest to lowest.

Graph 9: PORI DEVIDA fish farms. Compliance with mitigation measures, by theme.



Compliance with the environmental mitigation measures of the fish farm project's EMMP is variable. The greatest compliance is seen in measures associated with technical assistance (TA) in fitting out and preparing aquaculture ponds for juvenile fish stocking, which reached 91%. High compliance is also seen in technical assistance measures in the design and selection of demonstration module sites, including clearing and weeding with minimum loss of primary or secondary production forests, which reached 82%.

An important issue is the operation or maintenance of modules in accordance with good aquaculture and biosafety practices, which shows 64% compliance, a good achievement due to the management of the aquaculture system, with different characteristics that will be discussed later. However, compliance with solid waste management is low.

Technical assistance in feed dosage and disease control in fish is at 57% compliance due to a combination of adequate support regarding balanced feed - which has a good level - and the management of dead animal waste, which affects the ponds' asepsis and shows low compliance.

Compliance with the measures related to construction and outfitting with minimum earthwork so as to not to modify natural landscapes is also at 57%. This is due to the fact that the natural landscape has to be modified in order to build this type of facility, and they used previously disturbed land. However, this would have allowed for the development of forest reconversion alternatives to maintain the biological diversity, which cannot be seen.

The set of actions carried out by the families of the fish farmers and in consideration of the processes that have been identified in the interviews to be detailed below, it is considered that the fish farms are part of the work they carry out in the farms and in the dynamics of the household. So, they are productive and social processes that allow important economic and environmental dynamics.

- **Technical assistance in design and site selection of modules, including clearing and weeding with minimum loss of primary or secondary production forests.**

This measure has a very satisfactory average compliance of 82%.

Table 26. PORI-DEVIDA Fish farms. Site selection, clearing and weeding with minimum forest loss

OBSERVED ASPECTS	INDICATOR	COMPLIANCE %
Technical assistance in design and selection of demonstration module sites, including clearing and weeding with minimum loss of primary or secondary production forests		**82%**
No felling, clearing or weeding of major primary production forests for module installation	Families that designed and cleared pond areas with primary forest clearing and weeding procedures (no slashing or burning of primary forests)	95%
Use of previously disturbed areas for pond construction, so as not to affect primary production forests	Families that used previously disturbed areas to install demonstration modules	68%
Minimal thinning of secondary forests or uncultivated land (*purmas*) for module placement and pond construction	Families that, for placement of ponds, carried out minimum thinning of secondary forests or uncultivated land.	68%
Prohibiting the burning of plant biomass.	Families that did not fell or burn primary forests (no slash and burn)	99%

In the interviews conducted, fish farmers mentioned that other entities such as the Alternative Development Assistance Unit (CADA) supported them in environmental issues. Ninety-nine percent of the people responded that they installed the fish farm without felling or burning primary forests. In addition, all of the fish farms are currently located in secondary forests and the primary forests are quite far from their areas. This shows in the use of previously disturbed areas. For the placement of ponds, they carried out the minimum thinning of secondary forests or uncultivated land (in both cases, 68%). Certainly, for design and selection of the site, according to the interviews, they took environmental protection into account, in the first years of PORI's intervention in some cases and, in others, with the intervention of another institution.

- **Technical assistance in construction and outfitting of modules, with minimum landscape-modifying earthworks**

This environmental measure has a 57% compliance level. Only 47% of fish farmers reported that they did not modify the natural landscape, which means that the vast majority, i.e., 53%, consider that they did modify it. The measure has the following indicators to establish compliance level (see table below):

Table 27: PORI- DEVIDA fish farms. Construction and fitting out of modules

OBSERVED ASPECTS	INDICATOR	COMPLIANCE %
Technical assistance in construction and outfitting of demonstration modules and family modules, with minimum landscape-modifying earthworks		**57%**

OBSERVED ASPECTS	INDICATOR	COMPLIANCE %
Avoiding modification of the natural landscape in places with biological diversity by building demonstration modules with minimum earthworks, and ensuring the finishing of the fishpond dikes make the pond look like a natural aquatic surface.	Demonstration modules that did not modify the natural landscape.	47%
Building on land that is unsuitable for agriculture, has soils with impermeable characteristics, and is close to water sources	Modules make use of previously disturbed areas	68%

- **Technical assistance in operation and maintenance according to good aquaculture and biosafety practices**

This is an important measure, as it considers training elements and the effective use of good practices. As indicated, this measure reaches an average of 64% compliance and can therefore be considered satisfactory. This measure comprises two indicators: One refers to the disposal of organic and inorganic solid waste at specific locations on the farm, which has a compliance rate of less than 50%. The other indicator, compliance with rational use of water with the implementation of systems, stands at around 80%.

Table 28: DEVIDA-PORI. Fish farms. Good aquaculture and biosafety practices

ASPECT OBSERVED	INDICATOR	COMPLIANCE %
Technical assistance in operation and maintenance of demonstration modules in accordance with good aquaculture and biosafety practices		**64%**
Avoiding presence of organic or inorganic waste in all demonstration modules and areas surrounding fish farms	Aquaculture units/families that dispose of their solid waste at specific locations within the farm	
	Families that dispose of inorganic solid waste	46%
	Families that dispose of organic solid waste	41%
	Modules make rational use of water by avoiding excessive use through constant water intake, through implementation of:	
	Modules with opening and closing system for rational use of water	80%
	Aquaculture units with opening and closing system	79%

Analyzing each of the indicators, we can see where the highest and lowest compliance levels are. Firstly, the achievement in the measures related to the management of the water system stands out, both in terms of rational use (80%) and the use of opening and closing systems (79%). This level of satisfaction became evident in the interviews with the fish farmers, who explained how important it was to install water control systems in their fish farms and to gradually learn how to use them, which resulted in an important change because they used to waste water.

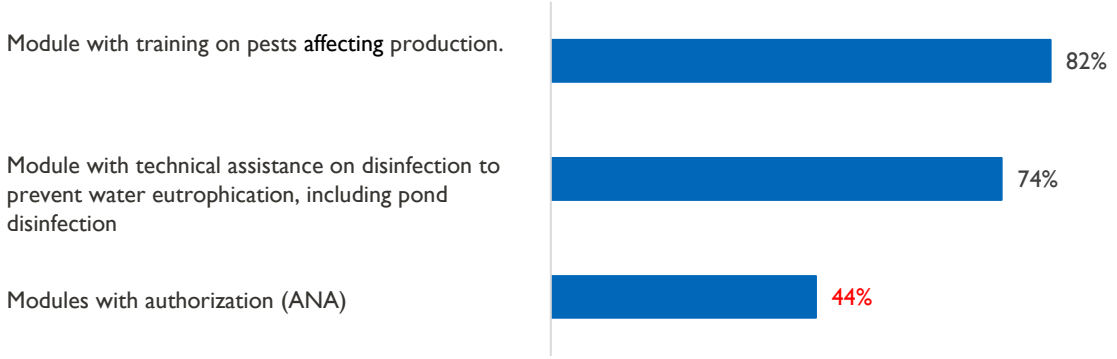
In the interviews, fish farmers explained that they can also make some changes in terms of controlling pollutants in the water because microorganisms from stocked fish remain in the water, and then the water is diverted to the natural streams. When the fish have grown large, it is necessary to replace the water to keep the oxygen level they require. Certainly, it is assumed that small fish farms have little pollution due to feeding and waste management. However, it is advisable to have another control in the drains of the fish farms before the water reaches or returns to the natural stream.

This measure includes two other factors on waste management in fish farms that are at a lower level: the disposal of inorganic and organic solid waste, which reach 46% and 41% compliance respectively. As can be seen in the results and from the interviews conducted, fish farmers know about inorganic and organic solid waste disposal, but do not apply the knowledge (10% and 6%, respectively). Organic waste is collected by the farmers themselves and taken to ponds prepared for composting.

Here there is a certain difficulty regarding inorganic waste. Fish farmers wait for the municipality or recyclers to pick it up, but they never arrive. In addition, disposal requires carrying heavy garbage bags, which is something people are not accustomed to in the field. Also, there are several fish farms that are managed by women, but they do not usually carry heavy bags.

In relation to the measure of good practices in aquaculture and biosafety, there are other factors that have also been included in the 2021 report (DEVIDA, 2021a) and which are shown in the following graph.

Graph 10: DEVIDA-PORI. Other key factors in this measure



Firstly, the percentage of fish farmers trained in pest control is significant (82%), but the survey results showed that 4% do not apply the training knowledge.

Another indicator, which reaches 74% compliance, is technical assistance for disinfection to prevent water eutrophication, and for fish farmers to disinfect their ponds. The fish farmers interviewed express their awareness and use of good practices considering the possibilities of fish school productivity and mortality reduction. It can also be seen that 99% of those trained carry out disinfection, which shows the effectiveness of the training. In the interviews, the fish farmers stated that ongoing training during each campaign has been important for the application of disinfection measures in their ponds. They emphasize the constant follow-up by PORI engineers.

ANA's authorization is also included in this measure. Forty-four percent of respondents indicate that they have authorization from this institution for the use of the aquifer. However, the analysis of the PORI data shows that only 32% actually have such authorization. In the interviews, everyone indicated that they are currently in the process of obtaining the papers, which is confirmed by PORI's producer

database. The certification is a prerequisite for ANA to provide support for adequate water quality monitoring[12].

- **Technical assistance in fitting out and preparing aquaculture ponds for juvenile fish stocking**

This measure has a high satisfaction level given that it reaches an average of 91% compliance. Here, two factors are analyzed that have been related in a single indicator: (a) technical assistance for proper dosage and effective application of fertilizers (94%) and (b) monitoring that fertilization is carried out properly (92%). It is understood that by combining these two indicators there is a correlation between them, which in this case is a positive cause-effect. Making sure that these two factors are met at the same time implies being more demanding regarding compliance. The compliance level is shown in the following table.

Table 29: DEVIDA-PORI. Fish farms. Preparation for juvenile fish stocking

OBSERVED ASPECTS	INDICATOR	COMPLIANCE %
Technical assistance in fitting out and preparing aquaculture ponds for juvenile fish stocking		**91%**
Making proper use of fertilizer in terms of dosage and application in pond preparation	Demonstration modules/aquaculture units that make proper use of fertilizers	91%

A correlation analysis of these two variables was carried out and it was found that there is indeed a direct positive effect of medium strength: When analyzing the combination, it is shown that 91% of those who have received technical assistance in fertilization apply this knowledge effectively. This is an important achievement in this endeavor.

In interviews, fish farmers explained that this is a very important aspect for them. Assisted by DEVIDA, they have explained in great detail what the dosage and application of fertilizers means and in further detail to the extent that they are already using it, considering the three growth levels of fish over several months in a campaign at the fish farms.

- **Technical assistance in feed dosage, growth assessment and disease control in fish**

This aspect has an average compliance level of 57%. However, this is due to the fact that one of the factors has a high compliance level and the other one has a low level. This measure has the compliance level indicators shown in the following table.

Table 30: DEVIDA-PORI. Fish farms. Feed dosage, growth assessment, and disease control

OBSERVED ASPECTS	INDICATOR	COMPLIANCE %
Technical assistance in balanced feed dosage, growth assessment and disease control in fish		**57%**

[12] ANA, with its local ALA unit, carries out the necessary actions for multisectoral and sustainable use of water resources by watershed. The water use license allows holders to use water in a productive and inclusive development activity that does not cause environmental harm (Article 38 of Administrative Resolution No. 007-2015-ANA), protecting the quality and promoting a culture aimed at efficient water use in economic, social, and environmental terms.

OBSERVED ASPECTS	INDICATOR	COMPLIANCE %
Making proper use of balanced feed, dosing according to growth stage to avoid water eutrophication	Demonstration modules/aquaculture units that make proper use of balanced feed	93%
Final disposal of animal waste (dead animals) in special septic tanks for such organic waste	Demonstration modules/aquaculture units that have records of final disposal of dead animal waste in special septic tanks for such organic waste	21%

One of the factors reaching high compliance is related to the proper use of balanced fish feed by aquaculture units. In this case, there are two factors that have been related: (a) technical recommendations on fish feeding, which families are aware of (95%) and (b) family awareness of monitoring and feed dosage according to growth stage (94%). By combining these two factors, the indicator is more demanding, and the result is 93%.

Again, a correlation analysis between technical feed recommendations and the use of these recommendations by fish farmers to monitor growth was conducted. It shows a direct positive effect and achieves a high satisfaction level.

Feed dosing is an achievement recognized by fish farmers in interviews: the new feed dosage techniques and the monitoring and determination of the feed they have to use has resulted in a substantial change in their techniques. They have already adopted these new techniques and are well aware of and concerned about achieving and maintaining a certain feed quality.

They use these two technical aspects regarding feed and in some cases even keep notes for their records, supported by engineers. They recognize the importance of both quantity and quality of the feed. They are very grateful for the feed DEVIDA provides, as it is very effective. They also recognize their change in attitude regarding feed myths such as the use of the blood of other small animals.

This is important because it is leading to a specialized feeding practice among fish farmers based on the different fish stages, from growth through fattening for consumption or sale. However, from the interviews conducted, fish farmers state that this DEVIDA service should remain because they do not have the resources to buy high-quality food. Some say that they are already able to save some money, but it is not enough.

Finally, another element that is unsatisfactory, reaching 21% compliance, is the record of disposal of animal remains in septic tanks. This situation is comparable to the difficulty in the disposal of organic waste explained above. This means that it is also very difficult for them to implement the practice of organic waste disposal. In one interview, a fish farmer mentioned that he used fish waste to fertilize his plants or to prepare compost. But there is no further evidence.

FACILITATING AND LIMITING FACTORS

FINDING 24: Enabling factors are the strategies developed by fish farmers, such as fish farm disinfection, cleaning and protection, training sessions, and the location of fish farms in previously disturbed land —not in primary forests.

Among the most important facilitating factors for environmental compliance are disinfection, cleaning, and covering fish farms with mesh. First off, all fish farmers mentioned the importance of the use of salt or lime for fish disinfection. This practice is linked to two other aspects that some consider important, such as periodic cleaning of the pond and the placement of mesh (depending on the location of the fish farm) to cover them in order to protect them from aerial predators such as birds. All this avoids contamination and loss of fish.

Another facilitating factor is the land where the fish farms are located. Before installing the fish farms, the land had been used for cacao, coca, rice, and cassava plantations, or it had been formerly cultivated land (*purma*). Therefore, the fish farmers had a good level of knowledge of the land and the conditions for fish farms.

It is also evident in all cases that the fish farms have high-quality water because they are fed from springs and small streams in the forest coming from higher areas. In addition, in general this water is transferred through basic pipelines going from the middle or higher springs to the fish farms. This situation is due to the fish farmers' knowledge and practice of reforestation on their land. The producers mentioned previous reforestation work with an institution (PEA), which resulted in the establishment of different species.

An element that facilitates and catalyzes the environmental management of fish farms is that they meet the need for food and increased income among rural producers. This leads to the recognition of training as a key factor for fish farm management. Among the aspects mentioned by fish farmers was DEVIDA's role and training on planting density, pond fertilization (which was not done before) and predation prevention.

Another topic discussed in the training, which facilitates the process, is related to the characteristics of the fish feeding process: Initial feeding should be twice a day. They also learned how the feeding process changes when the fish is bigger yet still growing. And they learned when fattening is required, as well as where more feed has to be given. In some cases, they mentioned that they themselves buy the food with their own resources if DEVIDA is late in delivering it.

DEVIDA's technical team mentioned that there are multiple facilitating factors for fish farm work, which have been grouped as follows:

1. Importance of assessment at the start of support to fish farms.

The technicians mentioned conservation and environmental issues that are linked to the EMMP requirements analyzed from the beginning, but this is a limitation because it was only done at that time. The fish farmers and fish farms were geo-referenced to ensure that they were not located in Natural Protected Areas (NPAs).

Right from the start, they have improved the slopes of the fish farms with some vegetation cover (native species). They are also concerned about the ground preparation, for a good base structure, so that there is no water seepage.

They recognize that most reforestation occurs along the riverbanks with local forest species (pencil cedar, bolaina blanca, Shaina), but that the goal is to reforest the land near the fish farms.

2. Importance of water management conditions

Water is certainly a key factor in fish farms and its care is also a protective factor in possible environmental mitigation measures. Water quality is important, so it is recommended to establish measures both to maintain oxygen levels with artificial waterfalls and to keep pH stable so as not to affect the fish, and also because the same water will later flow to cultivation areas or downstream.

Firstly, DEVIDA's technical team mentioned that it is important for fish farmers to be trained in water care. Secondly, they pointed out that pond construction involves an evaluative analysis, establishing the quantity and quality of water, as well as aspects related to topography and soil texture to ensure that the soil is not sandy but rather compact so as not to allow water seepage.

They also point out that fish farmers observe a 50-meter river fringe and that they are far from the headwaters. Water flow management is important because it is part of ALA regulations. In addition, the layout of the fish farms is important to increase productivity without exceeding water use. They consider that a physical-chemical balance of water is achieved. The intake is being checked, as well as the water movement. DEVIDA's technicians mentioned that this is an important change because there used to be no such considerations.

FINDING 25: Limited understanding of manuals or forms delivered by DEVIDA. There is a low educational level and paternalism by local authorities. No progress was made in training on environmental issues. It is not clear if solid waste is segregated in the designated spaces. There is no worksheet on this topic. The PORI-DEVIDA team does not have a specialist in environmental issues for the fish farms.

- Institutional factors

A first limiting factor is that the manuals[13] and forms provided by DEVIDA to fish farmers are complex and producers do not understand them and use them only partially. Mostly, there are annotations in the engineer's manual. It should be pointed out that, although it is difficult for fish farmers to understand, it is an interesting tool that they certainly consider valuable. This limiting factor has external causes such as the low educational level of the average farmer, who only have a primary school education, as well as internal causes such as the agreement to receive free support from the DEVIDA team, as well as household or agricultural work, which does not leave them enough time to read these materials.

[13] Manual Técnico. Acuicultura amazónica en estanques de tierra. DEVIDA. Agosto 2022 (Technical Manual. Amazonian aquaculture in land-based ponds. DEVIDA. August 2022)

Consequently, fish farmers do not assume greater responsibility in saving for the fish farm for the time when DEVIDA can no longer continue providing support. DEVIDA technicians say that "they only think about the gift" or state that they "just comply with what DEVIDA says." The women interviewed say that they do not examine the recommendations because they have their household chores. And the men have to tend to their work of caring for the crops.

Another limiting factor mentioned by the fish farmers is that there is a lack of relationships with other fish farmers to share experiences about the fish farm duties. Also, they point out that there are no brochures on environmental issues.

Some complained that the feed delivery took too long, but they did not look for alternatives while these products were on their way. Other fish farmers mentioned that they had used some of their savings, but that it was not enough.

DEVIDA's technicians consider that there are limitations in the traditional management of fish farms that have always existed because fish farmers were accustomed to inappropriate procedures, which DEVIDA has tried to reverse. Among others, these inappropriate procedures include the following:

- 80% of ponds are old and had deficiencies in layout.
- Fish farmers were used to having up to 10 fish/mt2 and above. They had limited knowledge of the relationship between water volume and number of fish.
- There is an important effort in training fish farmers on the new and complex systems of fish farms, which is already making it possible to reduce the limiting factors. However, there has not been as much progress in training on environmental issues.
- The technicians consider that the project's Environmental Adjustment and Management Program (PAMA) allowed them to establish some starting parameters regarding potential environmental effects (PTA)[14],which is complemented by an environmental mitigation plan.
- Farmers are trained not to apply herbicides to plantations that may affect fish farms. Nevertheless, it is not clear whether fish farmers have really stopped using them.
- There is training in living cover around the pond to ensure that the fish farm is aerated. However, during field visits it was found that there was very little cover.
- Another training farmers have found difficult to understand and apply has been on how to achieve adequate stocking density (3 fish/mt2). However, little by little, this is being achieved. In the visits during the current study, fish farmers mentioned that they are indeed making an effort to manage this new technique.
- DEVIDA technicians mentioned that they provided training on solid waste and that the fish farmers are expected to collect the waste in bags and take them to the organic/inorganic micro-fills located at different sites designated by them. The technicians also expect the (municipal) companies to

[14] See Appendix 1. Environmental Monitoring Form in: infrastructure, biophysical, global climate change, socioeconomic, environment & health, gender. See in *Guía para los Socios Implementadores Plan de Mitigación y Monitoreo Ambiental (PMMA)1 de USAID/Agencia Latino América y El Caribe (LAC)* (USAID/Latin American and Caribbean Agency (LAC) Guide for Implementing Partners Environmental Mitigation and Monitoring Plan (EMMP)1), 2015. See also the details on the installation and maintenance of areas with alternative crops under agroforestry systems - SAF. (cacao, coffee, pineapple, citrus fruits, beekeeping, and aquaculture) in the Environmental Monitoring Mitigation Plan (EMMP), May 2021.

collect it, but this often does not happen. Consequently, there are still problems regarding waste management.

- They also explained that there are no environmental awareness raising events in general, but that there are group talks with fish farmers.
- The PORI-DEVIDA team mentions that there is a need for a specialist to address environmental issues in fish farms and for tools resulting from the specialist's work.
- Practices employed by fish farmers

A fish farmer pointed out that they do not use any fertilization or that they use elements such as corrugated iron around their farm to prevent "wolves" or otters from entering. This is not interpreted as affecting the farm environment.

With respect to solid waste, although they mention that they have places to dispose of it, it is not clear whether they actually do so. Virtually none of the people interviewed mentioned their practices for disposing of inorganic waste. There is no record on the subject either, but the technicians mentioned that they are working on this issue. There was only one case mentioning the recycling of organic waste as fertilizer for their plots.

Some of the fish farmers mentioned that there are recyclers or garbage collectors from the municipalities that help them collect mainly the inorganic waste. However, it was noted that there are difficulties in providing a permanent service.

No one mentions hazardous waste, because it is possible that they are not aware of which elements may be hazardous. In fact, batteries are widely used in the Amazon region to charge different types of radios or tape recorders, but there is no proper practice in place to handle them as hazardous waste. Also, there is use of hazardous chemical insecticides, but it is not very clear how people dispose of the containers.

Two fish farmers showing the area surrounding the module

STAKEHOLDERS INVOLVED

Study questions:

11. To what extent can stakeholders contribute to a higher compliance level regarding the EMMP mitigation measures? What is the percentage of compliance?

11.1 What is the role of USAID, the implementing partners and the beneficiaries in improving compliance with the EMMP measures?

11.2 What is the role of men and women in environmental practices?

Summary of findings:

- FINDING 26: Fish farmers highlight DEVIDA's role as the main partner and acknowledge the training, services and materials they provide. The role of local water authorities (ALA) is important because of the permits or support they provide. None of the fish farmers interact with SERNANP, SERFOR or municipalities.
- FINDING 27: Fish farms allow women to perform productive activities close to their homes without requiring any physical effort in some of the production processes, especially in fish farming and feeding. Men usually participate in fish farm outfitting and

FINDING 26: Fish farmers highlight DEVIDA's role as the main partner and acknowledge the training, services and materials they provide. The role of local water authorities (ALA) is important because of the permits or support they provide. None of the fish farmers interact with SERNANP, SERFOR or municipalities.

DEVIDA's role as main partner is identified by the fish farmers interviewed. They acknowledge the training and input services. DEVIDA's technical team of engineers that support the fish farmers made a clear reference to this work, but they also pointed out that it is more focused on productive terms rather than on environmental ones. This is due to the lack of an environmental specialist in the region.

On the other hand, although DEVIDA's representative from the Directorate for Promotion and Monitoring of Lima stated that they have a sheet for monitoring environmental measures, the local technicians indicated that some aspects of this sheet are not necessary and other criteria should be included.

Another key partner in the region with respect to fish farm activities is the Local Water Authority (ALA), which grants the water license and the permit for fish farm operation. During the field visit, of the six fish farms visited, two had an approved permit. The other fish farmers noted that they have submitted a document for authorization for water use permits or a resolution for water use permits. Only one fish farmer stated that he had obtained the ALA permit from an association.

However, none of the fish farmers have a relationship with SERNANP or SERFOR. This is because they are far away from protected areas or forests (including the Tingo María National Park or the Carpish Montane Forest Regional Conservation Area, as shown in the map at the beginning of this report).

According to the technical team, opportunities for environmental agreements linking the fish farms with the municipalities have been lost. It should be noted that some municipalities have a relationship with DEVIDA, but not with the PORI Project. Finally, there are only two fish farmer associations in the area (Cachicoto and Acuacot) that are linked to DEVIDA-PORI.

FINDING 27: Fish farms allow women to perform productive activities close to their homes without requiring any physical effort in some of the production processes, especially in fish farming and feeding. Men usually participate in fish farm outfitting and extraction, but only alongside agricultural duties.

From the interviews, it can be stated that there is a unanimous appreciation among both women and men fish farmers that this work is an opportunity for women to grow because it allows them to be close to home and does not require physical effort in some production processes. Women are more active in the fish farms at various times, such as during fish stocking and feeding. The people interviewed believed that women can engage in fish farming as well as men, throughout the entire process.

In fish farms, women assume different roles, especially in the early stages of fish breeding. Some of the tasks are as follows:

- checking water inflow in fish farm
- working on both feeding and fishing
- cleaning areas adjacent to ponds

Interviewed women said that the men go to the fields to cut weeds with their machetes and take care of the areas around the fish farm that require constant weeding or where animals are present. Both men and women admit that men are in charge of preparing the fish farm.

ALTERNATIVES TO INCREASE ENVIRONMENTAL COMPLIANCE

Study questions:

12. What are the alternatives that contribute to increasing compliance with environmental mitigation measures included in EMMP?

12.1 What are the alternatives that can be implemented in the short, medium and long term to achieve higher compliance with EMMP measures?

12.2 What are the mechanisms for monitoring the implementation of the alternatives presented?

12.3 ¿How well are the recommendations presented in last year's internal ECR and the external ECR implemented?

Summary of findings:

- FINDING 28: Fish farmers have the manual and the forms with recommendations from the DEVIDA technical assistant. In addition, DEVIDA started addressing environmental issues after PAMA approval. The forms delivered by DEVIDA are not fully applied because a specialist is needed for monitoring environmental issues.
- FINDING 29: The fish farmers interviewed stated that they are not aware of environmental mitigation measures or supervision results. DEVIDA technical personnel believe that there is an internal ECR with fish farmers' work on learning fish control, feeding, as well as the cultural change processes in aquaculture management.

Question 3.1 was answered in the recommendations section.

FINDING 28: Fish farmers have the manual and the forms with recommendations from the DEVIDA technical assistant. In addition, DEVIDA started addressing environmental issues after PAMA approval. The forms delivered by DEVIDA are not fully applied because a specialist is needed for monitoring environmental issues.

Fish farmers have a manual and forms where DEVIDA's technicians write their recommendations. These are instruments for monitoring the implementation of productive and environmental aspects. All interviewees mentioned this instrument; some of them even showed the manual and explained the recommendations. This booklet includes a biometric technique that uses scales and distance measuring by selecting fish at random, which allows assessing fish growth and then, based on this, dosing the feed.

For fish farmers, the recommendations written in the booklet should be easier to understand in terms of handwriting and content, especially when fish farmers have only basic education.

DEVIDA-PORI specialists pointed out that, with the PAMA approval, they started working on environmental issues[15]. It should be specified that the fish farm activity is also framed in Supreme Decree No. 012-2019, which approves the Environmental Management Regulations for the Fisheries and Aquaculture Subsectors (Ministry of Production, 2019).

Although they stressed the importance of both the manuals and the forms used by the fish farmers, this does not mean that they are using all DEVIDA forms. They believe that the forms are not fully applied because a specialist is required to follow up on environmental issues.

FINDING 29: The fish farmers interviewed stated that they are not aware of environmental mitigation measures or supervision results. DEVIDA technical personnel believe that there is an internal ECR with fish farmers' work on learning fish control, feeding, as well as the cultural change processes in aquaculture management.

All fish farmers interviewed mentioned that they are unaware of environmental mitigation measures or recommendations arising from monitoring (ECR). However, in some cases they implement DEVIDA recommendations, but with limitations. Local technicians explained several interrelated aspects, which are presented below:

1. Learning to control fish and feeding.

This aspect is considered key and a significant training effort has been made to enable fish farmers to measure their fish progressively at all growth stages, with weight and size as the two elements of technical monitoring. Growth is related to the adequate feeding of the fish. Through this monitoring, it is possible to keep an efficient balance between production and the aquaculture environment, without wasting any water.

2. Cultural changes in aquaculture management

As explained by fish farmers, and according to the technicians' comments, the training for achieving a cultural change for proper fish stocking was an arduous task. The fish farmers had other conceptions about water management and feeding based on fish growth and volume in fish farms. Moreover, it is necessary to consider the low educational level of the rural population in the areas. Therefore, changing the producers' habits in terms of feeding and aquaculture management in fish farms required a great deal of prior work.

[15] The Environmental Adjustment and Management Program (PAMA) is an environmental management instrument that is complementary to the National Environmental Impact Assessment System (SEIA). It is carried out to identify environmental deficiencies and impacts, as well as to describe measures and commitments to mitigate such impacts. Fish farms (except for some AMYPEs) could certainly declare a minor environmental impact, where the license for the use of water for aquaculture purposes is provided by ALA. In addition, the fish farms in Huánuco are outside a Natural Protected AREA (NPA).

CONCLUSIONS

ALLIANCE FOR DIGITAL AND FINANCIAL SERVICES (CR3CE ALLIANCE)

Conclusion 1

The level of compliance with environmental mitigation measures established in the CR3CE Project's EMMP is different when it comes to tower maintenance, which has an average satisfaction level of 68% and is higher in two of the three topics: 90% in good location and forestry maintenance. In telecenters, the average reaches 52%. Of the five topics, only good management of energy efficiency exceeds 60%. In both cases, the compliance level in solid waste management is unsatisfactory.

Associated findings

- *Finding 1*
- *Finding 2*

Conclusion 2

The poor compliance with environmental mitigation measures in telecenters is the responsibility of the municipalities to whom their management was transferred in 2017. The CR3CE Alliance has an advisory role in the implementation of environmental mitigation measures, but it does not have resources allocated for such implementation. Limitations in compliance with environmental measures are lack of training, lack of knowledge of protocols, lack of coordination of municipal management, staff turnover, and limited budget. The facilitating elements are the capacity and responsibility of the telecenter manager, who is in charge of waste management, internet equipment and services, with little knowledge of the agreement.

Associated findings

- *Finding 3*
- *Finding 4*
- *Finding 5*

Conclusion 3

Men and women have different roles in their relationship with telecenters. Women play an important role in the management of the telecenters, in the actions of the partners committee, or as participants in telecenter activities. They are also involved in cleaning and collecting solid waste. Men play a role as officials in telecenter decision-making and in computer or equipment management and issues.

Associated findings

- *Finding 7*

Conclusion 4

A weakness of telecenter managers and regional coordinators of the CR3CE Alliance is the lack of knowledge of the mechanisms for monitoring environmental issues, in addition to the agreements with the municipalities, and the responsibilities of both parties.

Associated findings

- *Finding 8*

ALLIANCE FOR COFFEE EXCELLENCE (CAFE)

Conclusion 5

The level of compliance with the environmental mitigation measures of the EMMP of the Alliance for Coffee Excellence Project reaches 55% in four out of five topics, with reforestation, erosion control, and solid waste management as the mitigation measures with the highest compliance. The lowest compliance is in water conservation and management measures. The existence of other institutions in the intervention area has a positive influence on farmers, as does the work done by the Alliance for Coffee Excellence (CAFE). Economic limitations and lack of awareness among farmers are aspects that hinder compliance.

Associated findings

- *Finding 10*
- *Finding 11*
- *Finding 12*

Conclusion 6

The greatest compliance with environmental mitigation measures is related to the interventions of regional public entities and private companies, which provide environmental training to the population.

Associated findings

- *Finding 13*

Conclusion 7

Although machismo persists in the area, the Alliance for Coffee Excellence (CAFE) has managed to raise awareness among farmers about the role of women in production processes and their participation at different stages of the production chain. Within this framework, women participate in the implementation of some environmental measures alongside coffee cultivation.

Associated findings

- *Finding 14*

Conclusion 8

Although the Alliance for Coffee Excellence (CAFE) has an environmental specialist and established procedures for the implementation and follow-up of environmental measures, the technical teams are not aware of the recommendations resulting from internal inspections or external monitoring.

Associated findings

- *Finding 15*

PERU CACAO ALLIANCE – PHASE II

Conclusion 9

The level of compliance with seven of the project's eight environmental mitigation measures is greater than 40%. Pesticide use and management is the measure with the highest compliance (74%), while water source conservation is the one with the lowest (7%). Training and other strategies by the Peru Cacao Alliance contribute to compliance with environmental measures. The lack of coordination between institutions operating within the scope of the alliance hinders compliance with environmental mitigation because it results in contradictory discourses that cause confusion among farmers. Furthermore, the use of indicators that aggregate results hides detailed information that is also valuable.

Associated findings

- *Finding 17*
- *Finding 18*
- *Finding 19*

Conclusion 10

The presence of different institutions working on environmental issues in the intervention areas contributes to strengthening farmers' knowledge. The presence of technological agents trained by the alliance, who provide technical assistance to their peers, is also important.

Associated findings

- *Finding 20*

Conclusion 11

Women's empowerment and participation is visible. Their participation throughout the production process and in the execution of environmental measures with greater rigor is more than evident. Women are taking on positions of responsibility, not only in their community organizations, but also in public institutions, with equal presence in relation to their male counterparts.

Associated findings

- *Finding 21*

Conclusion 12

The EMMP does not include feedback from the technicians of the different intervention areas in a way that reflects reality rather than generalizes environmental measures.

Associated findings

- *Finding 22*

PORI-DEVIDA

Conclusion 13

Fish farms are part of the productive process and the dynamics of rural households in the area. The five environmental mitigation measures achieve a compliance level of more than 57%. The one with the highest compliance is the outfitting and preparation of aquaculture ponds for the juvenile fish stocking. This includes site design and selection, clearing and weeding with minimum loss of primary or secondary production forests, coupled with good aquaculture and biosafety practices.

Associated findings

- *Finding 23*

Conclusion 14

Associated findings

Compliance with environmental measures has been achieved through strategies developed by fish farmers regarding production changes such as stocking density, and DEVIDA's role in the placement of fish farms and in water management. There is limited understanding of the manuals or forms provided by DEVIDA to fish farmers as they are not adapted to the local reality. Also, there is limited training on environmental issues.	• *Finding 24* • *Finding 25*
Conclusion 15 The most important stakeholder for the implementation of environmental measures is DEVIDA, whose role as main partner is recognized, as well as the Local Water Authority (ALA) due to the permits or support they are already obtaining or are in the process of obtaining. Women's role in fish farms is fundamental because it is an activity close to home and it does not require physical effort in some of the production processes. Men can work in agriculture and, when required, be involved in the fish farm preparation and extraction stage.	***Associated findings*** • *Finding 26* • *Finding 27*
Conclusion 16 The environmental monitoring forms sent by DEVIDA are not fully applied because a specialist is required to follow up on environmental issues. DEVIDA technicians believe that the internal ECR should be carried out in work with fish farmers, in learning how to control fish and feed, and in the processes related to cultural changes in aquaculture management.	***Associated findings*** • *Finding 28*

RECOMMENDATIONS

ALLIANCE FOR DIGITAL AND FINANCIAL SERVICES (CR3CE ALLIANCE)

FOR CEDRO

1. Urge the new internet provider to comply with national regulations and implement environmental mitigation activities in the telecommunication towers and to build technical infrastructure, such as electric power backup and a battery bank for solar recharging. The municipal managers of the telecenters should also be aware of the maintenance plan for these towers and mitigate environmental risks in terms of harm to people and nature.
2. Urge the telecommunications provider to comprehensively carry out responsible practices for the implementation and maintenance of signage on towers to make them safer and prevent risks, such as electrical accidents. The new municipal administrations are an opportunity to make sure that the operating company indeed implements the technical strategies to apply minimum signage standards.
3. Guide municipalities on proper interaction between management units that have common issues regarding environmental monitoring and include them as part of the new agreement with the municipalities.
4. Agree with the new municipal authorities to get the company operating the towers to implement minimum standards for solid waste management in the area. It is highly advisable to coordinate with the regional government's environmental directorate and environmental health directorate, which have protocols in place for detecting chemical contaminants and, of course, solid waste.
5. Categorize municipalities in order to define telecenter characteristics. If municipalities are ultimately responsible for implementation, it is necessary to identify which municipal management office is in charge and assign an available budget for this task. MEF has classified province and district municipalities according to the percentage of urban or rural population which can be revisited for this purpose.
6. Improve agreements between CEDRO and municipalities to have guidelines for environmental risk management, including the responsible Ministry as well.
7. Carry out awareness and advocacy actions on environmental issues with municipal authorities and officials related to the telecenters, including, to the extent possible, the users of these facilities and, if feasible, ensuring that improved environmental management aspects be extended to all municipal structures.
8. Develop communication campaigns, aimed at the general population, on solid waste management, separation, water and forest care, prevention and electrical risks from antennas, etc. (for example, use of short video clips in telecenters).

FOR MUNICIPALITIES

1. Include telecenters in the municipal structure and the Annual Operating Plan, therefore ensuring budget allocation.

2. Develop and implement an electrical and electronic waste management plan for the telecenters, as well as for the other municipality departments.
3. The very interesting potential of partner committees recognized by municipalities should be publicized more by the alliance and public bodies as a task carried out by citizens that creates value for environmental protection. They constitute an example of how various grassroots, corporate, and public stakeholders participate together.
4. Create better social media campaigns publicizing the services provided by telecenters. Telecenter fan pages can include environmental topics, apart from promoting the virtual literacy and financial education courses that telecenters provide. Training through videos or short videos could be given to raise awareness of the general public, telecenter users, and municipal officials.
5. Regarding training organization, it is important for municipalities to have a detailed and progressive training plan for environmental issues involving management of various municipal issues, particularly telecenters. An agreement should provide evidence that CEDRO will make a greater effort in relation to awareness and advocacy actions aimed at authorities and municipal officials on environmental protection topics.

FOR TELECENTERS

1. Regarding computers: Computer equipment should be renewed, and annual maintenance should be included. If possible, municipalities should procure laptops, as these are easier to use and secure.
2. On electricity: Telecenters should include, at a minimum, a good voltage stabilizer because the electrical system is unstable and electrical discharges are frequent during rainy periods. Adequate cable gutters are required for electricity wires to prevent electrical hazard for attendees or visitors.
3. An aspect related to environmental protection standards that is not often mentioned is that broken equipment should be placed in safe recycling zones.
4. On infrastructure and basic service equipment:
    a. Provide adequate maintenance and renewal of infrastructure to complement the renewal of electrical systems in telecenters.
    b. Create physical spaces for special children in telecenters or municipalities, to avoid electrical and electronic environmental risks. In addition, it could be an educational space for them.
    c. Establish adequate infrastructure and protocols for restrooms and water quality, which are still absent in most cases.
    d. Improve signage for solid waste containers and install them where they are still absent.
    e. Prepare the premises to operate as a library that allows complementary educational services, especially for children.
    f. Improve internet service and tower operation. In fact, several municipalities are making arrangements for other internet transmission systems.
5. Organizational management:
    a. Coordinate environmental topics with the municipality environmental management office or determine its role.
    b. Provide more space for citizens to participate in partner committees so that these have more significant roles at telecenters. A complementary recommendation would be to have partner committees exchange experiences, focusing on those which have been successful. Those which do not have this committee are advised to reactivate it.

6. Regarding training for individuals who attend telecenters:
    a. Continue with training sessions on solid waste for visitors.
    b. Provide training on environmental topics to children, considering that they attend in large numbers. This is an opportunity to achieve gradual changes in households.
    c. Include adult women in the training sessions, so that they relate the topic to their own social, family or work-related programs.
    d. Develop online courses on computer operations.
    e. Perform solid waste segregation campaigns.
7. Adapt schedules based on women's and men's needs given that telecenter managers work only during normal office hours.
8. Generate an exchange of telecenter experiences at a regional level.

FOR USAID

1. It is advisable for telecenters to be part of environmental monitoring processes because several items they implement have high-risk factors which may have negative effects on human beings. Therefore, it is necessary to check the actual conditions to implement monitoring, possibly using virtual methodologies, with USAID.

ALLIANCE FOR COFFEE EXCELLENCE (CAFÉ)

FOR TECHNOSERVE

1. Review the environmental mitigation measures of the EMMP more exhaustively, especially the indicators, selecting those that refer to practices rather than activity indicators.
2. Consider more specific indicators regarding what is intended to be achieved for compliance with environmental mitigation measures.
3. Continue with the dissemination of the EMMP with the stakeholders involved in the promotion of the coffee production chain through participation in regional technical roundtables, as well as public and private institutions that are linked to the coffee production chain to improve the level of compliance with environmental mitigation measures.
4. Continue carrying out awareness campaigns on the environmental mitigation measures set forth in EMMP.
5. Regarding environmental mitigation measures:
    a. Continue CAFÉ Alliance work with NGO Campo Limpio to improve solid waste (pesticide container) collection, because, in both Huánuco and Ucayali regions, most of the producers interviewed claimed that the service is not available.
    b. Share results of using technologies for vetiver implementation for adequate management of honey water with all entities related to the coffee production chain.
    c. Continue awareness raising actions for producers in relation to coffee pulp management by means of organic fertilizer production, given that many producers have composters that are not operational.

d. Strengthen producer capacity by training them on the adequate use of pesticides in relation to pesticides approved by PERSUAP.

6. Regarding strategies developed:
    a. Organize theoretical-practical training sessions on the varieties of trees associated with coffee, and topics including climate change, adequate chemical use, environmental protection, landfills, timber tree planting, and waste management.
    b. Use digital media (WhatsApp) to receive technical assistance from qualified professionals who can teach and become familiar with producers with the goal of generating change.
    c. Implement a processing plant for coffee washing and drying, rainwater harvesting tanks, small farm animals to obtain manure and prepare compost, soil analysis to apply the fertilizers required for farming, waste bins and mini landfills to build community habits, latrines, model plots, solid waste transportation, and empty containers.
    d. Help farmers establish associations, so that the association regulations encourage them to change their ways of working and leverage the benefits of being part of an organization.
    e. Partner with municipalities in implementing techniques for agrochemical waste management.
    f. Disseminate information on infiltration wells with vetiver for honey water management in coffee.
    g. Widely promote the implementation of environmental mitigation through leaflets.
    h. Execute projects with counterpart contributions from producers, to value their support in implementing environmental mitigation measures.
    i. Organize internships in other regions with successful producers, so producers observe and replicate their implementation of environmental mitigation measures.
    j. Involve a business association in export chains that demand compliance with sustainable environmental measures and provide services such as certifications to more profitable and sustainable chains.
    k. Encourage the business association to be involved in compliance with environmental measures and introduce better markets that pay a good price for sustainable managed coffee.

FOR USAID

1. Promote joint work with public and private entities linked to the coffee production chain to identify mitigation measures that unify criteria and indicators that respond to USAID regulations and Peruvian legislation.
2. Make sure that the implementing partners include environmental mitigation activities in their annual work plans and that their indicators are contained in their monitoring and evaluation plans and are also reflected in the field.

PERU CACAO ALLIANCE – PHASE II

FOR PALLADIUM

1. Review and improve the formulation of the Environmental Monitoring and Mitigation Plan by sharing it with the technicians in each area, entering real data on microclimate, soil, and productivity. Then, based on that information, prepare the environmental mitigation measures.
2. Review and improve the formulation of indicators so that the report is in line with work carried out in the field.
3. Monitor progress in the implementation of environmental measures, differentiated by stakeholders: small producers, medium-sized producers, and associations.
4. Disseminate and analyze the results of internal and external ECR with area teams from Peru Cacao Alliance.
5. Develop work strategies to strengthen and expand the role of women in the implementation and monitoring of compliance with environmental measures.
6. Regarding environmental mitigation measures:
    a. Indicator formulation should be analyzed before joining them with "AND" as a condition to validate a measure.
    b. Infiltration ditches can be implemented on the coast, but they do not make sense in the Amazon jungle region. Drainage ditches are built in these areas.
    c. Coordinate with SENASA for pest control in new cacao varieties.
    d. Review tree species that are assigned to each area before including them in the EMMP, taking the soil and climate of each area into consideration.

FOR USAID

1. Promote coordinated work with government entities (MINAM, MINAGRI, DEVIDA) to identify mitigation measures that unify criteria and meet USAID and Peruvian legislation regulations.
2. Work should be better coordinated. There are initiatives, but they are isolated. There should be an Environmental Roundtable that brings together all initiatives and analyzes the most relevant ones to then make proposals to the Ministries of Economy, Agriculture, the Environment, and the Reforestation programs.
3. Strengthen the capacities of alternative development partners in relation to Regulation 216 as an important input for Environmental Monitoring and Mitigation Plans, identifying indicators and objectives.

FOR DEVIDA

1. Promote spaces for national and regional consensus with participation of public institutions (MINAGRI, MINAM, SENASA, INIA, DEVIDA, and regional governments), the private sector, USAID partners, and other relevant stakeholders (UNDP) to unify criteria and identify environmental mitigation measures.
2. Generate an environmental monitoring system to follow up on compliance with environmental mitigation measures agreed upon by consensus.

3. Update Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) and share it with stakeholders in each region.

PORI-DEVIDA

FOR DEVIDA

1. Establish connection between fish farmers and market for sale of aquaculture products, partnering with Huánuco's regional government to create a market for aquaculture production.
2. Implement a greater number of ponds or enlarge the existing ones given their potential for generating income for families.
3. Hire personnel with environmental expertise to provide advice on the value chain and fish farm production.
4. Train field personnel on environmental issues, since they advise fish farmers on production issues, providing them with better guidelines.
5. Provide better support for creation of associations to allow fish farmers to access better technical assistance and services in the local and even international aquaculture market.
6. Regarding EMMP:
    a. Identify another measure to monitor landscape or natural resource restoration or impact mitigation.
    b. Promote well-defined certification goals among fish farmers.
7. Regarding fish farms:
    a. Ensure adequate reforestation work, both in the surrounding areas of the fishing arm (such as nearby areas including the dwelling site), and farms for smaller animals.
    b. Implement additional control systems in fish farm drains before reaching spring course.
    c. Train fish farmers on the preparation of fish food so that they learn to prepare food based on their own resources (fruits, maize, cassava).
    d. Promote a conditional revolving fund to maintain the shared support and savings system. This fund will be initially managed by DEVIDA and a committee formed by men and women, considering that fish farms are managed by both genders. Gradually, this fund may be transferred to this committee or placed in a local service cooperative with a managing committee.
    e. Solid waste management and handling:
        i. Prepare a training and solid waste management plan that includes materials such as shovels and simple wheelbarrows to transport waste, considering a pilot intervention to several households.
        ii. Establish a more suitable procedure for all organic waste under a circular economic framework. Fish farmers should also be aware of it to ensure the collection of this waste and the reduction of their costs.
    f. Water:
        i. Water quality is important, so it is recommended to establish measures to maintain oxygen levels with artificial waterfalls and to keep pH levels stable so as not to affect

the fish. This is also important because the water will later be diverted to cultivation areas or downstream.

g. Plant vetiver grass in discharge channels to complete the treatment system. Also, use efficient microorganisms (MME) to treat wastewater. Regarding the safe use and management of pesticides, it is necessary to coordinate activities such as cacao, sanitation, and other institutions to strengthen the joint management of this issue.

FOR PUBLIC AUTHORITIES

1. It is important to reach an agreement with the Ministry of Production and the National Water Authority (ANA), which is a body attached to the Ministry of Agriculture and Irrigation, to achieve not only certifications but also specialized advice for fish farms considering other experiences in the Amazon region of Loreto: National Fisheries Development Fund (FONDEPES), Peruvian Amazon Research Institute (IIAP).

FOR MUNICIPALITIES

1. Reach agreements with municipalities regarding inorganic solid waste management and increase their budget allocation by the MEF.
2. Sign agreements with municipalities, since this area must foresee the risks resulting from a larger number of fish-farm-related businesses (restaurants, recreational facilities, etc.), the use of different types of materials that could affect both the natural resources and the pressure on the plots. Also, reach agreements on the use of telecenters to obtain training such as to improve the educational level, as well as virtual literacy and communication.
3. Promote compliance with regulations by the National Water Authority (ANA).

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ANNEXES

ANNEX A: RESUMEN EJECUTIVO

El Programa de Desarrollo Alternativo de USAID se implementa en las regiones de Huánuco, Ucayali, San Martín y Pasco e incluye, entre otros, los proyectos Alianza para los Servicios Digitales y Financieros - CR3CE (implementado por CEDRO), Alianza CAFE (implementado por TechnoServe), Alianza Cacao Perú (implementado por Palladium) y el Acuerdo Gobierno a Gobierno *Plan Operativo de Reforzamiento Institucional* (PORI) con DEVIDA. Estos socios implementadores llevan a cabo acciones de mitigación ambiental a través de planes de Monitoreo y Mitigación Ambiental (PMMA) y estudios internos de Revisión del Cumplimiento Ambiental, según el Reglamento 216 de USAID y los requisitos de la legislación ambiental peruana. Adicionalmente, USAID lleva a cabo ECR externos, como el estudio que aquí se presenta.

PROPÓSITO DEL ESTUDIO

El propósito de la Revisión del Cumplimiento Ambiental de la Oficina de Desarrollo Alternativo de USAID es analizar el nivel de cumplimiento de las medidas de mitigación ambiental que se encuentran en los planes de cada actividad. Otros objetivos fueron identificar los factores que facilitan o limitan el cumplimiento de las medidas de mitigación ambiental y formular recomendaciones.

METODOLOGÍA

El estudio utilizó una metodología mixta que incluyó técnicas cualitativas y cuantitativas. En cuanto a los métodos cuantitativos, se aplicaron encuestas diferenciadas a muestras de 190 cafetaleros, 173 cacaoteros y 131 acuicultores. En cuanto a los métodos cualitativos, éstos abarcaron entrevistas en profundidad con diferentes actores de cada proyecto, realizando 24 entrevistas relacionadas a Telecentros, 26 entrevistas de actores de la Alanza Café, 37 entrevistas de la Alianza Cacao y 16 con actores de PORI. Además, se revisaron documentos de las intervenciones y se realizaron observaciones no participantes a 16 torres y 15 telecentros.

HALLAZGOS

ALIANZA PARA SERVICIOS DIGITALES Y FINANCIEROS (ALIANZA CR3CE)

1. El cumplimiento de las medidas de mitigación ambiental del PMMA para las torres de elevación y antenas repetidoras tiene en promedio un grado de satisfacción que llega a 68 porciento. Las medidas relacionadas con la adecuada ubicación de las torres y antenas tienen un nivel de cumplimiento de 10 por ciento; el mantenimiento de la foresta llega a 94 porciento, el manejo de los residuos sólidos tiene un grado de cumplimiento de 41 porciento, y las medidas de señalización son las de menor nivel de cumplimiento, con 3 por ciento.
2. El promedio del nivel de cumplimiento de las medidas de mitigación ambiental del PMMA en los telecentros es 52%. El mayor nivel se encuentra en el cuidado del medio ambiente (69%). en particular en el cumplimiento de eficiencia energética. El menor cumplimiento se da en el cuidado del agua, y en el manejo de residuos electrónicos, orgánicos e inorgánicos con 49%, 48% y 43% respectivamente.

3. La responsabilidad del cumplimiento de las medidas de mitigación ambiental recae en mayor grado en las municipalidades como gestores de los telecentros, asimismo en la Alianza CR3CE como asesores de las municipalidades para cumplir estándares de calidad e implementar mecanismos y procedimientos complementarios de gestión ambiental, en donde existen convenios interinstitucionales vigentes.
4. Los factores que limitan el cumplimiento de las medidas ambientales son: falta de capacitación en medidas de mitigación/ eficiencia energética/ agua, desconocimiento de protocolos ambientales, escaso apoyo en mantenimiento de equipos y locales, limitada segregación de residuos sólidos y electrónicos, gestión de telecentros desarticulada de la gestión municipal, rotación de personal y escaso presupuesto en el tema ambiental de residuos sólidos.
5. Los factores facilitadores del cumplimiento de medidas ambientales son la capacidad y responsabilidad del gestor de telecentro, y el esfuerzo del gestor por manejar los residuos sólidos, la implementación básica de equipos y el servicio internet.
6. Los actores claves que intervienen en el cumplimiento de las medidas de mitigación ambiental son las municipalidades, los comités de aliados y las instancias públicas vinculadas a salud. La Alianza CR3CE tiene un rol limitado en el tema ambiental.
7. Las mujeres tienen un rol importante en la gestión de los telecentros, en las acciones del comité de aliados, como participantes en los cursos de capacitación y como responsables de limpieza y recolección de los residuos sólidos. El rol del varón es como funcionario en la toma de decisiones del telecentro, en la gestión y temas informáticos o de equipos.
8. Los mecanismos de seguimiento sobre temas ambientales son sumamente débiles, pues los gestores y coordinadores regionales de CR3CE no los conocen, y las municipalidades no realizan esta labor.
9. La mayoría de los gestores de los Telecentros no conocen los avances en el cumplimiento de medidas ambientales (ECR). Los responsables regionales de CR3CE indican que esa labor se hace a nivel de Lima y no conocen los resultados.

ALIANZA PARA EXCELENCIA EN CAFÉ (CAFÉ)

1. El nivel de cumplimiento de las medidas de mitigación ambiental del proyecto Alianza CAFE alcanzó el mayor cumplimiento promedio en reforestación y control de erosión (63%), y manejo de residuos sólidos (61%). Alcanzó el menor nivel de cumplimiento en la conservación y manejo de agua (32%).
2. Los factores que facilitan el cumplimiento de medidas de mitigación ambiental son la existencia de instituciones que trabajan en temas ambientales, las estrategias desarrolladas por la Alianza Café en el fortalecimiento de capacidades y contar con una especialista ambiental.
3. Los factores limitantes para el cumplimiento de las medidas ambientales se relacionan a los altos costos de la implementación, el poco interés y la falta de toma de conciencia.
4. Los actores que intervienen e influyen en la implementación de medidas de mitigación ambiental son SENASA, DEVIDA, las municipalidades, el Gobierno Regional, la Autoridad Regional Ambiental – ARA y el Programa de las Naciones Unidas para el Desarrollo – PNUD y las empresas privadas.
5. Las mujeres realizan tanto actividades domésticas como actividades agrícolas, incluyendo las medidas de mitigación ambiental.
6. Los mecanismos de seguimiento para conocer el nivel de cumplimiento de las medidas de mitigación ambiental fueron la asistencia técnica a los productores y las inspecciones internas que realizó el equipo técnico de la Alianza Café. El resultado de este seguimiento fue la comprobación de un nivel de cumplimiento mayor al 60%.

7. Los asesores técnicos desconocen las recomendaciones del ECR interno, sin embargo, la especialista ambiental y el jefe del proyecto conocen estos resultados porque son los responsables de elaborar el informe de cumplimiento ambiental. Las recomendaciones del ECR externo fueron implementadas en parte.

ALIANZA PERÚ CACAO – FASE II

1. El nivel de cumplimiento promedio de las medidas de mitigación ambiental del proyecto en 7 de 8 temáticas de su PMMA está por encima del 40%, siendo uso y manejo de pesticidas la medida asociada de mayor avance relativo con 74% y Conservación de fuentes de agua la medida de menor resultado con 7%.
2. Los factores que facilitan el cumplimiento de las medidas ambientales son la presencia de otras instituciones que fortalecen capacidades a los productores sobre medidas de mitigación ambiental y las estrategias desarrolladas por la Alianza Cacao.
3. Los factores que limitan el cumplimiento de las medidas de mitigación ambiental se relacionan a problemas económicos de los agricultores para implementarlas, la falta de coordinación interinstitucional, algunas debilidades en la formulación de indicadores del PMMA y las prácticas de los agricultores.
4. En las zonas de intervención de la Alianza Cacao están presentes diferentes instituciones públicas cuyas intervenciones fortalecen los conocimientos de los agricultores en los temas de mitigación ambiental.
5. La participación de la mujer se ha visibilizado, empoderando su participación en el proceso del cuidado del medio ambiente.
6. El seguimiento del cumplimiento de las medidas ambientales se realiza en la oficina de Lima. Este ECR interno se socializa con los técnicos para poder rectificar o profundizar el trabajo en campo, pero el ECR externo no fue compartido.

PORI-DEVIDA PISCIGRANJAS

1. Las medidas de mitigación ambiental del PMMA sobrepasan el 57%. El que tienen el mayor grado de cumplimiento es la asistencia técnica en acondicionamiento y preparación de estanques acuícolas para la siembra de peces con 91%. El diseño y selección del sitio, la limpieza y desmalezado con la mínima pérdida de bosques de producción primaria o secundaria alcanza el 82%. Hay un cumplimiento en promedio de 64% en la operación y mantenimiento de las piscigranjas de acuerdo con las buenas prácticas acuícolas y de bioseguridad.
2. Los factores facilitadores son las estrategias desarrolladas por los piscicultores tales como desinfección, limpieza y protección de las piscigranjas, las capacitaciones y la ubicación de las piscigranjas en los terrenos anteriormente intervenidos y no de bosques primarios.
3. Limitado entendimiento de los manuales o formatos que son entregados por DEVIDA. Hay bajo nivel educativo y paternalismo local. No se avanzó en capacitaciones sobre temas ambientales. No queda establecido si segregan en lugares establecidos los RRSS. Tampoco se tiene ficha sobre el tema. El equipo de PORI-DEVIDA no cuenta con especialista ambiental para las piscigranjas.
4. Los piscicultores resaltan el rol de DEVIDA como socio principal, y reconocen la capacitación, servicios e insumos que ofrecen. El rol de la ALA es importante por los permisos o apoyos que están logrando. Ninguno de los piscicultores tiene relación con SERNANP, SERFOR o las municipalidades.

5. Las piscigranjas permiten a las mujeres realizar actividades productivas cerca al hogar y que no requiere esfuerzo físico en algunos procesos de la producción, especialmente en la siembra y la alimentación de los peces. El varón puede suele participar en la etapa de acondicionamiento de la piscigranja y extracción, pero de manera paralela a la agricultura.
6. Los piscicultores tienen el manual y los formatos de las recomendaciones del asistente técnico DEVIDA, además con la aprobación del PAMA, DEVIDA comenzó a trabajar los temas ambientales. No se aplican plenamente los formatos enviados por DEVIDA porque se requiere un especialista para hacer el seguimiento al tema ambiental.
7. Los piscicultores entrevistados mencionan que desconocen las medidas de mitigación ambiental y los resultados de la supervisión. Los técnicos de DEVIDA consideran que hay un ECR interno con el trabajo de los piscicultores en el aprendizaje del control de peces y alimentación y los procesos de cambios culturales en el manejo acuícola

RECOMENDACIONES

ALIANZA PARA SERVICIOS DIGITALES Y FINANCIEROS (ALIANZA CR3CE)

Para CEDRO

1. Revisar con el nuevo proveedor de internet el cumplimiento de la normatividad nacional y ejecución de actividades de mitigación ambiental en las torres de los municipios y la capacidad de infraestructura en sus aspectos técnicos y respaldo de energía eléctrica, tal como un banco de baterías por recarga solar. Es importante también que los gestores municipales de los telecentros puedan conocer el plan de mantenimiento de estas torres y mitigar los riesgos ambientales en lo físico y los recursos naturales.
2. Precisar los acuerdos con la empresa para ejercer de manera integral una práctica responsable para la implementación y mantenimiento de la señalización en las torres para asegurar y prever riesgos, como los eléctricos. Las nuevas gestiones municipales constituyen una oportunidad para efectivizar con la empresa operadora la implementación de las estrategias técnicas para aplicar los estándares mínimos de señalización.
3. Orientar a las municipalidades sobre la adecuada interrelación entre gerencias que tienen temas comunes en cuanto al monitoreo ambiental, e incluirlas como parte del nuevo acuerdo con las municipalidades.
4. Acordar con las nuevas gestiones municipales que efectivicen con la empresa operadora de las torres, la implementación de la normatividad mínima de manejo de residuos sólidos en el entorno. Es altamente recomendable coordinar con la dirección ambiental y la dirección de salud ambiental del gobierno regional que tienen protocolos establecidos para detección de residuos químicos contaminantes y por supuesto para residuos sólidos.
5. Categorizar a las municipalidades para definir las características de los telecentros. Si al final el ejecutor responsable es la municipalidad, se requiere identificar la responsabilidad de la Gerencia de la cual depende y el presupuesto que podrán tener para esta labor. El MEF tiene una clasificación para las municipalidades provinciales y distritales, según el porcentaje de población urbana o rural que puede ser retomada con ese propósito.
6. Mejorar los convenios entre CEDRO y las municipalidades para contar con lineamientos de gestión de riesgos ambientales, incluyendo al Ministerio responsable.

7. Realizar acciones de sensibilización e incidencia sobre temas de cuidado ambiental con las autoridades y funcionarios municipales relacionados con los telecentros; sumando en la medida de lo posible a los usuarios de estas facilidades y si fuera posible, logrando que los aspectos de mejor gestión ambiental se extiendan a todas las estructuras municipales.
8. Elaborar campañas comunicacionales orientadas a la población en general sobre manejos de residuos sólidos, segregación, cuidado del agua, foresta, prevención y riesgos eléctricos de antenas, etc. (minivídeos, por ejemplo, para ser utilizados en los telecentros).

Para las MUNICIPALIDADES

1. Incluir al telecentro en la estructura municipal, así como en el Plan Operativo Anual, asegurando el presupuesto.
2. Elaborar e implementar el plan de gestión de residuos eléctricos y electrónicos tanto de los telecentros como de las demás gerencias de la municipalidad.
3. El comité de aliados, reconocido por las municipalidades, tiene un potencial muy interesante que se debe difundir más por la alianza y las instancias públicas como un trabajo ciudadano y creador de valor para el cuidado del ambiente. Configura un ejemplo de participación de diferentes actores de base organizativos, empresarios y de instancias públicas.
4. Realizar mejores campañas por redes sociales mostrando los servicios del telecentro. Se puede utilizar el fan page del telecentro incluyendo temas ambientales además de la promoción de los cursos de alfabetización virtuales o financiera que proporciona. Podrían realizar capacitaciones con videos o minivídeos para sensibilizar a la población en general y a los usuarios de los telecentros y funcionarios de los municipios.
5. En cuanto a la organización de las capacitaciones, es importante que la municipalidad tenga un plan detallado y progresivo en la capacitación en temas ambientales que involucre la gestión de los diferentes temas municipales y en particular el telecentro. Se tienen que evidenciar con un acuerdo que CEDRO efectuará un esfuerzo aún más grande en lo referido a las acciones de sensibilización e incidencia sobre temas de cuidado ambiental con las autoridades y funcionarios municipales.

Para los TELECENTROS

1. Sobre las computadoras: Los equipos de cómputo deben ser renovados, incluir un mantenimiento anual. De ser posible las municipalidades deberían adquirir laptops por ser más fáciles de manejar y prever seguridad para los equipos.
2. Sobre los aspectos eléctricos: Los telecentros deben incluir como mínimo un buen estabilizador de corriente eléctrica, dado que el sistema eléctrico no es estable y las descargas eléctricas son constantes en época de lluvia. Se requiere canaletas adecuadas que conduzcan los cables eléctricos y de esta manera evitar riesgos eléctricos para los asistentes o visitantes.
3. Otro aspecto menos mencionado, pero que tiene que ver con hábitos de resguardo ambiental es que los equipos malogrados deben ser colocados en zonas seguras de reciclaje.
4. Infraestructura y equipos de servicios básicos
    a. Proporcionar un adecuado mantenimiento y renovación de la infraestructura como complemento a la renovación de los sistemas eléctricos en los telecentros.
    b. Instalar espacios físicos para niños especiales en los telecentros o las municipalidades, para evitar riesgos ambientales eléctricos y electrónicos. Además, podría ser un especio educativo para estos.

c. Establecer adecuada infraestructura y protocolos de los servicios higiénicos y calidad de agua que en la mayoría de los casos aún no lo tienen.
d. Mejorar la señalización de los tachos para los residuos sólidos e instalar donde no existen
e. Acondicionar el local para que funcione una biblioteca que permita servicios complementarios educativos especialmente para los niños.
f. Mejorar el servicio de internet y funcionamiento de la torre. De hecho, algunas municipalidades están tramitando otros sistemas de trasmisión de internet.

5. Gestión organizativa:
    a. Coordinar los temas ambientales con la gerencia ambiental de la municipalidad o establecer el rol de ésta.
    b. Dar mayor espacio a la participación de los ciudadanos en el Comité de Aliados para que tenga una mayor acción en telecentros. En este sentido una recomendación complementaria podría ser un intercambio de experiencias de los Comités de Aliados considerando las experiencias exitosas. Ciertamente aquellos que no tienen este Comité, se recomienda reactivarlo.
6. Sobre las capacitaciones a las personas que asisten a los telecentros:
    a. Mantener capacitaciones sobre residuos sólidos a asistentes.
    b. Capacitar en temas ambientales a niños considerando que tienen buena asistencia y es una oportunidad para lograr cambios progresivos en los hogares.
    c. Ampliar las capacitaciones a las mujeres adultas y que permita relacionar este tema a sus programas sociales, familiares o de trabajo.
    d. Desarrollar cursos virtuales sobre el manejo del cómputo.
    e. Realizar campañas de segregación de residuos sólidos.
7. Adecuar los horarios según las necesidades de mujeres y hombres dado que los gestores de los telecentros tienen horarios de oficina.
8. Generar el intercambio de experiencias de telecentros a nivel regional.

PARA USAID

1. Es recomendable que los telecentros sean parte de los criterios de monitoreo ambiental, pues tienen factores de alto riesgo en algunos elementos de su implementación que pueden tener efectos en los seres humanos. Por tanto, revisar con USAID las reales condiciones para implementar este monitoreo que además puede utilizar metodologías virtuales.

ALIANZA PARA EXCELENCIA EN CAFÉ (CAFÉ)

Para TECHNOSERVE

1. Revisar de manera más exhaustiva las medidas de mitigación ambiental del PMMA, especialmente los indicadores, seleccionando los referentes a prácticas más que indicadores de actividades.
2. Considerar indicadores más específicos sobre lo que se pretende lograr para el cumplimiento de las medidas de mitigación ambiental.
3. Continuar con la socialización del PMMA con los actores involucrados en la promoción de la cadena productiva de café, mediante la participación en mesas técnicas regionales, instituciones públicas y

privadas que están vinculadas a la cadena productiva del café para mejorar el nivel de cumplimiento de las medidas de mitigación ambiental.

4. Continuar con la realización de campañas de sensibilización sobre las medidas de mitigación ambiental planteadas en el PMMA.
5. Respecto a las medidas de mitigación ambiental:
    a. Continuar el trabajo de la Alianza CAFE con la ONG Campo Limpio para mejorar la recolección de residuos sólidos (envases de plaguicidas), puesto que en la región Huánuco y Ucayali la mayoría de los productores entrevistados mencionaron que no cuentan con el servicio.
    b. Socializar los resultados de las tecnologías de la implementación de vetiveria para el manejo adecuado de las aguas mieles con todos los entes relacionados a la cadena productiva del café.
    c. Continuar con la sensibilización a los productores sobre el manejo de la pulpa de café mediante la elaboración de abonos orgánicos, puesto que muchos cuentan con compostera, pero no los tienen en funcionamiento.
    d. Fortalecer las capacidades de los productores mediante la capacitación sobre el uso adecuado de plaguicidas relacionado a plaguicidas aprobados por el PERSUAP.
6. Respecto a estrategias desarrolladas:
    a. Realizar capacitaciones teórico- prácticas sobre las variedades de árboles para asociar con el café, cambio climático, uso adecuado de productos químicos, cuidado del medio ambiente, relleno sanitario, siembra de árboles maderables y manejo de residuos.
    b. Implementar medios digitales (whatsapp) para recibir asistencia técnica por parte de profesionales idóneos para enseñar y poder familiarizarse con el productor para que se genere un cambio.
    c. Implementar una planta de beneficio para el lavado y secado de café, tanques de cosecha de agua, animales menores para obtener el estiércol y elaborar compost, análisis de suelos para aplicar la fertilización necesaria para el cultivo, tachos de basura y microrelleno dentro de la comunidad para que se haga habito en la población, letrinas, parcelas demostrativas, transporte de los residuos sólidos y envases vacíos.
    d. Asociar a agricultores para que la normativa de las asociaciones haga cambiar su manera de trabajo y aprovechar beneficios de una organización.
    e. Aliarse con las municipalidades para implementar una técnica de manejo de los residuos de los agroquímicos.
    f. Difundir la tecnología de pozos de infiltración con vetiveria para el manejo de aguas mieles del café.
    g. Promocionar mediante folletos la implementación de las medidas de mitigación ambiental para masificar la información.
    h. Ejecutar proyectos con contrapartida por parte de los productores para valorar el apoyo hacia la implementación de las medidas de mitigación ambiental.
    i. Realizar pasantías a otras regiones con productores exitosos, para que los productores visualicen la implementación de las medidas de mitigación ambiental y realicen la réplica.

j. Contar con una asociatividad en las cadenas de exportación que sean exigentes en el cumplimiento de medidas ambientales sostenibles, además que brinden servicios como las certificaciones a cadenas más rentables y sostenibles.

k. Incentivar a la asociatividad para que esté ligada al cumplimiento de las medidas ambientales, e insertar a mejores mercados que paguen un buen precio por cafés manejados sostenibleme nte.

Para USAID

1. Promover la realización de trabajo conjunto con entes públicos y privados ligados a la cadena productiva del café para lograr identificar medidas de mitigación que unifiquen criterios e indicadores que respondan a las regulaciones de USAID y la legislación peruana.
2. Hay que asegurar que los socios implementadores incorporen las actividades de mitigación ambiental en los planes de trabajo anual y que sus indicadores se encuentren en sus planes de monitoreo y evaluación asimismo se refleje en campo.

ALIANZA PERÚ CACAO – FASE II

Para PALLADIUM

1. Revisar y mejorar la formulación del Plan de Monitoreo y Mitigación Ambiental socializando con los técnicos de cada zona, ingresando data de la realidad del microclima, suelo, productividad que poseen y desde esta información elaborar las Medidas de Mitigación Ambiental
2. Revisar y mejorar la formulación de los Indicadores para que el reporte se ajuste al trabajo realizado en campo.
3. Monitorear el estado de avance diferenciado de implementación de las medidas ambientales por los actores: pequeño, mediano productor y asociaciones.
4. Socializar y analizar los resultados de ECR interno y externo con los equipos zonales de la Alianza Cacao.
5. Elaborar estrategias de trabajo para fortalecer y ampliar el rol de las mujeres en la implementación y vigilancia del cumplimiento de las medidas ambientales.
6. Respecto a las medidas de mitigación ambiental:
    a. La formulación de los Indicadores se debe analizar antes de unirlas con "Y" como condición para validar una medida
    b. Acerca de las zanjas de infiltración pueden ser realizadas en la costa, pero no son coherentes en la región de la selva, en estas zonas se hace drenes,
    c. Coordinar con SENASA para el control de plagas de las nuevas variedades de cacao.
    d. Revisar las algunas especies forestales que se apunten a la zona antes de incluirlos en el PMMA, teniendo en cuenta lo suelos y clima de cada zona.

Para USAID

1. Promover el trabajo coordinado con instituciones de gobierno (MINAM, MINAGRI, DEVIDA) para identificar medidas de mitigación que unifiquen criterios y que respondan a las regulaciones de USAID y la legislación peruana.

2. Debe haber un trabajo más concertado, hay iniciativas pero aisladas, debería haber una Mesa Ambiental que concentren todas estas iniciativas y analizar las más relevantes y llevar propuestas a los Ministerios de Economía, Agricultura, Medio Ambiente, los Programas de Reforestación.
3. Fortalecer las capacidades de los socios de Desarrollo Alternativo sobre las regulaciones de la Norma 216 como insumo importante para la elaboración del Plan de Monitoreo y Mitigación Ambiental, identificando indicadores y metas.

Para DEVIDA

1. Promover espacios de consenso nacional y regional con la participación de instituciones públicas (MINAGRI, MINAM, SENASA, INIA, DEVIDA, gobiernos regionales), sector privado y socios de USAID y otros actores relevantes (PNUD) para unificar criterios e identificar medidas de mitigación ambiental.
2. Generar un sistema de monitoreo ambiental que permita realizar un seguimiento del cumplimiento de las medidas de mitigación ambiental acordados por consenso.
3. Actualizar el PERSUAP y difundirlo a los actores involucrados en cada región.

PORI-DEVIDA

Para DEVIDA

1. Generar una conexión entre los piscicultores y el mercado para la venta de productos acuícolas, asociándose con el Gobierno Regional de Huánuco para tener un mercado de producción acuícola.
2. Implementar un mayor número de estanques o agrandar los que existen porque es un potencial para la generación de ingresos de las familias.
3. Contratar personal con la especialidad ambiental que brinde asesoría sobre la cadena de valor, además de la producción de la piscigranja.
4. Capacitar al personal de campo sobre los temas ambientales, dado que asesoran a los piscicultores en temas productivos, dándoles mejores lineamientos.
5. Apoyar una mayor asociatividad que les permita acceder a mejores condiciones de AT y servicios de mercado acuícola local e incluso internacional.
6. Respecto al PMMA:
    a. Identificar otra medida que permita monitorear el restablecimiento o mitigación del paisaje o los recursos naturales.
    b. Tener una meta definida sobre certificación en los piscicultores.
7. Sobre las piscigranjas:
    a. Hacer un adecuado trabajo de reforestación tanto de las áreas colindantes de la piscigranja, como áreas cercanas que incluye la vivienda, así como granjas de animales menores.
    b. Es aconsejable que en los sumideros de las piscigranjas pueda haber otro control antes de llegar o retomar el cauce del manantial.
    c. Capacitar a los piscicultores sobre la preparación de alimento de peces, por un lado, que aprendan a preparar comida en base a sus propios recursos (frutas, maíz, yuca).
    d. Promover un fondo revolvente condicionado que pueda mantener el sistema de apoyo y ahorro compartido. Este será gestionado al inicio por DEVIDA y un Comité de varones y

mujeres en consideración a que las piscigranjas tienen como gestoras a estos dos géneros. Progresivamente este fondo podrá ser trasladado a este comité o colocado en una cooperativa de servicio local con un comité gestor.

e. Gestión y manejo de residuos sólidos:
    i. Elaborar un plan de capacitación y manejo de residuos sólidos que contemple insumos como palas y carretillas sencillas para trasladar los residuos considerando una intervención piloto a algunas familias.
    ii. Establecer un procedimiento más adecuado para todos los residuos orgánicos en el marco de una economía circular que deben conocer los piscicultores también para lograr reutilizar estos residuos y ahorrar sus costos en el ámbito.

f. Agua:
    i. Es importante la calidad del agua por ello se recomienda establecer medidas tanto para mantener la calidad de oxígeno con caídas artesanales de agua y el Ph estable para que no afecte a los peces. Ello también porque luego la misma agua tendrá salida para zonas de cultivo o arroyo abajo.

g. Sembrar *vetiveria* en los canales de descarga y así completar el sistema de tratamiento. También utilizar MME microorganismos eficientes como tratamiento de las aguas residuales. En cuanto al tema uso y manejo seguro de pesticidas realizar articulaciones con las diferentes actividades como cacao, sanidad y otras instituciones para fortalecer el manejo conjunto de este tema.

Para INSTANCIAS PÚBLICAS

1. Es importante mantener un acuerdo con el Ministerio de la Producción y la Autoridad Nacional del Agua (ANA) que es un órgano adscrito al Ministerio de Agricultura y Riego para lograr no solo las certificaciones, sino también asesoría especializada hacia las piscigranjas considerando otras experiencias en la Amazonía loretana: Fondo Nacional de Desarrollo Pesquero (FONDEPES), Instituto de Investigaciones de la Amazonia Peruana (IIAP),

Para MUNICIPALIDADES

1. Acordar con la municipalidad el manejo de los residuos sólidos inorgánicos y tener un incremento en su presupuesto por el MEF.
2. Firmar convenios con las municipalidades, pues esta zona debe prever riesgos de una mayor presencia de negocios con piscigranjas (restaurantes, recreos, etc.), el uso de diferente tipo de materiales que podrían afectar tanto los recursos naturales, como la presión sobre los terrenos. Asimismo, tener acuerdos sobre uso de los telecentros para conseguir procedimientos de capacitación mejorando el nivel educativo y también alfabetización virtual y comunicación.
3. Promover el cumplimiento de las regulaciones de la Autoridad Nacional del Agua (ANA).

ANNEX B: STUDY TEAM

Jorge Noriega, Team Leader

Sociologist, with a master's degree in management and Organization for Development from the Pontificia Universidad Católica del Perú. Consultant with more than 35 years as an expert in impact evaluation and design of project and program planning. He participated in more than 300 national evaluations requested by international cooperation agencies or public entities.

Inés Ardiles, Rural Development Specialist

Economist, expert in marketing, finance, monitoring and evaluation on alternative development issues. He has more than 25 years of experience working in the economic and social development of Peru, of which 11 years he worked in alternative development zones Ucayali, Huánuco, San Martin and Ayacucho, with the United Nations and USAID. He has held management positions in monitoring and evaluation in public institutions such as the Sierra and Selva Exportadora Programs, Ministry of Economy and Finance and Ministry of Agriculture.

Janeth Ruiz, Agronomy Specialist

Agricultural Engineer from the National University Toribio Rodríguez de Mendoza de Amazonas, with a master's degree in Agribusiness Management and a Doctorate in Sciences for Sustainable Development. Experience in public and private entities, in research, formulation, coordination, and supervision of projects and business plans agricultural, livestock, agroindustrial and environmental, plant health and identification of nematodes and fungi of tropical and high Andean crops, Implementation of certifications such as Global Gap and organic and training through the methodology of farmer field schools.

ANNEX C: CONCEPT NOTE

REVISIÓN DEL CUMPLIMIENTO AMBIENTAL

CONTEXTO

La Oficina de Desarrollo Alternativo de USAID incluye las siguientes actividades: Alianza Cacao Perú, Alianza CAFE, Alianza para los Servicios Digitales y Financieros - CR3CE y el "Plan Operativo de Reforzamiento Institucional" (PORI) con DEVIDA. Las actividades señaladas deben cumplir Procedimientos ambientales de USAID, 22 CFR 216 (referido como Reg. 216) y del gobierno peruano. Con este fin, las actividades elaboran Planes de Monitoreo y Mitigación Ambiental (PMMA) anuales donde identifican los potenciales impactos adversos de las actividades y se proponen medidas para prevenir o mitigar esos impactos. Reg. 216 solicita el monitoreo anual del cumplimiento de las medidas de mitigación ambiental realizados por los equipos de la actividad y también el monitoreo externo, como es el presente estudio.

En el presente estudio se incluyen las siguientes actividades:

4. **Alianza para Servicios Digitales y Financieros (Alianza CR3CE)** ejecutado por CEDRO en las regiones de Huánuco, San Martín y Ucayali. El proyecto tiene el propósito de contribuir a modernizar y diversificar los mercados locales en zonas de desarrollo alternativo a través de la expansión de un mercado de servicios de Internet, el fortalecimiento de competencias en tecnologías de la información (TIC), así como de la oferta y demanda de servicios financieros. El PMMA del cuarto año (2021) propone acciones de CR3CE para monitorear y hacer incidencia en la empresa IPT para el cumplimiento de las medidas de prevención y mitigación ambiental en espacios donde están instaladas torres de comunicación y acciones específicas con municipalidades.
5. **Alianza para la Excelencia del Café (CAFE)** es implementado por TechnoServe y tiene por objetivo apoyar a los hogares cafetaleros de las regiones de San Martín, Huánuco y Ucayali para que administren de manera más rentable sus fincas y negocios no agrícolas a fin de aumentar los ingresos lícitos y evitar así su retorno al cultivo de coca. El PMMA del periodo 2021 se orienta a crear una base productiva de café más segura y sostenible al restaurar tierras degradadas, evitar la deforestación y mejorar la capacidad de los agricultores para mitigar y adaptarse al cambio climático.
6. **Alianza Perú Cacao – Fase II (Alianza Cacao)** es ejecutado por Palladium en las regiones de San Martín, Huánuco, Ucayali y Pasco. Su objetivo es apoyar a 24,000 familias del área rural a superar la pobreza e integrarlas en la economía lícita a través del cultivo de cacao. Las estrategias son el incremento de la productividad, la promoción de la inversión privada y el fortalecimiento de los mercados de servicios comerciales, tecnológicos y financieros. El PMMA del año 5 considera medidas de mitigación que permitan incrementar la producción y productividad de los cultivos que maneja el agricultor para contrarrestar los efectos del cambio climático (como la disminución de las precipitaciones y el aumento de la temperatura) y tratar de mitigar los impactos ambientales como erosión del suelo, desechos inorgánicos contaminación de cuerpos de agua, etc.
7. **Plan Operativo de Reforzamiento Institucional (PORI)** implementado por DEVIDA en las regiones de Huánuco, Junín, San Martin y Ucayali. Tiene el propósito de apoyar a DEVIDA en la reducción sostenida de la producción de coca luego de la erradicación forzada para la generación de ingresos lícitos. El PMMA del año 2021 de los componentes productivos y de implementación de módulos básicos y equipamiento menor, tiene la finalidad de identificar los posibles impactos ambientales generados por las diferentes actividades y se recomienda medidas preventivas, de

control y de mitigación en los caseríos/sectores y/o comunidades nativas, firmantes dispuestos a vivir de manera licita bajo un ambiente de paz y desarrollo sostenible, ubicados en las zonas de intervención del Desarrollo Alternativo Integral y Sostenible – DAIS. Las actividades productivas incluidas son café, cacao, cítrico y piña, apicultura, acuicultura.

PROPÓSITO Y OBJETIVOS

PROPÓSITO

El propósito de la Revisión de Cumplimiento Ambiental (ECR) de la Oficina de Desarrollo Alternativo de USAID es analizar el nivel de cumplimiento de las medidas de mitigación ambiental identificadas en los PMMA de las actividades de desarrollo alternativo implementadas por Alianza Cacao, Alianza para la Excelencia en Café (CAFE), Alianza CR3CE y PORI y proporcionar recomendaciones para incrementar el cumplimiento exitoso de las medidas ambientales.

OBJETIVOS

8. Determinar el nivel de cumplimiento de las actividades de Desarrollo Alternativo con la Reg. 2016 de USAID y la legislación ambiental peruana incluidas en sus respectivos PMMA.
9. Identificar los factores que facilitan o impiden el cumplimiento de las medidas de mitigación ambiental.
10. Elaborar recomendaciones para incrementar el nivel de cumplimiento y para la sostenibilidad de los avances logrados.

AUDIENCIA

Los actores que utilizarán los resultados de este estudio son USAID, los socios implementadores y DEVIDA.

PREGUNTAS DEL ESTUDIO

PREGUNTAS	SUB-PREGUNTAS
1. ¿Cuál es el nivel de cumplimiento de las medidas de mitigación ambiental incluidas en los PMMA de las actividades de desarrollo alternativo?	1.1 ¿Cuál es el porcentaje de cumplimiento de las medidas de mitigación del PMMA de las actividades de desarrollo alternativo incluidas? 1.2 ¿Cuáles son los factores que facilitan o impiden el cumplimiento de las medidas de mitigación del PMMA?
2. ¿En qué medida los actores involucrados pueden contribuir con un mayor nivel de cumplimiento de las medidas de mitigación del PMMA?	2.1 ¿Cuál es el rol que juega USAID, los socios implementadores y beneficiarios en la mejora del cumplimiento de las medidas del PMMA? 2.2 ¿Cuál es el rol de hombres y mujeres en las prácticas ambientales?
3. ¿Cuáles son las alternativas que contribuyen a incrementar el nivel de cumplimiento de las medidas de mitigación	3.1 ¿Cuáles son las alternativas que se pueden implementar en el corto, mediano y largo plazo para lograr un mayor nivel de cumplimiento de las medidas del PMMA?

PREGUNTAS	SUB-PREGUNTAS
ambiental incluidas en el PMMA?	3.2 ¿Cuáles son los mecanismos de seguimiento de la implementación de las alternativas presentadas? 3.3 ¿Qué tanto se implementan las recomendaciones presentadas en el ECR interno realizado el último año y del ECR externo?

ALCANCE

El estudio incluirá cuatro planes de medidas de mitigación ambiental, cada uno de ellos con un determinado número de medidas ambientales e indicadores como se muestra a continuación. En el caso del PMMA de PORI, éste contiene 100 medidas para 6 cadenas productivas (café, cacao, cítrico y piña, apicultura, acuicultura). Se sugiere realizar el ECR para las medidas referentes a las actividades de acuicultura debido a que es una actividad que puede llevar a impactos ambientales por el mal uso del agua, la mala ubicación de las pozas (tumba de árboles), introducción de especies no nativas, contaminación por aguas estancadas, proliferación de mosquitos de transmisión de dengue y malaria, etc.

NOMBRE DE LA ACTIVIDAD	AMBITO DE ESTUDIO	PERIODO DE ESTUDIO	N° DE MEDIDAS AMBIENTALES	N° DE INDICADORES
Alianza CR3CE	San Martín, Huánuco, Ucayali	PMMA del año 4	9	15
Alianza CAFE	San Martín, Huánuco, Ucayali	PMMA del año 4	20	25
Alianza Perú Cacao – Fase II	San Martin, Huánuco, Ucayali y Pasco	PMMA del año 5	37	27
PORI	Huánuco, Junín, San Martin, Cusco, Ucayali, Loreto, Puno y Ayacucho	2021	24	24

METODOLOGÍA

El estudio se realizará con una metodología mixta aplicando métodos cuantitativos y cualitativos, con las siguientes técnicas: revisión documental, encuestas dirigidas a una muestra representativa de agricultores, entrevistas en profundidad a actores clave nacionales, regionales y locales, grupos focales con agricultores y observación. La metodología será adecuada a cada una de las actividades porque las intervenciones son diferentes, así como los PMMA desarrollados. Para cada una de estas técnicas se desarrollarán los instrumentos respectivos. Un resumen de la metodología se muestra a continuación:

ACTIVIDAD	TÉCNICA DE RECOLECCIÓN DE DATOS	UNIVERSO[16]	MUESTRA
Alianza CR3CE	Observación	128 antenas tipo torre	20 antenas tipo torre
	Observación	39 telecentros	18 telecentros

[16] Será ajustado en el diseño

	Entrevistas en profundidad		18 responsables
Alianza CAFE	Encuesta Entrevistas en profundidad	3,500 agricultores	144 agricultores (95% de nivel de confianza y 8% error) Se definirá en el diseño
Alianza Perú Cacao – Fase II	Encuesta Entrevistas en profundidad	16,000 agricultores	149 agricultores (95% de nivel de confianza y 8% error) Se definirá en el diseño
PORI	Encuesta Entrevistas en profundidad	182,000 familias	Se definirá en el diseño Se definirá en el diseño

GESTIÓN Y ENTREGABLES

ENTREGABLES

- Plan de trabajo
- Informe preliminar
- Informe final

PERFIL DEL EQUIPO DEL ESTUDIO

El equipo estará integrado por profesionales con experiencia en evaluación con métodos cuantitativos y cualitativos. Se buscará que el equipo en su conjunto integre conocimientos y experiencias en metodologías de evaluación mixtas, evaluación en contextos complejos, género, inclusión social y diversidad cultural, gestión pública, desarrollo rural, fortalecimiento institucional. También se buscará que la composición del equipo guarde un equilibrio de género.

PUESTO	ROL	PERFIL
Investigador/a principal	Lidera al equipo, diseña la metodología del estudio, organiza la recolección de datos, participa en la recolección de datos, realiza análisis, escribe los informes y presentaciones. Asegura que el plan de trabajo se implemente de acuerdo con los plazos.	• Maestría o Doctorado en Ciencias Económicas, Ciencias Sociales, u otras áreas relacionadas con los temas de la evaluación. • Mínimo 10 años de experiencia liderando equipos de investigación o como investigador principal. • Experiencia en el uso de métodos mixtos de investigación: diseño de instrumentos de recolección de datos, supervisión de personal de campo, análisis de datos y elaboración de informes de evaluación. • Experiencia en la redacción de informes de investigación • Excelentes relaciones interpersonales. • Experiencia de trabajo en contextos virtuales. • Experiencia de trabajo en contextos virtuales.

PUESTO	ROL	PERFIL
Especialista en desarrollo rural	Apoya en el diseño de la metodología desde su especialidad, realiza recopilación de datos, analiza información secundaria, proporciona insumos para los informes.	● Bachiller o Maestría en Ciencias Económicas, Ciencias Sociales o Ciencias Agrarias. ● Al menos 6 años de experiencia de trabajo en desarrollo rural o desarrollo alternativo ● Experiencia en el uso de métodos de evaluación mixtos (recolección, procesamiento y análisis de datos). ● Experiencia de trabajo en contextos virtuales. ● Experiencia en la redacción de informes de evaluación.
Especialista en agronomía	Apoya en el diseño de la metodología desde su especialidad, realiza recopilación de datos, analiza información secundaria, proporciona insumos para los informes.	● Bachiller o Maestría en Ciencias Económicas, Ciencias Sociales o Ciencias Agrarias. ● Al menos 6 años de experiencia de trabajo en desarrollo rural o desarrollo alternativo ● Experiencia en el uso de métodos de evaluación mixtos (recolección, procesamiento y análisis de datos). ● Experiencia de trabajo en contextos virtuales. ● Experiencia en la redacción de informes de evaluación.
Muestrista	Calcula el tamaño de muestra final y propone método de selección de unidades muestrales, incluyendo reemplazos.	● Estadístico ● Al menos 6 años de experiencia en cálculos muestrales.
Equipo de campo	El equipo está integrado por supervisores (4) y encuestadores (24)	● Supervisa la aplicación de encuestas ● Aplica encuesta según muestra

CRONOGRAMA

Nº	ENTREGABLE	SEMANA
1	Revisión documental	1-2
2	Plan de trabajo (incluyendo instrumentos de recolección de datos)	6
3	Plan de trabajo de campo	8
4	Trabajo de campo	12
5	Procesamiento de datos y análisis	16
6	Elaboración de hallazgos iniciales	20
7	Taller participativo para el análisis de los hallazgos y la co-creación de recomendaciones	24
8	Informe preliminar	26
9	Informe final	30

ANNEX D: ENVIRONMENTAL MITIGATION MEASURES

CR3CE ALLIANCE

Nº	MITIGATION MEASURES	INDICATORS
1	Aplicación por parte de Yachay de recomendaciones para la no afectación del paisaje (uso de áreas protegidas o de mantenimiento) en las torresde elevación de su red de telecomunicaciones	1. Porcentaje de nuevas torres de elevación instaladas fuera de las áreas protegidas o de mantenimiento
		2. Porcentaje de torres de elevación instaladas fuera de las áreas protegidas o de mantenimiento
2	Aplicación por parte de Yachay de recomendaciones para la no afectación del paisaje (tala o poda indiscriminada de árboles) en las torres de elevación desu red de telecomunicaciones	3. Porcentaje de nuevas torres de elevación en cuya instalación no se realiza tala o poda indiscriminada de árboles
		4. Porcentaje de torres de elevación en cuyo mantenimiento no se realiza tala o poda indiscriminada de árboles
3	Aplicación por parte de Yachay de recomendaciones para la no afectación del paisaje (afectación de la cobertura vegetal) en las torres de elevación de su redde telecomunicaciones	5. Porcentaje de nuevas torres de elevación en cuya instalación se mantiene la cobertura vegetal
		6. Porcentaje de torres de elevación en cuyo mantenimiento se mantiene la cobertura vegetal
4	Aplicación por parte de Yachay de los protocolos de señalética (manejo de residuos y seguridad de las personas) en las torres de elevación de su red de telecomunicaciones	7. Porcentaje de nuevas torres de elevación que cuentan con la señalética según protocolo
		8. Porcentaje de torres de elevación que cuentan con la señalética según protocolo
5	Aplicación por parte de Yachay de los protocolos de uso de implementos de seguridad (arnés y casco) durante las acciones de instalación o mantenimiento de torres de elevación de sured de telecomunicaciones	9. Porcentaje de nuevas torres de elevación en cuya instalación se han hecho uso de los protocolos de uso de implementos de seguridad y protección
		10. Porcentaje de torres de elevación en cuyo mantenimiento se han hecho uso de los protocolos de uso de implementos de seguridad y protección
6	Aplicación por parte de Yachay de los protocolos de recolección y disposición de envases de pintura y otros materiales que hayan sido usados (thinner, aguarrás, etc.) en la instalación o mantenimiento de las torresde elevación de su red de telecomunicaciones	11. Porcentaje de nuevas torres de elevación en cuya instalación se han hecho uso de los protocolos de recolección y disposición de envases de pintura y otros materiales que hayan sido usados
		12. Porcentaje de torres de elevación en cuyo mantenimiento se han hecho uso de los protocolos de recolección y disposición de envases de pintura y otros materiales que hayan sido usados
7	Aplicación por parte de las municipalidades que gestionan telecentros, de los protocolos de manejo de residuos sólidos (electrónicos y no electrónicos) en lostelecentros	13. Porcentaje de telecentros que emplean los protocolos de manejo de residuos sólidos (electrónicos y no electrónicos)
8	Desarrollo por parte de las municipalidades que gestionan telecentros, de acciones para el cuidado del agua	14. Porcentaje de telecentros que desarrollan acciones para el cuidado del agua
9	Desarrollo por parte de lasmunicipalidades que gestionan telecentros, de acciones de cuidado del medio ambiente	15. Porcentaje de telecentros que desarrollan acciones para el cuidado del medio ambiente

CAFE ALLIANCE

Nº	MITIGATION MEASURE	INDICATORS
1	CAFE se asegurará de proporcionar asistencia para la adquisición o el uso de plaguicidas (incluida la capacitación o la asistencia técnica en el uso de plaguicidas), se hará de acuerdo con lo que se describe en las directrices de PERSUAP.	1. Porcentaje participantes capacitados en uso seguro de plaguicidas 2. Porcentaje de participantes capacitados que aplican el uso seguro de plaguicidas.
2	Para entrenamiento en el uso de fertilizantes, CAFE deberá asegurar que se incorpore la provisión del Plan de Manejo de Fertilizantes.	3. Porcentaje de participantes capacitados en Plan de Abonamiento. 4. Porcentaje de participantes capacitados que aplican el Plan de Abonamiento
3	La preparación de fertilizantes orgánicos (sólidos y/o líquidos) será una prioridad en los eventos de capacitación de agricultores, así como la incorporación de fertilizantes verdes (estiércol, compost) para mejorar la calidad del suelo.	5. Porcentaje participantes capacitados en Preparación de Fertilizantes Orgánicos. 6. Porcentaje de participantes capacitados que incorporan el uso de Fertilizantes Orgánicos en el suelo de sus fincas.
4	Aplicar el principio de Manejo Integrado de Plagas.	7. Porcentaje participantes capacitados en Manejo Integrado de Plagas 8. Porcentaje de participantes capacitados que aplican el Manejo Integrado de Plagas.
5	Uso obligatorio de equipo de protección para la aplicación de pesticidas.	9. Porcentaje de participantes capacitados que utiliza Equipo Básico de Obligatorio para Aplicación de Pesticidas.
6	Manejo y disposición final de contenedores (botellas, bolsas, latas) que contienen residuos de plaguicidas.	10. Porcentaje participantes capacitados en Manejo y Disposición Final de Contenedores
7	Implementar el uso de cultivos de cobertura y el uso de medios mecánicos para el control de malezas.	11. Porcentaje Participantes capacitados que logran recolectar al menos el envase de pesticida.
8	Capacitar a los agricultores en el correcto uso y aplicación de fertilizantes y pesticidas.	12. Porcentaje participantes capacitados en el correcto uso y aplicación de fertilizantes según plan de abonamiento y pesticidas como última opción. 13. Porcentaje de participantes capacitados que aplican el correcto uso y aplicación de fertilizantes según plan de abonamiento y pesticidas como última opción.
9	Reforzar la elaboración de abonos orgánicos a partir de los residuos del despulpado del café.	14. Porcentaje participantes capacitados en la elaboración de abonos orgánicos a partir de los residuos del despulpado del café.
10	Implementar campañas de concientización sobre las implicancias de la contaminación del agua	15. Número de Campañas implementadas de concientización sobre las implicancias de la contaminación del agua.
11	Capacitar permanentemente en manejo y conservación de suelos.	16. Porcentaje participantes capacitados en manejo y conservación de suelos.
12	Organizar campañas de concientización sobre la contaminación de pesticidas y de los cursos de agua y cómo evitarlos.	17. Número de Campañas implementadas de concientización sobre la contaminación de pesticidas y de los cursos de agua y cómo evitarlos.
13	Proveer entrenamiento y monitoreo en el manejo ambiental de las aguas mieles, así como la mejor forma de tratar los residuos del despulpado.	18. Porcentaje participantes capacitados en la elaboración de abonos orgánicos a partir de los residuos del despulpado del café.
14	Implementar la construcción de pequeños depósitos para arrojar los residuos del despulpado.	19. Porcentaje participantes capacitados en el manejo de la pulpa de café (compostaje).

Nº	MITIGATION MEASURE	INDICATORS
15	Reforzar la elaboración de fertilizantes orgánicos (composteras) a partir de la pulpa del café y otros residuos de cosecha.	20. Porcentaje de participantes capacitados que aplican la elaboración de abonos orgánicos a partir de los residuos del despulpado del café.
16	Implementar la construcción de pequeños canales y pozos de infiltración para conducir las aguas mieles y evitar la contaminación de los acuíferos.	21. Porcentaje de participantes capacitados que tratan las aguas residuales y evitan la contaminación de los acuíferos.
17	Capacitación intensiva a los agricultores sobre las diferentes formas de conservación de suelos, estableciendo máximas inclinaciones donde el café pueda ser sembrado.	22. Porcentaje participantes capacitados en las diferentes formas de conservación de suelos, estableciendo máximas inclinaciones, donde el café pueda ser sembrado.
18	Implementar la instalación de terrazas de formación lenta, curvas de nivel, barreras de contención vivas o muertas. Cada medida de conservación tiene que estar de acuerdo con la inclinación de la ladera.	23. Porcentaje Participantes capacitados que implementan al menos una de las diferentes formas de conservación de suelos, estableciendo máximas inclinaciones, donde el café pueda ser sembrado.
19	Cubrir el suelo con una capa de mulch aprovechando los residuos del café como hojas, hojarasca, ramas etc.	24. Porcentaje Participantes capacitados que cubren el suelo con residuos de poda de la planta de café
20	Capacitar a los agricultores sobre los riesgos a la salud en el corto y largo plazo, debido a prácticas que deben ser evitadas como: falta de adecuado equipo de protección (guantes, lentes cubre ojos, mandiles, botas); inapropiada almacenamiento de pesticidas; inapropiado descarte de los envases de pesticidas o soplar con la boca las boquillas atoradas.	25. Porcentaje participantes capacitados en al menos 1 de los items siguientes: • Uso el equipo básico de protección • Almacenamiento inapropiado de pesticidas. • Inapropiado descarte de los envases de pesticidas.

CACAO ALLIANCE

Nº	AREA	MITIGATION MEASURES	INDICATORS
1	Consolidación Nuevas	El módulo de beneficio centralizado de cacao, debe ubicarse a una distancia mayor de 50 metros de un curso de agua, no inundable y con nivel freático alto.	1. Porcentaje de módulos de beneficio centralizado de cacao construidos cumplen con los Lineamientos y Directivas Ambientales de USAID y la reglamentación peruana.
2	Consolidación Nuevas	Los cajones fermentadores, ya sean rectangulares o en escalera, no deben estar en contacto directo con el suelo, para lo cual se implementará un sistema de recolección con canaletas para la evacuación de mucilago que transporte el residuo a envases para su uso posterior, a pozos sépticos o pozas de pretratamiento (estabilización de efluentes).	
3	Consolidación Nuevas	Los servicios higiénicos deben estar operativos (letrina o baño séptico), a una distancia de 30 metros del centro de beneficio en caso de letrina y 20 metros en baño séptico.	
4	Consolidación Nuevas	Instalación de por lo menos un contenedor y tacho de basura para los residuos sólidos (segregación de la basura), el cual será depositado temporalmente en lugares estratégicamente seleccionados (almacenes), para su posterior disposición final.	
5	Consolidación Nuevas	Realizar el almacenamiento en un lugar adecuado. Los sacos de granos de cacao deben ser apilados sobre parihuelas de madera previniendo la exposición de los granos al contacto directo del piso.	
6	Consolidación Nuevas	Realizar revegetación de las áreas exteriores del módulo de beneficio de cacao.	
7	Consolidación Nuevas	Charlas técnicas por parte de la organización en la operatividad y mantenimiento del módulo y beneficio de cacao a sus socios(as), cumpliendo los estándares de calidad diferenciado, así como de las normativas ambientales vigentes.	2. Porcentaje de organizaciones que implementan charlas técnicas en la operatividad del MBC cumpliendo estándares calidad diferenciada, así como de las normativas ambientales vigentes
8	Consolidación	Implementar un área exclusiva para el almacén de lubricantes o combustible, fuera del alcance de niños.	3. Porcentaje de sistema de fertirriego cumplen con los Lineamientos y Directivas Ambientales de USAID y Reglamentación Peruana.
9	Consolidación	Los residuos de envases contaminantes de fertiirrigación, restos de aceites y lubricantes, envases de combustible, materiales inflamables y otros, deben ser dispuestos temporalmente en lugares estratégicamente seleccionados (almacenes), para su posterior disposición final.	
10	Consolidación	Promover la reforestación con especies de la zona, en los contornos del área de captación del sistema de agua, en este caso se realiza a través de un pozo de agua para el fertirriego.	
11	Consolidación	Charlas técnicas a los socios(as)/agricultores(as) en la operatividad y mantenimiento del sistema de fertirriego, cumpliendo con las normativas ambientales y técnicas requeridas.	4. Porcentaje de socios(as)/agricultores(as) adiestrados en la operatividad y mantenimiento del sistema de fertirriego

Nº	AREA	MITIGATION MEASURES	INDICATORS
			cumpliendo con las normativas ambientales vigentes.
12	Consolidación Nuevas	Implementación de pozos sépticos artesanales o la implementación de sistema de recolección para el tratamiento de "aguas mieles".	5. Porcentaje de agricultores(as) toman en cuenta los cuidados medio ambientales en la implementación de los módulos de beneficio familiar.
13	Consolidación Nuevas	En caso de tener fuentes de agua, evitar su contaminación con "aguas mieles".	
14	Consolidación Nuevas	Para el secado usar mantas de polietileno, para evitar la contaminación de los granos de cacao con el suelo y/o loza de cemento.	
15	Consolidación Nuevas	Destinar un sitio o área para el almacenamiento de granos y evitar descomposición microbiológica por daños o contaminación, reduciendo el riesgo de que respire olores desagradables por este proceso.	
16	Consolidación Nuevas	Los agricultores cumplen las especificaciones técnicas, entre ellas: - Una vez culminada la etapa de producción de plantones en los viveros, hacer la limpieza total del vivero (caña brava, listones, tablas y bolsas biodegradables), que serán destinados en un lugar específico al costado de la parcela de cacao para su posterior descomposición. - Recojo de los pasivos ambientales (alambres, envases de plástico, bolsas de polietileno, malla rashell y otros) que serán depositados en costales y trasladados a un almacén temporal para su disposición final.	6. Porcentaje de agricultores(as) que cuentan con viveros, toman en cuenta los cuidados ambientales para la producción de plantones.
17	Consolidación Nuevas	Implementación del Manejo integrado de plagas (MIP) basado principalmente en control biológico, cultural, físico y mecánico; considerando como última opción la aplicación de plaguicidas.	7. Porcentaje de agricultores(as) aplican el Manejo Integrado de Plagas - MIP
18	Consolidación Nuevas	Control de maleza en base a un manejo cultural (uso de mulch, sombra, cobertura y otras), en donde se hará un uso mínimo de herbicidas listados en el PERSUAP	8. Porcentaje de agricultores(as) que no hacen uso de herbicidas
19	Consolidación Nuevas	Hacer uso de equipos de protección personal en la aplicación de químicos, debido a que, por los poros de la piel, los ojos, la nariz y la boca estos químicos se adhieren al organismo.	9. Porcentaje de agricultores(as) que hacen uso de equipos de protección personal
20	Consolidación Nuevas	Ubicar áreas seguras para preparación de plaguicidas (incluidos herbicidas), lavado de equipos y materiales. Estas áreas deben estar alejadas de fuentes de agua.	10. Porcentaje de agricultores(as) que realizan la preparación y limpieza (triple lavado) de los envases de los plaguicidas en áreas seguras.
21	Consolidación Nuevas	Realizar el "triple lavado" de equipos de fumigación y reúso de aguas del lavado en el cultivo fumigado.	
22	Consolidación Nuevas	Realizar excavaciones (calicatas) para determinar el nivel de compactación de los suelos, nivel freático, verificación de plantas bioindicadores, análisis de suelos y pendiente del terreno.	11. Porcentaje de agricultores(as) realizaron prospección de terreno.
23	Consolidación Nuevas	Realizar el acopio seguro de los residuos inorgánicos utilizados en la actividad agrícola (plásticos, costales,	12. Porcentaje de agricultores(as) cuentan

Nº	AREA	MITIGATION MEASURES	INDICATORS
		madera, etc.), recogerlos en costales y/o cilindros, tachos y guardarlos en un almacén temporal o ambiente adecuado para su disposición final.	con un lugar adecuado para depositar los residuos sólidos utilizados en la actividad agrícola.
24	Consolidación Nuevas	Compostaje en rumas de residuos de cosecha en puntos focalizados que se encuentren bajo sombra y para el proceso de descomposición de la mazorca aplicar ceniza y tapar con plástico, hojarasca u hojas de plátano.	13. Porcentaje de agricultores(as) que realizan compostaje de residuos de cosechas haciendo pequeñas rumas.
25	Consolidación Nuevas	Realizar el acopio seguro de los residuos (envases de plaguicidas) en lonas, costales, cajas o bolsas, residuos que serán traslados a un centro de acopio temporal debidamente identificados, que cumplan con las normas de almacenamiento establecidos por las autoridades competentes (Entidades responsables de su reciclaje).	14. Porcentaje de agricultores(as) que acopian envases vacíos de plaguicidas y son trasladados a los centros de acopio temporal.
26	Consolidación Nuevas	No tumbar y quemar bosques primarios, ni bosques secundarios mayores a 5 años, especialmente durante la preparación de terreno para la instalación del cultivo de cacao.	15. Porcentaje de agricultores(as) tienen ubicadas sus parcelas en bosques secundarios menores a 5 años.
27	Consolidación Nuevas	Por ninguna circunstancia se deberá intervenir en Áreas Naturales Protegidas (ANP), Bosque de Producción Permanente (BPP) o Concesiones forestales (CF).	16. Porcentaje de agricultores(as) de cacao, respetan las áreas protegidas o restringidas.
28	Consolidación Nuevas	Realizar el uso de barreras vegetales vivas de contención (eritrina y/o siembra de árboles forestales) para evitar el socavamiento en la faja marginal.	17. Porcentaje de agricultores(as) que impementan barreras vivas de contención en parcelas cercanas a ríos y quebradas.
29	Consolidación Nuevas	Instalación de barreras vivas con especies como: "grama", "vetiveria" (Vetiveria zizanioides), "eritrina", "palo vivo", "cerco vivo", "amasisa" (Erythrina sp), "guaba", "pacae", "shimbillo" (Inga edulis), "bolaina" (guazuma), "capirona" (Calycophyllum spruceanum), "shaina" ("Clubrina glandulosa) y "pino chuncho" (Schizolobium amazonicum).	18. Porcentaje de agricultores(as) cuentan con barreras vivas en parcelas con pendientes mayores a 20%.
30	Consolidación Nuevas	Instalación de barreras muertas, utilizando residuos de maleza, restos de ramas de la poda, troncos en descomposición, seudotallos de plátano y otros restos vegetales que se encuentran en el entorno de la parcela, contra la pendiente.	19. Porcentaje de agricultores(as) cuentan con barreras muertas en parcelas con pendientes mayores a 20%.
31	Consolidación Nuevas	Se recomendará la implementación de zanjas de infiltración, con medidas de 50 cm de ancho x 40 cm de profundidad, lo que permitirá la estabilidad de los suelos, en pendiente superiores a 20%.	20. Porcentaje de agricultores(as) que cuentan con zanjas de infiltración en parcelas con pendientes mayores a 20%.
32	Consolidación Nuevas	Protección de los suelos con base en coberturas vivas tipo "calisia" (Callisia repens), "canavalia" (Canavalia ensiformis) y otros.	21. Porcentaje de agricultores(as) con coberturas vivas implementadas.

Nº	AREA	MITIGATION MEASURES	INDICATORS
33	Consolidación Nuevas	Protección del suelo con coberturas muertas, utilizando hojarascas, residuos de maleza, restos de podas, troncos en descomposición, seudo tallos de plátano y otros restos vegetales que se encuentran en el entorno de la parcela.	22. Porcentaje de agricultores(as) hacen uso de cobertura muerta.
34	Consolidación Nuevas	Implementación del uso de la innovación tecnológica que promueve la ACP: Nutrición Integral y Podas Oportunas – (NIPO).	23. Porcentaje de agricultores(as) aplican la técnica de NIPO (Nutrición Integral y Podas Oportunas).
35	Consolidación Nuevas	"Siembra y cosecha de agua" Es la captación de agua de lluvia antes que se pierda y poder aprovecharla en la agricultura, consumo humano, crianza de animales, regar plantaciones forestales, entre otros. También es una opción para tener más agua en temporada seca.	24. Porcentaje de agricultores(as) que adoptan la técnica de siembra y cosecha de agua.
36	Consolidación Nuevas	Verificar la existencia de parcelas con sistemas agroforestales establecidos, sean estos como sombra permanente, linderaje, a pie y cabecera de parcela.	25. Porcentaje de agricultores(as) cuentan con especies forestales como sombra permanente, linderaje, a pie y cabecera de parcela.
37	Consolidación Nuevas	En caso de identificar parcelas con suelos poco profundos (por presencia de agua y nivel freático alto) y suelos inundables, se deberá realizar la apertura de drenes para evacuar los excesos de agua de los predios.	26. Porcentaje de agricultores(as) que cuentan con drenes en las parcelas con tendencia a encharcarse de agua.
38	Consolidación Nuevas	El mantenimiento periódico de los equipos se realiza para evitar fugas y gastos innecesarios de combustible y lubricantes.	27. Porcentaje de agricultores(as) que realizan mantenimiento periódico de equipos a combustible de uso agrícola.
39	Consolidación Nuevaa	Se implementará un plan de salud ocupacional, el cual contendrá programas de charlas técnicas de 5 minutos, el mismo que estará a cargo de los técnicos de campo quienes aprovecharan este espacio para sensibilizar a los productores(as) sobre el riesgo para su salud a estar en exposición directa por plaguicidas y sobre los protocolos de bioseguridad establecidos en el marco de la pandemia del COVID 19.	28. Porcentaje socios(as) que recibieron charlas técnicas en salud ocupacional.
40	Consolidación Nuevas	Cada subdonatario deberá elaborar su propio PMMA para identificar los impactos ambientales, así como incluir medidas de prevención, mitigación y control; acorde a lo establecido por USAID y las normas ambientales peruanas.	29. Porcentaje de subdonatarios cuentan con PMMA.

DEVIDA - PORI

Nº	MITIGATION MEASURES	INDICATORS
1	No tumbar, limpieza ydesmalezado de bosques de producción primaria mayores para la instalación de módulos	1. Número de familias que diseñaron y limpiaron los estanques con procedimiento de limpieza y desmalezado de bosques primarios
2	Uso de áreas anteriormente intervenidas para la construcción de estanques, así no afectar bosques de producciòn primaria	2. Número de familias que usaron áreas anteriormente intervenidas para instalar módulos demostrativos.
3	Ralear mínimamente losbosques secundarios o las purmas para la ubicación de módulos y construcción de estanque.	3. Número de familias que, para ubicación de estanques, realizaron la mínima tumba y quema de bosques primarios.
4	Prohibir la quema de la biomasa vegetal.	4. Número de familias que no se realizaron tumba y quema de bosques primarios.
5	Evitar modificar el paisaje natural en lugares con diversidad biológica por la construcción de módulos de,ostrativos mediante el mìnimo movimiento de tierra, y lograr realizar el acabado de los diques para que el estanque de peces .se vea como una superficie acùstica del medio natural.	5. Número de Módulos demostrativos que no modificaron el paisaje natural del medio ambiente.
6	Construir sobre terrenos noaptos para agricultura, que posean suelos con características impermeables,y que estén cerca a los ojos de agua.	6. Número de módulos realizan uso de áreas anteriormente intervenidas.
7	Evitar presencia de residuos orgánicos e inorgánicos en todos los módulosdemostrativos y alrededores ala piscigranja	7. Número de familias/unidades acuícolas que disponen sus residuos sólidos en lugares específicos dentro de la finca
		8. Número de Módulos demostrativos/unidades acuícolas que realizan el uso racional del agua evitando el uso excesivo mediante ingreso constante del agua, mediante la implementación de sistema de apertura y cierre.
8	Realizar el uso adecuado en cuanto a la dosificación y aplicación de fertilizantes en el acondicionamiento del estanque.	9. Número de Módulos demostrativos/unidades acuícolas que realizan el uso adecuado de los fertilizantes.
9	Realizar el uso adecuado de alimentos balanceados dosificando según etapa de cultivo para evitar la eutrofización del agua.	10. Número de Módulos demostrativos/unidades acuícolas que hacen el uso adecuado de los alimentos balanceados.
10	Disposición final de residuos de animales muertos en pozos séptico para estos restos orgánicos.	11. Número de Módulos demostrativos/unidades acuícolas que cuentan con registros de. Disposición final de residuos de animales muertos en pozos séptico para estos restos orgánicos.

ANNEX E: METHODOLOGICAL MATRIX

QUESTIONS	SUB-QUESTIONS	METHODS	DATA COLLECTION TOOLS	SAMPLE
1. What is the level of compliance with environmental mitigation measures included in LDCs for alternative development activities?	1.1 What is the percentage of compliance with PMMA mitigation measures of the alternative development activities included?	**CR3CE:** Observación de torres Observación de telecentros **CAFE** Encuesta a agricultores de café **CACAO** Encuesta a agricultores de cacao **PORI** Encuesta a acuicultores	 Guía de observación Guía de observación Cuestionario Cuestionario Cuestionario	 15 torres 15 telecentros 164 agricultores 165 agricultores 131 acuicultores
	1.2 What are the factors that facilitate or impede compliance with LDC mitigation measures?	**CR3CE:** Entrevistas a responsables de telecentros Entrevistas a equipo técnico **CAFE** Entrevista a agricultores de café Entrevista a equipo técnico **CACAO** Entrevista a agricultores de cacao **PORI** Entrevista a acuicultores	Guía de entrevista Guía de entrevista Guía de entrevista Guía de entrevista Guía de entrevista Guía de entrevista	15 responsables de telecentros 4 equipo técnico 12 agricultores 4 equipo técnico 12 agricultores 6 acuicultores
2. To what extent can stakeholders contribute to a higher level of compliance with PMMA mitigation measures?	2.1 What is the role of USAID, implementing partners, and beneficiaries in improving compliance with PMMA measures? 2.2 What is the role of men and women in environmental practices?	**CR3CE:** Entrevistas a responsables de telecentros Entrevistas a equipo técnico **CAFE** Entrevista a agricultores de café Entrevista a equipo técnico **CACAO** Entrevista a agricultores de cacao **PORI** Entrevista a acuicultores	Guía de entrevista Guía de entrevista Guía de entrevista Guía de entrevista Guía de entrevista Guía de entrevista	15 responsables de telecentros 4 equipo técnico 12 agricultores 4 equipo técnico 12 agricultores 6 acuicultores
3. What are the alternatives that contribute to	3.1 What are the alternatives that can be implemented in	**CR3CE:** Entrevistas a responsables de telecentros Entrevistas a equipo técnico	Guía de entrevista Guía de entrevista	15 responsables de telecentros 4 equipo técnico

QUESTIONS	SUB-QUESTIONS	METHODS	DATA COLLECTION TOOLS	SAMPLE
increasing the level of compliance with the environmental mitigation measures included in the PMMA?	the short, medium and long term to achieve a higher level of compliance with PMMA measures? 3.2 What are the mechanisms for monitoring the implementation of the alternatives presented? 3.3 How well are the recommendations presented in the internal ECR carried out last year and the external ECR implemented?	**CAFE** Entrevista a agricultores de café Entrevista a equipo técnico **CACAO** Entrevista a agricultores de cacao **PORI** Entrevista a acuicultores	Guía de entrevista Guía de entrevista Guía de entrevista Guía de entrevista	12 agricultores 4 equipo técnico 12 agricultores 6 acuicultores

ANNEX F: SAMPLE DESIGN

DETERMINATION OF THE SAMPLE OF COCOA PRODUCERS

1. Población Objetivo

La población comprende todos los integrantes del padrón de productores de cacao que participan en las actividades de la Alianza Cacao. La unidad primaria de muestreo está compuesta por los productores agrícolas de cacao.

2. Diseño Muestral

El diseño de la muestra es probabilístico, bietápico, estratificado y sistemático donde la unidad de selección son los productores agrícolas y la unidad de observación es el predio agrícola.

- **Probabilístico.** Cada miembro de la población tiene la misma probabilidad de entrar en la muestr.
- **Bietápico**. Consiste en tomar muestras en dos etapas, la primera utilizando elmétodo estratificado y la segunda mediante el método sistemático.
- **Estratificado.** Se conformaron cuatro estratos, con dimensión proporcional al tamaño de la población, los estratos considerados son los siguientes departamentos: Huánuco, Pasco, San Martin y Ucayali.
- **Sistemático.** La muestra en el interior del estrato se obtiene seleccionando sistemáticamente cada k elementos, con el objetivo tener una representación uniforme de toda la población. Es importante precisar que para ordenar los productores que conforman la población se consideró la coordenada longitud de su correspondiente predio agrícola.

3. Marco Muestral

Conformada por el padrón de productores de cacao que participan en las actividades de la Alianza Cacao.

4. Tamaño de Muestra

El tamaño de muestra para el diseño de intervención esta dado por la siguienteexpresión:

$$n = \frac{Z^2 * N * P * (1 - P)}{(N - 1) * d^2 + Z^2 * P * (1 - P)} * \frac{1}{1 - TNR}$$

Donde:

n: tamaño de la muestra requerido

N: tamaño de la población

Z: nivel de fiabilidad de 95% (valor estándar de Z = 1,96)

P: Proporción de los elementos con el atributo estudiado (P =0.5)

TNR: Tasa de no respuesta (TNR=10%)

d: Limite del error de estimación o margen de error (d = 0.08)

El tamaño de muestra requerido es: 165

Tamaño de la muestra requerido según estrato:

Estrato	N° de encuestas
Huánuco	32
Pasco	11
San Martin	95
Ucayali	27
Total	**165**

5. Selección de la muestra

Los productores agrícolas de cacao fueron seleccionados mediante un muestreo probabilístico bietápico, estratificado y sistemático. En la primera etapa se utilizó muestreo estratificado, es decir, se conformó 04 estratos (Huánuco, Pasco, San Martin y Ucayali). En la segunda etapa, en el interior de cada estrato, se ordenó los productores considerando la coordenada longitud de su predio agrícola y luego se seleccionó a los agricultores sistemáticamente cada k elementos. En este contexto, para realizar la selección de la muestra bajo los criterios técnicos señalados se utilizó el software estadístico IBM SPSS. Es importante precisar que para cubrir imprevistos durante la operación de campo se seccionó 17 muestras de reemplazo.

DETERMINATION OF THE SAMPLE OF COFFEE PRODUCERS

1. Población Objetivo

La población comprende todos los integrantes del padrón de productores de café que participan en las actividades de la Alianza CAFE. La unidad primaria de muestreo está compuesta por los productores agrícolas de café.

2. Diseño Muestral

El diseño de la muestra es probabilístico, bietápico, estratificado y sistemático donde la unidad de selección son los productores agrícolas y la unidad de observación es el predio agrícola.

- **Probabilístico.** Cada miembro de la población tiene la misma probabilidad de entrar en la muestra.
- **Bietápico.** Consiste en tomar muestras en dos etapas, la primera utilizando el método estratificado y la segunda mediante el método sistemático.
- **Estratificado.** Se conformaron cuatro estratos, con dimensión proporcional al tamaño de la población, los estratos considerados son los siguientes departamentos: Amazonas, Huánuco, San Martin y Ucayali.
- **Sistemático.** La muestra en el interior del estrato se obtiene seleccionando sistemáticamente cada k elementos, con el objetivo tener una representación uniforme de toda la población. Es importante precisar que para ordenar los productores que conforman la población se consideró la coordenada longitud de su correspondiente predio agrícola.

3. Marco Muestral

Conformada por el padrón de productores de café que participan en las actividades de la Alianza CAFE.

4. Tamaño de Muestra

El tamaño de muestra para el diseño de intervención esta dado por la siguienteexpresión:

$$n = \frac{Z^2 * N * P * (1 - P)}{(N - 1) * d^2 + Z^2 * P * (1 - P)} * \frac{1}{1 - TNR}$$

Donde:

n: tamaño de la muestra requerido

N: tamaño de la población

Z: nivel de fiabilidad de 95% (valor estándar de Z = 1,96)

P: Proporción de los elementos con el atributo estudiado (P =0.5)

TNR: Tasa de no respuesta (TNR=10%)

El tamaño de muestra requerido es: 164

Tamaño de la muestra requerido según estrato:

Estrato	N° de encuestas
Amazonas	4
Huánuco	70
San Martin	87
Ucayali	3
Total	**164**

5. Selección de la muestra

Los productores agrícolas de café fueron seleccionados mediante un muestreo probabilístico bietápico, estratificado y sistemático. En la primera etapa se utilizó muestreo estratificado, es decir, se conformó 04 estratos (Amazonas, Huánuco, San Martin y Ucayali). En la segunda etapa, en el interior de cada estrato, se ordenó los productores considerando la coordenada longitud de su predio agrícola y luego se seleccionó a los agricultores sistemáticamente cada k elementos. En este contexto, para realizar la selección de la muestra bajo los criterios técnicos señalados se utilizó el software estadístico IBM SPSS. Es importante precisar que para cubrir imprevistos durante la operación de campo se seccionó 16 muestras de reemplazo.

DETERMINATION OF THE SAMPLE OF FISH PRODUCERS

1. Población Objetivo

La población comprende todos los integrantes del padrón de personas con módulos para la acuicultura que participan en las actividades de PORI, siendo la unidad primaria de muestreo los productores acuícolas.

2. Diseño Muestral

El diseño de la muestra es probabilístico, bietápico, estratificado y sistemático donde la unidad de selección son los productores acuícolas.

- **Probabilístico**. Cada miembro de la población tiene la misma probabilidad de entrar en la muestra.
- **Bietápico**. Consiste en tomar muestras en dos etapas, la primera utilizando elmétodo estratificado y la segunda mediante el método sistemático.
- **Estratificado.** Se conformaron dos estratos, con dimensión proporcional al tamaño de la población, los estratos considerados son las siguientes provincias: Humalies y Leoncio Prado.
- **Sistemático.** La muestra en el interior del estrato se obtiene seleccionando sistemáticamente cada k elementos, con el objetivo tener una representación uniforme de toda la población. Es importante precisar que para ordenar los productores que conforman la población se consideró la coordenada longitud de su correspondiente predio agrícola.

3. Marco Muestral

Conformada por el padrón de productores acuícolas que participan en las actividades de PORI.

4. Tamaño de Muestra

El tamaño de muestra para el diseño de intervención esta dado por la siguienteexpresión:

$$n = \frac{Z^2 * N * P * (1 - P)}{(N - 1) * d^2 + Z^2 * P * (1 - P)} * \frac{1}{1 - TNR}$$

Donde:

n: tamaño de la muestra requerido

N: tamaño de la población

Z: nivel de fiabilidad de 95% (valor estándar de Z = 1,96)

P: Proporción de los elementos con el atributo estudiado (P =0.5)

TNR: Tasa de no respuesta (TNR=10%)

El tamaño de muestra requerido es: 131

Tamaño de la muestra requerido según estrato:

Estrato	**N° de encuestas**
Humalies	87
Leoncio Prado	44
Total	**131**

5. Selección de la muestra

Los productores acuícolas fueron seleccionados mediante un muestreo probabilístico bietápico, estratificado y sistemático. En la primera etapa se utilizó muestreo estratificado, es decir, se conformó 02 estratos (provincias de Humalies y LeoncioPrado). En la segunda etapa, en el interior de cada estrato, se ordenó los productores considerando la coordenada longitud de su predio

agrícola y luego se seleccionó a los agricultores sistemáticamente cada k elementos. En este contexto, para realizar la selección de la muestra bajo los criterios técnicos señalados se utilizó el software estadístico IBM SPSS. Es importante precisar que para cubrir imprevistos durante la operación de campo se seccionó 13 muestras de reemplazo. El detalle de los registrosseleccionados se muestra en el archivo Excel adjunto.

Respecto a la elaboración de mapeo y ubicación de unidades muestrales. Para los tres padrones de productores (cacao, café y acuícolas) se convirtió los valores de latitud y longitud en puntosgeorreferenciados estandarizados, luego se generó archivos del tipo KML (Keyhole Markup Language) con los cuales se logró proyectar (en Google Earth) mapas de la población y muestra de los productores de cacao, café y acuícolas. Se adjunta al presente informe 06 archivos KMLcorrespondientes a mapas de la población y muestra según tipo de productores.

ANNEX G: INDICATORS CALCULATION

ALIANZA PERU CACAO II

Nº	MEDIDA DE MITIGACION	INDICADOR	FORMULA DE CALCULO	PREGUNTA EN INSTRUMENTO	RESULTADOS POR PREGUNTA	RESULTADO INDICADOR
	Cosecha, Post Cosecha y Almacenaje					
	Módulo de Beneficio centralizado					
1	El módulo de beneficio centralizado de cacao debe ubicarse a una distancia mayor de 50 metros de un curso de agua, no inundable y con nivel freático alto.	% de módulos de beneficio centralizado de cacao construidos cumplen con los Lineamientos y Directivas Ambientales de USAID y la reglamentación peruana.	% = Encuestados que respondieron 6.1 opción 2, 6.2 opción 2 y 6.3 opción 1 ó 2 ó 3 y respuesta a 6.3.1 opción 1, 6.4 opción 1, 6.5 opción 1 y 6.6 opción 1 / Total entrevistados que pertenecen a una asociación que cuenta con beneficio centralizado	6.1. ¿A qué distancia del curso de agua más cercano está ubicado el módulo centralizado?	1. Más de 50 metros 80.5% 2. Menos de 50 metros: 12.2% 3. No sabe: 7.3%	43.2% N=41
2	Los cajones fermentadores, ya sean rectangulares o en escalera, no deben estar en contacto directo con el suelo, para lo cual se implementará un sistema de recolección con canaletas para la evacuación de mucilago que transporte el residuo a envases para su uso posterior, a pozos sépticos o pozas de pretratamiento (estabilización de efluentes).			6.2. ¿En dónde coloca los cajones fermentadores?	1. En el suelo: 17.1% 2. Sobre un mueble: 61% 3. Otro (Especificar): 14.6% 4. No tiene Cajones: 7.32%	
3	Los servicios higiénicos deben estar operativos (letrina o baño séptico), a una distancia de 30 metros del centro de beneficio en caso de letrina y 20 metros en baño séptico.			6.3. ¿Qué tipo de servicios higiénicos tiene el módulo centralizado?	1. Servicios Higiénicos básicos: 75.6% 2. Letrinas: 7.3% 3. No tiene servicios higiénicos: 14.6% 4. No sabe: 2.4%	
				6.3.1 ¿A qué distancia del centro de beneficio está ubicado el servicio higiénico?	1. A 50 metros: 41.5% 2. A menos de 50 metros: 36.6% 3. No sabe: 22%	
4	Instalación de por lo menos un contenedor y tacho de basura para los residuos sólidos (segregación de la basura), el cual será depositado temporalmente en lugares estratégicamente seleccionados (almacenes), para su posterior disposición final.			6.4. ¿El módulo centralizado cuenta con al menos un contenedor de residuos sólidos?	1. Si: 90.2% 2. No: 7.3% 3. No sabe: 2.4%	
5	Realizar el almacenamiento en un lugar adecuado. Los sacos de granos de cacao deben ser apilados sobre parihuelas de madera previniendo la exposición de los granos al contacto directo del piso.			6.5 ¿El módulo centralizado cuenta con un lugar de almacenamiento y son apilados evitando contacto de los sacos con granos de cacao con el suelo?	1. Si: 82.9% 2. No: 17.1%	
6	Realizar revegetación de las áreas exteriores del módulo de beneficio de cacao.			6.6. ¿Hay vegetación, árboles y áreas verdes en las afueras del módulo centralizado?	1. Si: 75.6% 2. No: 24.4%	

Nº	MEDIDA DE MITIGACION	INDICADOR	FORMULA DE CALCULO	PREGUNTA EN INSTRUMENTO	RESULTADOS POR PREGUNTA	RESULTADO INDICADOR
7	Charlas técnicas por parte de la organización en la operatividad y mantenimiento del módulo y beneficio de cacao a sus socios(as), cumpliendo los estándares de calidad diferenciado, así como de las normativas ambientales vigentes.	% de organizaciones que implementan charlas técnicas en la operatividad del MBC cumpliendo estándares calidad diferenciada, así como de las normativas ambientales vigentes	% = # de entrevistados que respondieron 1 a pregunta 3 / total de encuestados que pertencen a una asociación que cuenta con módulo de beneficio centralizado	3. ¿Ha recibido capacitación entre el 2021 y el 2022 para el funcionamiento y mantenimiento del módulo centralizado?	1. Si: 58.5% 2. No: 34.2% 3. No recuerda: 7.3%	58.5% N=41
	Módulo de Beneficio Familiar					
12	Implementación de pozos sépticos artesanales o la implementación de sistema de recolección para el tratamiento de "aguas mieles".	% de agricultores(as) toman en cuenta los cuidados medio ambientales en la implementación de los módulos de beneficio familiar.	Promedio entre a,b,c, (a) % que respondieron 1 ó 2 a p9 (b) % que respondieron 1 ó 2 a p11 c)% que respondieron 1 ó 2 ó 4 ó 5 a p11	-	-	62.9%
13	En caso de tener fuentes de agua, evitar su contaminación con "aguas mieles".			9 ¿Dónde desecha los residuos de mucílago? *(Pregunta aplicada a los que tienen módulo de beneficio familiar)*	1. Por medio de canaletas hacia pozos sépticos: 10% 2. Por medio de canaletas hacia pozos de pretratamiento: 5% 3. al río, puquio u otra fuente de agua: 5% Otro (Especificar): 55%	(a) % que respondieron 1 o 2: 15% N=20
14	Para el secado usar mantas de polietileno, para evitar la contaminación de los granos de cacao con el suelo y/o loza de cemento.			11. ¿Qué utiliza para el secado del cacao? *(Pregunta aplicada a todos los encuestados)*	1. Mantas de polietileno: 69.4% 2. Parihuelas: 7.0% 3. Lozas de secado:11.0% 3. otro (Especificar): 20.8%	(b) % que respondieron 1 o 2: 73.9% N=173
15	Destinar un sitio o área para el almacenamiento de granos y evitar descomposición microbiológica por daños o contaminación, reduciendo el riesgo de que respire olores desagradables por este proceso.			12.1. Sobre los centros de acopio ¿Qué medidas toma para asegurar un buen almacenamiento? No leer las opciones. Marcar todas las opciones que el productor mencione espontáneamente. *(Pregunta aplicada a los que tienen centro de acopio P12=1)*	1. Almacén exclusivo con ventilación: 84.9% 2. Almacén exclusivo con protección contra las lluvias: 90.9% 3. Uso de parihuelas para el apilado de los sacos: 69.7% 4. Control de roedores: 69.7% 5. Otro (Especificar): 6.1% 6. Ninguna: 0% (c) % que respondieron 1 o 2 o 4 o 5:	100% N=33
16	Los agricultores cumplen las especificaciones técnicas, entre ellas: Una vez culminada la etapa de producción de plantones en los viveros, hacer la limpieza total del vivero (caña brava, listones, tablas y bolsas biodegradables), que serán destinados en un lugar específico al costado de la parcela de cacao para su posterior descomposición. Recojo de los pasivos ambientales (alambres, envases de plástico, bolsas de polietileno, malla rashell y otros) que serán depositados en costales y trasladados a un almacén temporal para su disposición final.	% de agricultores(as) que cuentan con viveros, toman en cuenta los cuidados ambientales para la producción de plantones.	% = # de entrevistados que respondieron 1 a pregunta 14.3 / total de entrevistados que tenían vivero (p13=1)	14.3. ¿Qué labores realiza luego de la producción de plantones?	1. Limpieza de la zona y disposición de material sobrante: 20% 2. Se usa para otra labor: 60% 3. se deja enmontar: 60% 4. Otros (Especificar): 20%	20% N=7

Nº	MEDIDA DE MITIGACION	INDICADOR	FORMULA DE CALCULO	PREGUNTA EN INSTRUMENTO	RESULTADOS POR PREGUNTA	RESULTADO INDICADOR
	Uso y manejo de pesticidas					
17	Implementación del Manejo integrado de plagas (MIP) basado principalmente en control biológico, cultural, físico y mecánico; considerando como última opción la aplicación de plaguicidas.	% de agricultores(as) aplican el Manejo Integrado de Plagas - MIP	% = # de entrevistados que respondieron 1 ó 2 ó 3 al 16 a la pregunta 16 / total de entrevistados	16. ¿Qué acciones realiza para el manejo de plagas?	1.Control Cultural: drenes 21.39% 2.Control Cultural: nutrición integral y podas oportunas 84.39% 3.Control Cultural: eliminación de residuos de cosecha 64.16% 4.Control Cultural: control de malezas 91.33% 5.Control biológico: parásitos 13.87% 6.Control biológico: insectos predadores 16.18% 7.Control biológico: hongos bacterias, virus 29.48% 8.Control etológico: trampas 34.10% 9.Control genético 34.68% 10.Control físico: machete 92.49% 11.Control físico: motoguadaña 80.35% 12.Control físico: uso de altas temperaturas 9.25% 13.Control físico: solarización 30.64% 14.Control mecánico: recojo manual de insectos 32.37% 15.Control mecánico: recojo manual de las plantas dañadas 75.14% 16.Control mecánico: exclusión de los insectos a través del 18.50% 17.Control químico: uso de pesticidas o plaguicidas 32.37%	99.4% N=173
19	Hacer uso de equipos de protección personal en la aplicación de químicos, debido a que, por los poros de la piel, los ojos, la nariz y la boca estos químicos se adhieren al organismo.	% de agricultores(as) que hacen uso de equipos de protección personal	% = # de entrevistados que respondieron 1 ó 2 ó 3 ó 4 ó 5 a pregunta 20/ total de entrevistados	20. ¿Podría indicarme qué equipos de protección personal utiliza cuando manipula productos químicos?	1. Lentes para cubrir los ojos: 37% 2. Plástico para cubrir la espalda, para que no tenga contacto directo con la mochila: 20.2% 3. Botas (de jebe): 87.9% 4. Guantes (de plástico, no de tela: 21.4% 5. Trapo limpio o mascarilla que cubra boca y nariz: 37.6% 6. Otro (Especificar): 6.9%	88.4% N=173
20	Ubicar áreas seguras para preparación de plaguicidas (incluidos herbicidas), lavado de equipos y materiales. Estas áreas deben estar alejadas de fuentes de agua.	% de agricultores(as) que realizan la preparación y limpieza (triple lavado) de los envases de los plaguicidas en áreas seguras.	Promedio de (a) y (b) (a) % que respondieron 1 o 2 o 3 o 4 a p.21 (b) % que respondieron 2 a p22 Ambos indicadores calculados sobre los entrevistados que respondieron utilizar pesticidas o plaguicidas (p16_17=1 ó p17 = 1)	21. ¿Dónde realiza la preparación de los pesticidas? No leer las opciones. Marcar las opciones que corresponda según la respuesta del productor.	1. En un ambiente con ventilación (con ventana, malla, espacio en la pared que permita la circulación de aire): 31.3% 2. En un lugar sin acceso de niños y animales: 64.1% 3. Lejos de una fuente de agua (mínimo 20 mt): 53.1% 4. Fuera del hogar: 62.5% 5. En el hogar: 1.6% 6. Junto a una fuente de agua: 26.6% 7. Otro (Especificar): 12.5% 8. NINGUNO: 1.6%	81.3% N=64
21	Realizar el "triple lavado" de equipos de fumigación y reúso de aguas del lavado en el cultivo fumigado.			22. ¿Puede decirme cómo/dónde realiza el lavado de equipos y materiales de fumigación?	1. Alejado de fuentes de agua: 79.7% 2. Los equipos y materiales se lavan al menos 3 veces (triple lavado): 76.6% 3. Otro (Especificar): 4.69% 4. NINGUNA: 6.3%	

Nº	MEDIDA DE MITIGACION	INDICADOR	FORMULA DE CALCULO	PREGUNTA EN INSTRUMENTO	RESULTADOS POR PREGUNTA	RESULTADO INDICADOR
38	El mantenimiento periódico de los equipos se realiza para evitar fugas y gastos innecesarios de combustible y lubricantes.	% de agricultores(as) que realizan mantenimiento periódico de equipos a combustible de uso agrícola.	% = # de entrevistados que respondieron 1 ó 2 ó 3 a pregunta 23/ total de entrevistados	23. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto? No leer las opciones. Marcar todas las opciones que el participante	1. Frecuencia de revisiones requeridas de los equipos: 24.9% 2. Instrucciones de mantenimiento requerido por tipo de equipo: 23.1% 3. Costos de mantenimiento: 23.7% 4. Otro (Especificar): 2.3%	27.8% N=173
	Fertilizantes y abonamiento					
8	Implementar un área exclusiva para el almacén de lubricantes o combustible, fuera del alcance de niños.	% de sistema de fertirriego cumplen con los Lineamientos y Directivas Ambientales de USAID y Reglamentación Peruana	% = # de entrevistados que respondieron 1 ó 2 ó 3 a p33a y 1 ó 2 a p33b y 1 ó 3 a p33c / total de entrevistados que declararon tener sistema de fertirriego	33a. ¿Qué medidas toma para almacenar los lubricantes, combustible y otros insumos que usa en la maquinaria que emplea en el campo?	1. El espacio está cercado con mallas: 20% 2. El espacio tiene puerta y está con candado o aldaba, cadenas: 40% 3. Está ubicado fuera del hogar en un	40% N=5
9	Los residuos de envases contaminantes de fertiirrigación, restos de aceites y lubricantes, envases de combustible, materiales inflamables y otros, deben ser dispuestos temporalmente en lugares estratégicamente seleccionados (almacenes), para su posterior disposición final.			33b. ¿Qué medidas toma para la disipación de los restos de aceite, lubricantes, envases de combustible, material inflamable y otros?	1. Almacenaje: 60% 2. Disposición final: 0% 3. Relleno: 0% 4. Otros: 40%	
10	Promover la reforestación con especies de la zona, en los contornos del área de captación del sistema de agua, en este caso se realiza a través de un pozo de agua para el fertirriego.			33c. ¿Qué acciones realiza para proteger las zonas de recarga de agua para fertirriego?	1. Reforestación en zona: 40% 2. Clausura de espacio: 60% 3. Mantener la vegetación: 60% 4. Otros (especificar): 0%	
11	Charlas técnicas a los socios(as)/agricultores(as) en la operatividad y mantenimiento del sistema de fertirriego, cumpliendo con las normativas ambientales y técnicas requeridas.	% de socios(as)/agricultores(as) adiestrados en la operatividad y mantenimiento del sistema de fertirriego cumpliendo con las normativas ambientales vigentes.	% = # de entrevistados que respondieron 1 ó 3 ó 6 a pregunta 32 (recibió capacitación titular, cónyuge o ambos / total de entrevistados	32. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto? No leer las opciones. Marcar todas las opciones que el participante mencione espontáneamente para cada uno de los temas vinculados a la operatividad y mantenimiento del sistema de fertirriego.	1. Limpieza del sistema de fertirriego: 12.1% 2. Compostaje: 26.6% 3. Registro de mantenimiento periódico del sistema: 12.1% 4. Mantenimiento continuo de motobombas: 9.8% 5. Instalación de pozos y sus respectivas tapas, evitando ser foco infeccioso: 8.7% 6. Reforestación en áreas de captación de agua para el sistema de fertirriego: 13.3%	19.7% N=173
18	Control de maleza en base a un manejo cultural (uso de mulch, sombra, cobertura y otras), en donde se hará un uso mínimo de herbicidas listados en el PERSUAP	% de agricultores(as) que no hacen uso de herbicidas	% = # de entrevistados que respondieron 1 ó 2 ó 3 a pregunta 30 / total de entrevistados	30. ¿Cómo controla la maleza?	1. Control manual (cobertura viva o machete): 88.4% 2. Control mecánico (motoguadaña):77.5% 3. Control cultural (mulch, sombra, cobertura): 70% 4. Control químico (herbicida): 27.2% 5. NO UTILIZA: 0.6%	99.4% N=173

Nº	MEDIDA DE MITIGACION	INDICADOR	FORMULA DE CALCULO	PREGUNTA EN INSTRUMENTO	RESULTADOS POR PREGUNTA	RESULTADO INDICADOR
24	Compostaje en rumas de residuos de cosecha en puntos focalizados que se encuentren bajo sombra y para el proceso de descomposición de la mazorca aplicar ceniza y tapar con plástico, hojarasca u hojas de plátano.	% de agricultores(as) que realizan compostaje de residuos de cosechas haciendo pequeñas rumas.	% = # de entrevistados que respondieron 1 ó 2 ó 3 ó 4 ó 5 a pregunta 27 / total de entrevistados	27. ¿Qué labores realiza cuando hace compostaje?	1. Apilar los desechos de cosecha: 30.6% 2. Incorporar rastrojos de cultivos: 20.2% 3. Aplicar cenizas: 20.2% 4. Cubrir con hojarasca, hojas de plátano, otros: 22.0% 5. Voltear periódicamente: 23.7% 6. Otro (Especificar): 3.5%	35.8% N=173
33	Protección del suelo con coberturas muertas, utilizando hojarascas, residuos de maleza, restos de podas, troncos en descomposición, seudotallos de plátano y otros restos vegetales que se encuentran en el entorno de la parcela.	% de agricultores (as) hacen uso de coberturas muertas	% = # de entrevistados que respondieron 1 a pregunta 29.4 / total de entrevistados	29. ¿Qué tipos de fertilizantes/abonos orgánicos utiliza? 4. Capa sobre el suelo de residuos del cultivo de cacao y coberturas muertas (cualquier especie)	29.4Capa sobre el suelo de residuos del cultivo de cacao y coberturas muertas (cualquier especie): 68.8%	68.8% N=173
34	Implementación del uso de la innovación tecnológica que promueve la ACP: Nutrición Integral y Podas Oportunas – (NIPO).	% de agricultores(as) aplican la técnica de NIPO (Nutrición Integral y Podas Oportunas).	% = # de entrevistados que respondieron 1 ó 2 ó 3 a pregunta 31/ total de entrevistados	31. Sobre la "Nutrición integral y podas oportunas NIPO"	1. Poda del cultivo considerando la edad de la planta: 89.6% 2. Manejo y conservación de suelos: 69.9% 3. Aplicación de materia orgánica al suelo: 72.8% 4. NINGUNA: 3.47%	96.5% N=173
	Reforestación y control de erosión					
22	Realizar excavaciones (calicatas) para determinar el nivel de compactación de los suelos, nivel freático, verificación de plantas bioindicadores, análisis de suelos y pendiente del terreno.	% de agricultores(as) realizaron prospección de terreno.	% = # de entrevistados que respondieron 1 a pregunta 34 / total de entrevistados	34. ¿Realiza excavaciones de profundidad (calicatas) para tomar muestras de suelo?	1. Si: 52.0% 2. No	52% N=173
28	Realizar el uso de barreras vegetales vivas de contención (eritrina y/o siembra de árboles forestales) para evitar el socavamiento en la faja marginal	% de agricultores(as) que implementan barreras vivas de contención en parcelas cercanas a ríos y quebradas.	% = # de entrevistados que respondieron 1 a pregunta 38 / total de entrevistados	38. ¿Qué tipo de barreras (vivas o muertas) ha instalado en su parcela? *(Total de entrevistados)*	1. Barrera vivas: grama o vetiveria, eritrina, palo vivo, cerco vivo, amasisa, guaba, pacae, shimbillo 50.87% 2. Barrera muertas: residuos de maleza, restos de ramas de la poda, troncos de descomposición, pseudotallos de plátano y otros restos 31.21%	50.8% N=173
29	Instalación de barreras vivas con especies como: "grama", "vetiveria" (Vetiveria zizanioides), "eritrina", "palo vivo", "cerco vivo", "amasisa" (Erythrina sp), "guaba", "pacae", "shimbillo" (Inga edulis), "bolaina" (Guasuma crinita), "capirona" Calycophyllum spruceanum), "shaina" ("Clubrina glandulosa) y "pino chuncho" (Schizolobium amazonicum).	% de agricultores(as) cuentan con barreras vivas en parcelas con pendientes mayores a 20%.	% = # de entrevistados que respondieron 1 a pregunta 38 / total de entrevistados que cuentan con zanjas de infiltración como proxi de terreno con pendiente mayor a 20% (p37=1)	38. ¿Qué tipo de barreras (vivas o muertas) ha instalado en su parcela?	1. Barrera vivas: grama o vetiveria, eritrina, palo vivo, cerco vivo, amasisa, guaba, pacae, shimbillo: 50.9% 2. Barrera muertas: residuos de maleza, restos de ramas de la poda, troncos de descomposición, pseudotallos de plátano y otros restos 3. No tiene barreras	71.4% N=42

Nº	MEDIDA DE MITIGACION	INDICADOR	FORMULA DE CALCULO	PREGUNTA EN INSTRUMENTO	RESULTADOS POR PREGUNTA	RESULTADO INDICADOR
30	Instalación de barreras muertas, utilizando residuos de maleza, restos de ramas de la poda, troncos en descomposición, seudotallos de plátano y otros restos vegetales que se encuentran en el entorno de la parcela, contra la pendiente.	% de agricultores(as) cuentan con barreras muertas en parcelas con pendientes mayores a 20%.	% = # de entrevistados que respondieron 2 a pregunta 38 / total de entrevistados que cuentan con zanjas de infiltración como proxi de terreno con pendiente mayor a 20% (p37=1)	38. ¿Qué tipo de barreras (vivas o muertas) ha instalado en su parcela?	1. Barrera vivas: grama o vetiveria, eritrina, palo vivo, cerco vivo, amasisa, guaba, pacae, shimbillo: 50.9% 2. Barrera muertas: residuos de maleza, restos de ramas de la poda, troncos de descomposición, pseudotallos de plátano y otros restos: 31.2% 3. NO TIENE BARRERAS	52.4% N=42
31	Se recomendará la implementación de zanjas de infiltración, con medidas de 50 cm de ancho x 40 cm de profundidad, lo que permitirá la estabilidad de los suelos, en pendiente superiores a 20 %.	% de agricultores(as) que cuentan con zanjas de infiltración en parcelas con pendientes mayores a 20%.	% = # de entrevistados que respondieron 1 a pregunta 37 / total de entrevistados	37. ¿Cuenta con zanjas de infiltración en su parcela?	1.Si: 24.3% 2. No	24.3% N=173
32	Protección de los suelos con base en coberturas vivas tipo "calisia" (Callisia repens), "canavalia" (Canavalia ensiformis) y otros.	% de agricultores(as) con coberturas vivas implementadas.	% = # de entrevistados que respondieron 1 ó 2 ó 3 a pregunta 36 / total de entrevistados	36. ¿Ha instalado en su parcela alguna de las siguientes especies?	1. Canavalia: 6.4% 2. Kudzu: 17.3% 3. Centrosema: 3.5% 4. otros: 78.6%	23.1% N=173
36	Verificar la existencia de parcelas con sistemas agroforestales establecidos, sean estos como sombra permanente, linderaje, a pie y cabecera de parcela.	% de agricultores(as) cuentan con especies forestales como sombra permanente, linderaje, a pie y cabecera de parcela.	% = # de entrevistados que respondieron 1 ó 2 ó 3 ó 4 a pregunta 41 / total de entrevistados	41. ¿Ha usado alguna de las especies para la reforestación?	1. Bolaina: 49.1% 2. Capirona: 51.5% 3. Shaina: 22.5% 4. Guaba: 50.9% 5. Otro (Especificar): 31.2% 6. Ninguno: 7.5%	85.0% N=173
37	En caso de identificar parcelas con suelos poco profundos (por presencia de agua y nivel freático alto) y suelos inundables, se deberá realizar la apertura de drenes para evacuar los excesos de agua de los predios.	% de agricultores(as) que cuentan con drenes en las parcelas con tendencia a encharcarse de agua.	% = # de entrevistados que respondieron 1 a pregunta 40 / total de entrevistados	40. ¿Cuenta con drenes para evacuar el exceso de agua?	1. Si: 35.8% 2. No: 64.16%	35.8% N=173
	Manejo de residuos sólidos y afluentes					
23	Realizar el acopio seguro de los residuos inorgánicos utilizados en la actividad agrícola (plásticos, costales, madera, etc.), recogerlos en costales y/o cilindros, tachos y guardarlos en un almacén temporal o ambiente adecuado para su disposición final.	% de agricultores(as) cuentan con un lugar adecuado para depositar los residuos sólidos utilizados en la actividad agrícola.	% = # de entrevistados que respondieron 1 ó 2 a pregunta 44 / total de entrevistados	44. ¿Dónde desecha los envases (botellas, bolsas, latas) que contienen residuos agroquímicos?	1. En contenedores o costales específicos para su uso: 16.8% 2. Los entrega a la empresa Campo Limpio: 1.7% 3. En cualquier contenedor: 1.7%	17.9% N=173
25	Realizar el acopio seguro de los residuos (envases de plaguicidas) en lonas, costales, cajas o bolsas, residuos que serán traslados a un centro de acopio temporal debidamente identificados, que cumplan con las normas de almacenamiento establecidos por las autoridades competentes (Entidades responsables de su reciclaje).	% de agricultores(as) que acopian envases vacíos de plaguicidas y son trasladados a los centros de acopio temporal.	% = # de entrevistados que respondieron 1 ó 2 ó 3 a pregunta 43 / total de entrevistados que respondieron utilizar pesticidas o plaguicidas (p 16_17 = 1 ó p17 = 1)	43. ¿Qué materiales usa para acopiar los envases de plaguicidas usados?	1. Costales: 64.1% 2. Cajas: 4.7% 3. Bolsas: 7.8% Otros: Especifica: 31.3%	71.9% N=64

Nº	MEDIDA DE MITIGACION	INDICADOR	FORMULA DE CALCULO	PREGUNTA EN INSTRUMENTO	RESULTADOS POR PREGUNTA	RESULTADO INDICADOR
	Conservación de Fuentes de Agua					
35	"Siembra y cosecha de agua" Es la captación de agua de lluvia antes que se pierda y poder aprovecharla en la agricultura, consumo humano, crianza de animales, regar plantaciones forestales, entre otros. También es una opción para tener más agua en temporada seca.	% de agricultores(as) adoptan la técnica de siembra y cosecha de agua.	% = # de entrevistados que respondieron 1 a pregunta 51 / total de entrevistados	51. ¿Realiza la técnica de siembra y cosecha de agua?	1. Si: 6.9% 2. No: 93.1%	6.9% N=173
	Prospección y Selección de Terrenos					
26	No tumbar y quemar bosques primarios, ni bosques secundarios mayores a 5 años, especialmente durante la preparación de terreno para la instalación del cultivo de cacao.	% de agricultores(as) tienen ubicadas sus parcelas en bosques secundarios menores a 5 años.	% = # de entrevistados que respondieron 2 a pregunta 49 / total de entrevistados que respondieron utilizar pesticidas o plaguicidas (p 16_17 = 1 ó p17 = 1)	49. ¿Para la preparación del terreno e instalación del cultivo de cacao, ha realizado tumba y quemar bosques (primarios o secundario) mayores a 5 años de edad?	1. Si: 40.6% 2. No: 59.4%	59.4% N=64
27	Por ninguna circunstancia se deberá intervenir en Áreas Naturales Protegidas (ANP), Bosque de Producción Permanente (BPP) o Concesiones forestales (CF).	% de agricultores(as) de cacao, respetan las áreas protegidas o restringidas.	% = # de entrevistados que respondieron 1 ó 2 ó 3 a pregunta 49 / total de entrevistados	50. ¿Qué aspectos toma en consideración para elegir el área donde sembrará de cultivo de cacao?	1. La zonificación de la zona: 31.2% 2. Que la zona no se encuentre en un área protegida, en zonas de amortiguamiento y concesiones forestales o sean bosques de producción permanente: 12.1% 3. Que el área no se encuentre en zona de protección: 24.9% 4. Otro (Especificar): 5.8% 5. NINGUNA: 42.2%	53.8% N=173
	Salud Ocupacional					
39	Se implementará un plan de salud ocupacional, el cual contendrá programas de charlas técnicas de 5 minutos, el mismo que estará a cargo de los técnicos de campo quienes aprovecharan este espacio para sensibilizar a los productores(as) sobre el riesgo para su salud a estar en exposición directa por plaguicidas y sobre los protocolos de bioseguridad establecidos en el marco de la pandemia del COVID 19.	% socios(as) que recibieron charlas técnicas en salud ocupacional.	% = # de entrevistados que respondieron 4 a pregunta 15 / total de entrevistados	15. De los siguientes temas ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto? - Opción 4: Riesgos en la salud y el ambiente por el uso de pesticidas	15.4. Riesgos en la salud y el ambiente por el uso de pesticidas: 58.4%	58.4% N=173
40	Cada subdonatario deberá elaborar su propio PMMA para identificar los impactos ambientales, así como incluir medidas de prevención, mitigación y control; acorde a lo establecido por USAID y las normas ambientales peruanas.	% de subdonatarios cuentan con PMMA.				

ALIANZA PERÚ CAFE

Nº	Medida de mitigación	Indicador	Formula de calculo	Pregunta en instrumento de recolección	Resultados por pregunta	Resultado indicador
	Uso y manejo de pesticidas					
1	CAFE se asegurará de proporcionar asistencia para la adquisición o el uso de plaguicidas (incluida la capacitación o la asistencia técnica en el uso de plaguicidas), se hará de acuerdo con lo que se describe en las directrices de PERSUAP.	% participantes capacitados en uso seguro de plaguicidas	% = # entrevistados que respondieron 2, 4, 5, 6 a P1 / Total de entrevistados	1. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1.Evaluación de las características de la plaga previo a la aplicación del plaguicida: 40% 2. Uso seguro de pesticidas: 35.3% 3. Manejo Integrado de Plagas (Métodos alternativos para el control de plagas): 44.7% 4. Riesgos en la salud y el ambiente por el uso de pesticidas: 39% 5. Uso de equipos de protección personal: 33.2% 6. Descarte adecuado de envases con residuos de pesticidas: 43.2% 7. Otro (Especificar): 10.5%	52.1%
		% de participantes capacitados que aplican el uso seguro de plaguicidas.	% = # entrevistados que respondieron 1 a P3 / Total de entrevistados	3. ¿Aplica plaguicidas aprobados por el PERSUAP?	Sí: 11.1% No: 88.9%	11.1%
4	Aplicar el principio de Manejo Integrado de Plagas.	% participantes capacitados en Manejo Integrado de Plagas	% = # entrevistados que respondieron 1, 3 a P1 / Total de entrevistados	1. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1.Evaluación de las características de la plaga previo a la aplicación del plaguicida: 40% 2. Uso seguro de pesticidas: 35.3% 3. Manejo Integrado de Plagas (Métodos alternativos para el control de plagas): 44.7% 4. Riesgos en la salud y el ambiente por el uso de pesticidas: 39% 5. Uso de equipos de protección personal: 33.2% 6. Descarte adecuado de envases con residuos de pesticidas: 43.2% 7. Otro (Especificar): 10.5% 8. NINGUNO: 42.11%	50.5%
		% de participantes capacitados que aplican el Manejo Integrado de Plagas.	% = # entrevistados que respondieron 1, 2, 3, 4, 5, 6, 7, 8 a P2 / Total de capacitados (respondieron 1, 3 a P1)	2. ¿Qué acciones realiza para el manejo de plagas? (Manejo Integrado de Plagas)	1. Asociación de cultivos (Labores culturales): 62.1% 2. Uso de barreras vivas (Labores culturales): 36.3% 3. Empleo de Beauveria, trichoderma (control biológico): 19% 4. Empleo de trampas (Control etológico) : 32.6% 5. Empleo de variedades resistentes (Control genético): 43.7% 6. Manejo de poda (Labores culturales): 81.1% 7. Manejo de sombra (Labores culturales): 86.8% 8. Remoción manual de malezas o de plagas (Control mecánico): 61.6% 9. Otra (Especificar):5.8% 10. NINGUNA: 3.7%	99.0%
5	Uso obligatorio de equipo de protección para la aplicación de pesticidas.	% de participantes capacitados y que utiliza Equipo Básico de Obligatorio para Aplicación de Pesticidas.	% = # entrevistados que respondieron 1, 2, 3, 4, 5 a P4 / Total de capacitados (respondieron 5 a p1)	4. De los siguientes equipos de protección personal, ¿Cuáles utiliza cuando manipula productos químicos o plaguicidas?	1. Guantes (de plástico, no de tela): 34.7% 2. Lentes para cubrir los ojos: 39.5% 3. Mascarilla que cubre boca y nariz: 45.8% 4. Botas de jebe: 95.3% 5. Plástico para cubrir la espalda, para que no tenga contacto directo con la mochila o capa: 50% 6. Otros: 10% 7. Ninguno: 2.1%	98.4%

Nº	Medida de mitigación	Indicador	Formula de calculo	Pregunta en instrumento de recolección	Resultados por pregunta	Resultado indicador
20	Capacitar a los agricultores sobre los riesgos a la salud en el corto y largo plazo, debido a prácticas que deben ser evitadas como: falta de adecuado equipo de protección (guantes, lentes cubre ojos, mandiles, botas); inapropiado almacenamiento de pesticidas; inapropiado descarte de los envases de pesticidas o soplar con la boca las boquillas atoradas.	% participantes capacitados en al menos 1 de los items siguientes: · Uso el equipo básico de protección. · Almacenamiento inapropiado de pesticidas. · Inapropiado descarte de los envases de pesticidas.	% = # entrevistados que respondieron 2, 4, 5, 6 a P1 / Total de entrevistados	1. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1.Evaluación de las características de la plaga previo a la aplicación del plaguicida: 40% 2. Uso seguro de pesticidas: 35.3% 3. Manejo Integrado de Plagas (Métodos alternativos para el control de plagas): 44.7% 4. Riesgos en la salud y el ambiente por el uso de pesticidas: 39% 5. Uso de equipos de protección personal: 33.2% 6. Descarte adecuado de envases con residuos de pesticidas: 43.2% 7. Otro (Especificar): 10.5%	52.1%%
	Fertilización y abonamiento					
2	Para entrenamiento en el uso de fertilizantes, CAFE deberá asegurar que se incorpore la provisión del Plan de Manejo de Fertilizantes.	% de participantes capacitados en Plan de Abonamiento.	% = # entrevistados que respondieron 1 a p 9.1 / Total de entrevistados	9. ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto? 9.1Elaboración de Plan de Manejo de Fertilizantes o Plan de Abonamiento (2 a 3 abonamientos al año)	1. SI 2. NO	44.7%
		% de participantes capacitados que aplican el Plan de Abonamiento	% = # entrevistados que respondieron1 a P10.4 / Total de capacitados en plan de abonamiento (p9.1=1)	10.4 ¿Aplica usted su Plan de Abonamiento?	1. SI 2. NO	72.9%
3	La preparación de fertilizantes orgánicos (sólidos y/o líquidos) será una prioridad en los eventos de capacitación de agricultores, así como la incorporación de fertilizantes verdes (estiércol, compost) para mejorar la calidad del suelo.	% participantes capacitados en Preparación de Fertilizantes Orgánicos.	% = # entrevistados que respondieron 2, 3 a p10.4 / Total de entrevistados	9. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1. Elaboración de Plan de Manejo de Fertilizantes o Plan de Abonamiento (2 a 3 abonamientos al año): 44.7% 2. Uso de compostera y elaboración de compost: 52.6% 3. Preparación y uso de biofertilizantes (abonos orgánicos): 45.3% 4. Siembra de leguminosas (guaba): 47.4% 5. Otro (Especificar): 12.6% 6. NINGUNO: 33.2%	55.3%
		% de participantes capacitados que incorporan el uso de Fertilizantes Orgánicos en el suelo de sus fincas.				(*)
8	Capacitar a los agricultores en el correcto uso y aplicación de fertilizantes y pesticidas.	% participantes capacitados en el correcto uso y aplicación de fertilizantes según plan de abonamiento y pesticidas como última opción.	% = # entrevistados que respondieron 1 a P9 / Total de entrevistados	9. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1. Elaboración de Plan de Manejo de Fertilizantes o Plan de Abonamiento (2 a 3 abonamientos al año): 44.7% 2. Uso de compostera y elaboración de compost: 52.6% 3. Preparación y uso de biofertilizantes (abonos orgánicos): 45.3% 4. Siembra de leguminosas (guaba): 47.4% 5. Otro (Especificar): 12.6% 6. NINGUNO: 33.2%	44.7%%

Nº	Medida de mitigación	Indicador	Formula de calculo	Pregunta en instrumento de recolección	Resultados por pregunta	Resultado indicador
		% de participantes capacitados que aplican el correcto uso y aplicación de fertilizantes según plan de abonamiento y pesticidas como última opción.	% = # entrevistados que respondieron 1 a P10.4 / Total de capacitados en manejo e fertilizantes o abonamiento (p9=1)	10.4 ¿Aplica usted su Plan de Abonamiento?	1. SI 2. NO	72.9%
9	Reforzar la elaboración de abonos orgánicos a partir de los residuos del despulpado del café.	% participantes capacitados en la elaboración de abonos orgánicos a partir de los residuos del despulpado del café.	% = # entrevistados que respondieron 3 a P9 / Total de entrevistados	9. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1. Elaboración de Plan de Manejo de Fertilizantes o Plan de Abonamiento (2 a 3 abonamientos al año): 44.7% 2. Uso de compostera y elaboración de compost: 52.6% 3. Preparación y uso de biofertilizantes (abonos orgánicos): 45.3% 4. Siembra de leguminosas (guaba): 47.4% 5. Otro (Especificar): 12.6% 6. NINGUNO: 33.2%	45.3%
14	Implementar la construcción de pequeños depósitos para arrojar los residuos del despulpado.	% participantes capacitados en el manejo de la pulpa de café (compostaje).	% = # entrevistados que respondieron 2 a P9 / Total de entrevistados	9. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1. Elaboración de Plan de Manejo de Fertilizantes o Plan de Abonamiento (2 a 3 abonamientos al año): 44.7% 2. Uso de compostera y elaboración de compost: 52.6% 3. Preparación y uso de biofertilizantes (abonos orgánicos): 45.3% 4. Siembra de leguminosas (guaba): 47.4% 5. Otro (Especificar): 12.6% 6. NINGUNO: 33.2%	52.6%
15	Reforzar la elaboración de fertilizantes orgánicos (composteras) a partir de la pulpa del café y otros residuos de cosecha.	% de participantes capacitados que aplican la elaboración de abonos orgánicos a partir de los residuos del despulpado del café.				(*)
	Reforestación y control de erosión					
7	Implementar el uso de cultivos de cobertura y el uso de medios mecánicos para el control de malezas.	El indicador establecido en el PMMA: Porcentaje de participantes capacitados que logran recolectar al menos el envase de pesticida. No se asocia con la medida 7 sino con la medida 6, por lo que fue reubicado				
11	Capacitar permanentemente en manejo y conservación de suelos.	% participantes capacitados en manejo y conservación de suelos.	% = # entrevistados que respondieron 1, 2, 3, 4, 5, 6 a p 15 / Total de entrevistados	15. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1. Barreras de contención vivas o muertas: 30.5% 2. Cultivos en curvas de nivel / filas en contra de la pendiente: 32.6% 3. Zanjas de infiltración/ drenes:21.1% 4. Manejo de árboles de sombra: 54.7% 5. Siembra de arbustos en las orillas de arroyos:33.7% 6. Siembra de árboles forestales (tornillo, moena, laurel cafetero, shaina): 44.2% 7. Otro (Especificar): 13.7% 6. NINGUNO: 31.6%	63.2%

Nº	Medida de mitigación	Indicador	Formula de calculo	Pregunta en instrumento de recolección	Resultados por pregunta	Resultado indicador
17	Capacitación intensiva a los agricultores sobre las diferentes formas de conservación de suelos, estableciendo máximas inclinaciones donde el café pueda ser sembrado.	% participantes capacitados en las diferentes formas de conservación de suelos, estableciendo máximas inclinaciones, donde el café pueda ser sembrado.	% = # entrevistados que respondieron 1, 2, 3, 4, 5, 6 a p 15 / Total de entrevistados	15. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1. Barreras de contención vivas o muertas: 30.5% 2. Cultivos en curvas de nivel / filas en contra de la pendiente: 32.6% 3. Zanjas de infiltración/ drenes:21.1% 4. Manejo de árboles de sombra: 54.7% 5. Siembra de arbustos en las orillas de arroyos:33.7% 6. Siembra de árboles forestales (tornillo, moena, laurel cafetero, shaina): 44.2% 7. Otro (Especificar): 13.7% 6. NINGUNO: 31.6%	63.2%
18	Implementar la instalación de terrazas de formación lenta, curvas de nivel, barreras de contención vivas o muertas. Cada medida de conservación tiene que estar de acuerdo con la inclinación de la ladera.	% Participantes capacitados que implementan al menos una de las diferentes formas de conservación de suelos, estableciendo máximas inclinaciones, donde el café pueda ser sembrado.	% = # entrevistados que respondieron 1, 2, 3, 4 a p 17 / Total de entrevistados	17. ¿Ha instalado o ya cuenta con alguno de los siguientes árboles en su parcela?	1. Laurel cafetero 2. Moena 3. Tornillo 4. Otro (Especificar): 5. NINGUNA	76.84%
19	Cubrir el suelo con una capa de mulch aprovechando los residuos del café como hojas, hojarasca, ramas etc.	% Participantes capacitados que cubren el suelo con residuos de poda de la planta de café.	% = # entrevistados que respondieron 3 a p 20 / Total de entrevistados	20. ¿Qué hace con los residuos orgánicos procedentes de su parcela y vivienda?	1. Los quema 2. Los desecha (no los utiliza en la parcela) 3. Los dispone entre las calles del café 4. Lo composta 5. Otro (Especificar):	50.5%
	Manejo de residuos sólidos y afluentes					
6	Manejo y disposición final de contenedores (botellas, bolsas, latas) que contienen residuos de plaguicidas.	% participantes capacitados en Manejo y Disposición Final de Contenedores.	% = # entrevistados que respondieron 6 a p 1 / Total de entrevistados	1. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1.Evaluación de las características de la plaga previo a la aplicación del plaguicida: 40% 2. Uso seguro de pesticidas: 35.3% 3. Manejo Integrado de Plagas (Métodos alternativos para el control de plagas): 44.7% 4. Riesgos en la salud y el ambiente por el uso de pesticidas: 39% 5. Uso de equipos de protección personal: 33.2% 6. Descarte adecuado de envases con residuos de pesticidas: 43.2% 7. Otro (Especificar): 10.5% 8. NINGUNO: 42.11%	43.2%
		% Participantes capacitados que logran recolectar al menos el envase de pesticida.	% = # entrevistados que respondieron 1, 2, 6 a p 5 / Total de entrevistados	5. ¿Dónde desecha los envases peligrosos (botellas, bolsas, latas) que contienen residuos de agroquímicos?	1. En contenedores o costales específicos para su uso: 26.8% 2. Los entrega a la empresa Campo Limpio: 6.8% 3. En cualquier contenedor: 8.4% 4. En contenedores de reciclaje: 9.5% 5. En fuentes de agua: 1.1% 6. Los entierra: 54.2% 7. Otro (Especificar): 31.1%	79.3%

N°	Medida de mitigación	Indicador	Formula de calculo	Pregunta en instrumento de recolección	Resultados por pregunta	Resultado indicador
	Conservación de fuentes de agua					
10	Implementar campañas de concientización sobre las implicancias de la contaminación del agua	N° de Campañas implementadas de concientización sobre las implicancias de la contaminación del agua.	% = # entrevistados que respondieron 1 a p 25 / Total de entrevistados	25. Recuerda que el proyecto haya lanzado campañas de comunicación o información sobre los siguientes temas?	1. Campañas implementadas de concientización sobre las implicancias de la contaminación del agua en el último año: 24.7% 2. Campañas implementadas de concientización sobre la contaminación de pesticidas en el último año y de los cursos de agua y cómo evitarlos: 25.3%	24.7%
12	Organizar campañas de concientización sobre la contaminación de pesticidas y de los cursos de agua y cómo evitarlos.	N° de Campañas implementadas de concientización sobre la contaminación de pesticidas y de los cursos de agua y cómo evitarlos.	% = # entrevistados que respondieron 2 a p 25 / Total de entrevistados	25. Recuerda que el proyecto haya lanzado campañas de comunicación o información sobre los siguientes temas?	1. Campañas implementadas de concientización sobre las implicancias de la contaminación del agua en el último año: 24.7% 2. Campañas implementadas de concientización sobre la contaminación de pesticidas en el último año y de los cursos de agua y cómo evitarlos: 25.3%	25.3%
13	Proveer entrenamiento y monitoreo en el manejo ambiental de las aguas mieles, así como la mejor forma de tratar los residuos del despulpado.	% participantes capacitados en la elaboración de abonos orgánicos a partir de los residuos del despulpado del café.	% = # entrevistados que respondieron 3 a p 9 / Total de entrevistados	9. De los siguientes temas, ¿Podría indicar en cuales recibió capacitación durante el último año por parte del proyecto?	1. Elaboración de Plan de Manejo de Fertilizantes o Plan de Abonamiento (2 a 3 abonamientos al año): 44.7% 2. Uso de compostera y elaboración de compost: 52.6% 3. Preparación y uso de biofertilizantes (abonos orgánicos): 45.3% 4. Siembra de leguminosas (guaba): 47.4% 5. Otro (Especificar): 12.6% 6. NINGUNO: 33.2%	45.3%
16	Implementar la construcción de pequeños canales y pozos de infiltración para conducir las aguas mieles y evitar la contaminación de los acuíferos.	% de participantes capacitados que tratan las aguas residuales y evitan la contaminación de los acuíferos.				(*)

ANNEX H: DATA COLLECTION TOOLS

GUÍA DE ENTREVISTA

INFORMANTE: RESPONSABLE DE TELECENTRO

Género de participante:

Edad de participante:

Lugar de entrevista:

Fecha de entrevista:

Tamaño de parcela:

Leer/explicar el CONSENTIMIENTO INFORMADO autorizando la Entrevistas en profundidad.

Confirmar que existe convenio actualizado con el gob. Local u otra instancia (yachay) para aplicar PMMA

Manejo de Residuos sólidos

6. ¿La municipalidad cuenta con protocolos o guías para el manejo de residuos sólidos?
7. ¿Usted ha recibido capacitación en clasificación, manejo y reciclaje de residuos sólidos? Si es afirmativo, ¿quién le dio la capacitación? ¿hace cuánto? ¿cómo lo aplica y cuáles han sido los resultados?
8. En este lugar, ¿cómo organizan los desechos sólidos (especificar a qué se refieren para que el interlocutor entienda)? Si no se realiza indagar ¿por qué?
9. ¿Realizan reciclaje? ¿Quién lo realiza? ¿Cómo realizan el reciclaje?
10. ¿Se cuenta con un sistema de clasificación de residuos peligrosos y sólidos (orgánicos e inorgánicos) en su telecentro? Si es afirmativo, ¿dónde se acopia y cuál es su disposición final, o hay empresas especializadas que se encargan del acopio? Si no se realiza preguntar ¿por qué?

Cuidado del agua

11. ¿Ha recibido capacitación en eficiencia del uso del agua en su telecentro? Si es afirmativo, ¿cómo lo aplica y cuáles fueron los resultados?
12. ¿El telecentro cuenta con un plan de mantenimiento de los servicios higiénicos? Cómo se aplica

Mantenimiento de equipo eléctricos

13. Primero indagar por los equipos eléctricos que tiene
14. ¿Su telecentro cuenta con un plan de mantenimiento de los equipos eléctricos? Si es afirmativo ¿quiénes son los encargados de su implementación y con qué frecuencia se realiza el mantenimiento?

¿cuáles son los equipos que reciben mantenimiento? Indagar qué hacen si los equipos no tienen mantenimiento

Eficiencia energética

1. ¿Usted ha recibido capacitación en eficiencia energética? Si es afirmativo, ¿quién le dio la capacitación? ¿hace cuánto? ¿cómo aplica lo aprendido?

Recomendaciones

1. ¡Qué recomendaciones podría proporcionar para mejorar la implementación de los temas tratados en el telecentro?
2. ¿Cuál es el mayor riesgo para el cuidado ambiental?? ¿Qué alternativas aplicaron?
3. ¿Qué retos y propuestas tuvieron con el Covid-19 y cuales fueron o son las mayores dificultes?

GUÍA DE ENTREVISTA

INFORMANTE: AGRICULTORES DE CAFÉ y CACAO

Género de participante:

Edad de participante:

Lugar de entrevista:

Fecha de entrevista:

Tamaño de parcela:

Leer/explicar el CONSENTIMIENTO INFORMADO autorizando la Entrevistas en profundidad.

Preguntar sobre los FACTORES. La influencia del contexto del covid y exigencias productivas e impedir/limitar pérdidas.

Uso y manejo seguro de plaguicidas

1. ¿Los productores de su comunidad utilizan equipos de protección para el manejo de agroquímicos? ¿El uso es frecuente? De no ser así, ¿a qué se debe?
2. ¿Tienen en su comunidad un lugar específico para almacenar y preparar los agroquímicos? De ser así, ¿podría brindar mayores detalles sobre la ubicación y condiciones de dichos lugares? ¿quién administra ese lugar? De no ser así, ¿a qué se debe?
3. ¿Usted conoce cómo los productores de su comunidad realizan la limpieza de los equipos agrícolas luego de su uso en el proceso productivo?

Fertilización y abonamiento

1. ¿Los productores de su comunidad utilizan abonos y fertilizantes orgánicos (ej. compost, estiércol, capa de suelo con residuos de cosecha)? De ser así, ¿cuál es el más empleado? Si no usan, ¿a qué se debe?
2. ¿Cuál es la práctica más común para el control de malezas en su comunidad?
3. ¿Utilizan calicatas durante el proceso de plantación del cultivo? De ser así, ¿podría brindar mayores detalles sobre cómo se utiliza y por qué?

Reforestación/ control de la erosión

1. ¿En su comunidad, cuáles son las técnicas de conservación de suelos más empleadas? (Ej. barreras de contención, zanjas de infiltración/ drenes, árboles de sombra) Si no se aplican ¿por qué cree?
2. ¿Los cultivos de (Café/ Cacao) de su comunidad cuentan con árboles que sirven de sombra? ¿Cuál es la variedad nativa más utilizada? (Ej. Bolaina, Capirona, Shaina, Guana)

Manejo de residuos sólidos/ efluentes

1. ¿En esta comunidad se emplea alguna técnica para tratar las aguas mieles? ¿cuáles? ¿quiénes las utilizan?

2. ¿Cuál es la práctica común en su comunidad para desechar los envases de agroquímicos utilizados? (Ej. limpieza de contenedores vacíos, reciclaje de contenedores, almacenamiento de contenedores en costales y entrega de los mismos a una empresa prestadora de servicios de residuos sólidos) ¿quiénes son los que realizan esta práctica? ¿quiénes no? ¿por qué?
3. ¿En su comunidad es frecuente la quema de residuos vegetales en las parcelas? De ser así, ¿a qué se debe ello?

Conservación de fuentes de agua

1. ¿Cuentan con alguna fuente natural de agua cercana a su comunidad empleada para fines agrícolas? De ser así, ¿se conserva vegetación en las cabeceras y riberas de estas fuentes de agua? De no ser así, ¿a qué se debe?
2. ¿Se aplica en la comunidad alguna técnica para la siembra y cosecha de agua? ¿cuál? Si no es así ¿por qué?

Preguntas generales

1. ¿Usted ha sido capacitado o tuvo asistencia técnica para el conocimiento de estas medidas?
2. ¿Cuáles son las acciones que puede implementar su comunidad para mejorar las prácticas ambientales señaladas?
3. ¿Qué podría realizarse para que los productores de su comunidad implementen las medidas ambientales anteriormente mencionadas? ¿Quién debería liderar dicho proceso?
4. En su opinión, ¿cuál es el rol de la mujer en la implementación de las prácticas ambientales anteriormente señaladas? ¿Ud. identifica diferencias en la participación del hombre y la mujer para la implementación de dichas prácticas?

GUÍA DE ENTREVISTA

INFORMANTE: ACUICULTORES

Género de participante:

Edad de participante:

Lugar de entrevista:

Fecha de entrevista:

Volumen de producción:

Antigüedad en la instalación del módulo:

Leer/explicar el CONSENTIMIENTO INFORMADO autorizando la Entrevistas en profundidad.

Confirmar que existe convenio actualizado con el gobierno Local /regional (Gerencia económica/Producción) para el PMMA. Asimismo, si cuenta con opinión de SERNANP y SERFOR, si la instalación está en superposición con Áreas Naturales Protegidas ANPs y/o zonas de amortiguamiento /Bosques de Producción Permanente BPP

1. Cuando va a instalar el módulo de producción de peces amazónicos ¿qué aspectos toma en cuenta para la elección del sitio para la instalación? Y ¿respecto a los bosques y la diversidad biológica? ¿Usted qué opina sobre estas medidas? ¿los otros productores cumplen con estas medidas? ¿por qué?
2. ¿Qué debe tener en cuenta sobre el paisaje y los terrenos? En esta comunidad ¿han respetado estos aspectos para instalar los módulos? ¿por qué?
3. ¿Qué medidas toma para no contaminar con los módulos demostrativos/unidades acuícolas por residuos sólidos orgánicos e inorgánicos? ¿Usted qué opina de estos aspectos? ¿los otros productores cumplen con estas medidas? ¿por qué?
4. ¿Qué medidas toma para el manejo de insumos para la desinfección del módulo? Y ¿para la fertilización? ¿Usted qué opina de estos aspectos? ¿los otros productores cumplen con estas medidas? ¿por qué?
5. ¿Me puede comentar acerca del uso de alimentos balanceados en su módulo? ¿cuánto y cada qué tiempo los usa? ¿Usted qué opina de estos aspectos? ¿los otros productores cumplen con estas medidas? ¿por qué?
6. ¿Qué hace cuando se presentan animales muertos, y peces muertos?
7. ¿Usted ha sido capacitado en estos temas? ¿por quién? ¿hace cuánto tiempo? ¿en qué consistió?
8. En su opinión, ¿cuál es el rol de la mujer en la implementación de las prácticas ambientales anteriormente señaladas? ¿Ud. identifica diferencias en la participación del hombre y la mujer para la implementación de dichas prácticas?
9. ¿Qué recomendaciones podría proporcionar para mejorar la implementación de estos temas tratados? ¿Requiere el apoyo de otras instituciones? ¿De cuáles? ¿por qué?
10. ¿Qué retos y propuestas tuvieron con el Covid-19 y cuales fueron o son las mayores dificultes?

GUÍA DE ENTREVISTA

INFORMANTE: EQUIPO TÉCNICO DEL PROYECTO

Lugar de entrevista:

Fecha de entrevista:

Instancia a la que pertenece o perteneció:

Leer/explicar el CONSENTIMIENTO INFORMADO autorizando la Entrevistas en profundidad.

PMMA

1. ¿Los formatos actuales remitidos por USAID, para la elaboración del Plan de Monitoreo y Mitigación Ambiental (PMMA) permiten identificar y gestionar los impactos ambientales más relevantes del proyecto? ¿por qué?
2. ¿Existen otros impactos ambientales que no están incluidos en el PMMA? ¿cuáles son? ¿por qué no se incluyeron?
3. ¿Cómo se integran la gestión de las medidas de mitigación contempladas en el PMMA en el ciclo del proyecto (diseño, implementación, monitoreo y evaluación)? ¿Las medidas de mitigación están incorporadas en los planes operativos de actividades? ¿Quiénes se encargan de implementarlas y quién se encarga de reportarlas?
4. ¿Cuenta con algún especialista encargado de la implementación del PMMA, a nivel de las zonas de trabajo del proyecto y a nivel central (Lima)? ¿Podría detallar sus funciones?

Cumplimiento de medidas ambientales

1. ¿Los ECR internos, son elaborados por personal del proyecto o por consultorías independientes?
2. ¿Conocen los resultados del ECR externo? ¿Qué opinión le merecen?
3. ¿Cuenta con algún mecanismo de seguimiento a la implementación de las recomendaciones vertidas en el ECR interno? ¿Existe un análisis de pertinencia de las mismas, así como de factibilidad para implementarlas? ¿Tienen dificultades para implementar las recomendaciones?
4. ¿Qué condiciones/ aspectos debería presentar un ECR interno para que contribuya a un mejor cumplimiento de las medidas ambientales del PMMA?
5. ¿Qué opina sobre el nivel de cumplimiento de las medidas ambientales? ¿por qué?
6. ¿Cuáles son las medidas que se cumplen en mayor medida? ¿por qué?
7. ¿Cuáles son las medidas que se cumplen en menor medida? ¿por qué?
8. ¿Existen diferencias en el nivel de cumplimiento ambiental por regiones de influencia del proyecto? Sustente su respuesta
9. ¿Qué factores limitan el cumplimiento de las medidas de mitigación ambiental por parte de los beneficiarios y cuáles los facilitan? ¿existen diferencias regionales?

Recomendaciones

1. En su opinión, ¿cuál es el rol de la mujer en la implementación de las prácticas ambientales anteriormente señaladas? ¿Ud. identifica diferencias en la participación del hombre y la mujer para la implementación de dichas prácticas?
2. ¿Qué acciones se podrían implementar para mejorar el cumplimiento de las medidas ambientales?
3. ¿Qué opinión le merece otorgar incentivos a los beneficiarios que cumplen con las medidas de mitigación ambiental?
4. ¡Qué recomendaciones podría proporcionar para mejorar la implementación de los temas tratados en el telecentro?

ANNEX I: INFORMED CONSENT

ENTREVISTAS EN PROFUNDIDAD

Somos profesionales en ciencias sociales y estamos a cargo de un estudio para analizar la implementación de las medidas de mitigación ambiental en los proyectos implementados por las Alianzas CAFÉ, CACAO y CR3CE y por PORI. Nos gustaría invitarlo(a) a participar en una entrevista para conocer su experiencia y opinión sobre estos temas y recoger sus sugerencias para el diseño e implementación de futuros proyectos.

1. ¿Cuál es el objetivo de la investigación?

El objetivo general del presente estudio es analizar el nivel de cumplimiento de las medidas de mitigación ambiental identificadas por las Alianza Cacao, Alianza CAFE, Alianza CR3CE y PORI, conocer las dificultades para su implementación y proporcionar recomendaciones para incrementar el cumplimiento exitoso de las medidas ambientales.

2. ¿En qué consiste mi participación?

Le pediremos participar en una entrevista en la que buscaremos conocer sus opiniones sobre la implementación de las medidas ambientales. La conversación durará 1 hora aproximadamente, y se realizará en una sesión virtual privada y cómoda para usted.

3. ¿Cómo se manejará la privacidad de mis opiniones?

Toda la información compartida por usted será confidencial, es decir, solo será utilizada por los profesionales de este estudio y no será usada con otra finalidad. Su nombre y su apellido no serán escritos en las notas de la entrevista, por lo que no habrá forma de identificarlo personalmente. Las grabaciones no llevarán su nombre ni permitirán identificarlo. Luego de dos años las grabaciones serán eliminadas. Solo el equipo de estudio tendrá acceso a los datos de esta evaluación, y ningún dato será citado en reporte final de manera identificable.

4. ¿Qué beneficios obtendré? ¿Qué riesgos existen?

Participar en este estudio no le traerá un beneficio directo o inmediato, pero al darnos información estará colaborando con nosotros en desarrollar propuestas destinadas a mejorar futuros proyectos. Participar de la entrevista no tiene riesgos mayores. Como con cualquier estudio, existe un riesgo de filtración de datos. En este caso, la participación de usted en este estudio podría volverse público, sin embargo, no habrá ninguna manera de vincular su participación a ninguna respuesta o dato dado. Recuerde que todo será confidencial, y los resultados serán prFesentados de forma agregada.

Al ser presencial, participar de la entrevista presenta el riesgo de contagio por el COVID-19. Por ello, le solicitamos seguir el cumplimiento estricto de las medidas establecidas en el protocolo de bioseguridad ante el COVID-19 que consiste en:

- Utilizar de forma permanente una mascarilla KN95 o doble mascarilla
- Guardar el distanciamiento social de 1.5 m durante toda la entrevista
- Está prohibido el saludo de manos u otro tipo de saludo que implique el contacto físico entre los participantes
- No se permitirá el ingreso a participantes adicionales a aquellos convocados durante las coordinaciones previas a la reunión

- La encuesta respetará y cumplirá con el horario y la duración establecida
- No se permitirá el consumo de alimentos o bebidas durante la aplicación de la encuesta
- Si alguno de los participantes presentase algún síntoma de resfrío, se procederá a cancelar la aplicación de la encuesta

Las medidas del protocolo de bioseguridad ante el COVID-19 han sido establecidas de acuerdo con las nuevas formas de interacción en la vida diaria, en el marco de la emergencia sanitaria por el COVID-19. Ello con el objetivo de salvaguardar la salud del informante y del equipo consultor

5. ¿Tiene algún costo mi participación?

No, participar en este estudio no tendrá ningún costo para usted.

6. ¿Es mi participación voluntaria?

Su participación es totalmente voluntaria. Usted puede dejar de participar o dejar de contestar una o más preguntas en cualquier momento si así lo decide, ello no tendrá consecuencia para usted.

7. ¿A quién debo contactar si tengo dudas?

Este estudio ha sido revisado y aprobado por el Comité de Ética de EnCompass, si usted requiere más información puede comunicarse con:

- Presidente Comité de Ética IRB@encompassworld.com
- Susana Guevara Salas, teléfono 997611979 correo electrónico sguevara@encompassworld.com

Autorización para realizar la entrevista

Si usted está de acuerdo con participar en el estudio, le solicitamos nos brinde su autorización para realizar la entrevista. De todas formas, le recordamos que usted puede dejar de participar o dejar de contestar una o más preguntas en cualquier momento.

	Marcar (x)
Acepto participar en la entrevista	

Autorización de grabación de la sesión

	Marcar (x)
Adicionalmente, si usted está de acuerdo y nos da su autorización, la entrevista será grabada para no perder información valiosa para el estudio. Si algunas preguntas le son incómodas, usted tiene el derecho de no contestarlas. **También tomaremos un registro fotográfico del lugar y su persona si nos permite.** Los registros serán tratados de manera confidencial y serán utilizados únicamente para fines del estudio.	
Autorizo la grabación de la entrevista	

Nombres y apellidos: _____

Firma: _____

Observación (opcional): _____

HOJA DE CONSENTIMIENTO INFORMADO

ENCUESTAS PRESENCIALES

Somos profesionales en ciencias sociales y estamos a cargo de un estudio para analizar la implementación de las medidas de mitigación ambiental en los proyectos implementados por las Alianzas CAFÉ, CACAO y CR3CE y por PORI. Nos gustaría invitarlo(a) a participar en una breve encuesta.

1. ¿Cuál es el objetivo de la investigación?

El objetivo general del presente estudio es analizar el nivel de cumplimiento de las medidas de mitigación ambiental identificadas por las Alianza Cacao, Alianza CAFE, Alianza CR3CE y PORI, conocer las dificultades para su implementación y proporcionar recomendaciones para incrementar el cumplimiento exitoso de las medidas ambientales.

2. ¿En qué consiste mi participación?

Le pediremos participar en una encuesta en la que buscaremos conocer sobre su actividad agropecuaria y las medidas ambientales que aplica. La encuesta durará entre 30-40 minutos aproximadamente, y se realizará en una sesión privada y cómoda para usted.

3. ¿Cómo se manejará la privacidad de mis opiniones?

Toda la información compartida por usted será confidencial, es decir, solo será utilizada por los profesionales de este estudio y no será usada con otra finalidad. Su nombre y su apellido no serán escritos en las notas de la encuesta, por lo que no habrá forma de identificarlo personalmente.

4. ¿Qué beneficios obtendré? ¿Qué riesgos existen?

Participar en este estudio no le traerá un beneficio directo o inmediato, pero al darnos información estará colaborando con nosotros en desarrollar propuestas destinadas a mejorar futuros proyectos de USAID. Participar de la entrevista no tiene riesgos importantes. Como con cualquier estudio, existe un riesgo de filtración de datos. En este caso, la participación de usted en este estudio podría volverse público, sin embargo, no habrá ninguna manera de vincular su participación a ninguna respuesta o dato dado. Recuerde que todo será confidencial, y los resultados serán presentados de forma agregada.

Al ser presencial, participar de la entrevista presenta el riesgo de contagio por el COVID-19. Por ello, le solicitamos seguir el cumplimiento estricto de las medidas establecidas en el protocolo de bioseguridad ante el COVID-19 que consiste en:

- Utilizar de forma permanente una mascarilla KN95 o doble mascarilla
- Guardar el distanciamiento social de 1.5 m durante toda la entrevista
- Está prohibido el saludo de manos u otro tipo de saludo que implique el contacto físico entre los participantes
- No se permitirá el ingreso a participantes adicionales a aquellos convocados durante las coordinaciones previas a la reunión
- La encuesta respetará y cumplirá con el horario y la duración establecida
- No se permitirá el consumo de alimentos o bebidas durante la aplicación de la encuesta
- Si alguno de los participantes presentase algún síntoma de resfrío, se procederá a cancelar la aplicación de la encuesta

Las medidas del protocolo de bioseguridad ante el COVID-19 han sido establecidas de acuerdo con las nuevas formas de interacción en la vida diaria, en el marco de la emergencia sanitaria por el COVID-19. Ello con el objetivo de salvaguardar la salud del informante y del equipo consultor.

5. ¿Tiene algún costo mi participación?

No, participar en este estudio no tendrá ningún costo para usted.

6. ¿Es mi participación voluntaria?

Su participación es totalmente voluntaria. Usted puede dejar de participar o dejar de contestar una o más preguntas en cualquier momento si así lo decide, ello no tendrá consecuencia para usted.

7. ¿A quién debo contactar si tengo dudas?

Este estudio ha sido revisado y aprobado por el Comité de Ética de EnCompass, si usted requiere más información puede comunicarse con:

- Presidente Comité de Ética IRB@encompassworld.com
- Susana Guevara Salas, teléfono 997611979 correo electrónico sguevara@encompassworld.com

Autorización para realizar la encuesta

Si usted está de acuerdo con participar en el estudio, le solicitamos nos brinde su autorización para realizar la encuesta. De todas formas, le recordamos que usted puede dejar de participar o dejar de contestar una o más preguntas en cualquier momento.

	Marcar (x)
Acepto participar en la encuesta	

Nombres y apellidos: _____

Firma: _____

Observación (opcional): _____

ANNEX J: DICLOSURE OF CONFLICT OF INTEREST