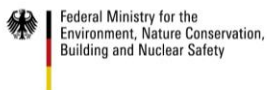


On behalf of



NAMA Facility

NAMA Support Project Outline 5th Call

To the Members of the NAMA Facility Board
NAMA Facility - Technical Support Unit (TSU)
E: contact@nama-facility.org

Country:	<i>Guatemala</i>
Project Title:	Sustainable and Low Carbon Bovine Livestock Development
Applicant:	Ministry for Environment and Natural Resources (MARN)

The following documents and annexes are enclosed:

X	General and Specific Information on the NAMA Support Project
X	Annex 1: Letters of Endorsement of National Government and national Implementing Partners
X	Annex 2: Logframe
X	Annex 3: Information and references of the (non-governmental) applicant
X	Annex 4: Detailed Project Preparation (DPP) concept
X	Annex 5: Information and references of the NSO if different from applicant (same)
-	Annex A (optional): GHG mitigation calculation
-	Annex B (optional): Business model and financial model

Version 5th Call

Submission Deadline: **15 March 2018, 3:00 pm (CEST)**

All documents must be provided in English language. If necessary, please provide a translation.

List of abbreviations

ASODEL:	Association for the development of dairy products
BANRURAL:	Bank for Rural Development
BAU:	Business as Usual
CAMAGRO:	Chamber of Agriculture
CATIE:	Tropical Agricultural Research and Higher Education Center
CHN:	National Hypothecary Credit Bank
CONADEA:	Agricultural Development Council at MAGA
DPP:	Detailed Preparation Phase
FC:	Financial Cooperation
FEGAGUATE:	Federation of livestock producers
FMVZ:	Faculty of Veterinarian Medicine and Livestock Science
FOLU:	Forestry and Other Land Use
FUNDEA:	Foundation for Entrepreneurial and Agricultural Development
GHG:	Greenhouse gas
GID:	General Information Document
INAB:	National Forestry Institute
LEDS:	Low Emissions Development Strategy
MAGA:	Ministry of Agriculture, Livestock and Food
MARN:	Ministry for Environment and Natural Resources
M&E:	Monitoring and Evaluation
MINFIN:	Ministry of Finance
NAMA:	Nationally Appropriate Mitigation Action
NDC:	Nationally Determined Contributions
NLCSLS:	National Low-carbon and Sustainable Bovine Livestock Strategy
NSO	Nama Support Organisation
NSP:	NAMA Support Project
ODA:	Official Development Assistance
PINPEP:	Forest Incentives program for owners of small parcels with forest or agroforestry vocation
PIU:	Project Implementing Unit
PROBOSQUE:	Program for the establishment, recovery, restauration, management, production and protection of forests in Guatemala
SC:	Steering Committee
SEGEPLAN:	National Planning Secretariat
TC:	Technical Cooperation
TNC:	The Nature Conservancy
ToC:	Theory of Change
TSU:	Technical Support Unit of the NAMA Facility
USAC:	San Carlos University
USAID:	United States Agency for International Development
VAT:	Value Added Tax
VIDER:	Vice-ministry for Rural Economic Development
VISAR	Vice-ministry for Agricultural and animal health and Regulations

1. General Information on the NAMA Support Project		
1.1 Project data	Project title	<i>Sustainable and Low Carbon Bovine Livestock Development</i>
	Country of implementation	<i>Guatemala</i>
	Sector focus	<input checked="" type="checkbox"/> <i>Agriculture</i> <input type="checkbox"/> <i>Forestry</i> <input type="checkbox"/> <i>Land use</i> <input type="checkbox"/> <i>Transport</i> <input type="checkbox"/> <i>Energy efficiency</i> <input type="checkbox"/> <i>Renewable energy</i> <input type="checkbox"/> <i>Waste/Waste water</i> <input type="checkbox"/> <i>Other</i>
	Duration of project implementation	60 months
	Duration of detailed preparation (DPP)	8 months
	NSP volume (EUR)	Preparation (DPP): 360,000.00 (<i>requested by this application</i>) Implementation: 9,300,000.00 (<i>indicative estimate of NSP grant</i>) Total: 9,660,000.00
	Data sharing	<i>Do you agree that information provided in this Outline is shared with selected other funding programmes like the Green Climate Fund if this NSP is not selected for support by the NAMA Facility?</i> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Publication	<i>Are you willing to have your submission (country, sector) listed on the NAMA Facility website?</i> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Emission reduction credits	NAMA Facility Funding is used directly for greenhouse gas mitigation and/or carbon sinks, which will contribute to generating emission allowances, emission credits, or any other type of CO2 compensation certificates: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, will the credits be permanently cancelled in an approved register: Yes <input type="checkbox"/> No <input type="checkbox"/>
	1.2 National ministry 1	Name of responsible national ministry
Department		Vice-ministry for Agricultural and animal health and Regulations (VISAR)
Postal Address		7ª. Ave. 12-90 z. 13, Edificio Monja Blanca. Guatemala City.
Contact Person		Lic. Byron Omar Acevedo Cordón (Vice-minister)
Telephone		+ 502-2413-7000 (ext. 7037) and +502-5808-2053
Email		bacevedo@maga.org.gt
Website		www.maga.gob.gt
Letter of Support		<input checked="" type="checkbox"/> Official support letter attached
1.3 National ministry 2	Name of responsible national ministry	<i>Ministry for Environment and Natural Resources (MARN)</i>
	Department	Vice-ministry for Natural Resources and Climate Change
	Postal Address	7 avenida 03-67, zona 13. Guatemala City.
	UNFCCC contact:	Licda. Jenny Vásquez (jvasquez@gmail.com)
	Contact Person	Ing. Carlos Fernando Coronado Castillo (Vice-minister)
	Telephone	+502-2423-0500 (ext. 2306) and + 502-5019-2919
	Email	cfcoronado@marn.gob.gt cinternacional.marn@gmail.com

	Website	www.marn.gob.gt
	Letter of Support ¹	<input checked="" type="checkbox"/> Official support letter attached
1.4 Applicant / Applicant Support Partner	Name of institution	<i>Tropical Agricultural Research and Higher Education Center -CATIE- (on behalf of the Ministry for Environment and Natural Resources-MARN).</i> <i>Further Information in Annex 3, attached.</i>
	Type of institution	Other nongovernmental Organisation
	Legal form	International Research and Education Organization
	Non-profit status	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Department	Agriculture, Livestock and Agroforestry Program -PRAGA-
	Postal Address	Cartago, Turrialba, 30501
	Country	Costa Rica
	Contact Person	MSc. Claudia Sepúlveda Coordinator Livestock and Environment Group
	Telephone	+506-2558-2137
	Email	csepul@catie.ac.cr
	Website	www.catie.ac.cr
	Role in the project	Administrator of NSP detailed preparation funds; As NSO: Administrator of funds, Technical guidance and M&E for NSP implementation.
	1.5 Main Implementing Partners	<i>Please name national implementing partner(s) (governmental or non-governmental), who will be responsible for the implementation of the NSP</i>
Name of organisation		Chamber of Agriculture -CAMAGRO-
Type of institution		Chamber of Agriculture-Private sector
Country		<i>Guatemala</i>
Contact		Licda. Carmen Godoy Advisor carmenrosagodoy@gmail.com
Role		Technical guidance of the NSP as part of the NSP Steering Committee; Liaison between the NSP Implementing Unit and the livestock producers' organizations that are members of CAMAGRO for information sharing, outreach, communication and knowledge generation and management.
Commitment		<input checked="" type="checkbox"/> Official support letter attached
Name of organisation		Association for the development of dairy products -ASODEL-
Type of institution		Milk industry-Private sector
Country		<i>Guatemala</i>
Contact	Lic. Ramiro Pérez Executive Director directorejecutivo@asodel.com	
Role	Technical guidance of the NSP as part of the NSP Steering Committee; Liaison between the NSP Implementing Unit and the milk industry enterprises that are members of ASODEL and the cattle farms that are their suppliers for information sharing, outreach, low-carbon certification, communication and knowledge generation and management.	

	Commitment	<input checked="" type="checkbox"/> Official support letter attached
	Name of organisation	Chamber of Milk Producers -CPL-
	Type of institution	Milk producers-Private sector
	Country	Guatemala
	Contact	Licda. Astrid García Salas General Manager astgarciasalas@yahoo.es
	Role	Technical guidance of the NSP as part of the NSP Steering Committee; Liaison between the NSP Implementing Unit, service providers and the cattle farms CPL members for information sharing, outreach, technical assistance and training, low-carbon certification, communication and knowledge generation and management.
	Commitment	<input checked="" type="checkbox"/> Official support letter attached
	Name of organisation	Federation of Livestock Producers -FEGAGUATE-
	Type of institution	Federation of producers' organisations-Private sector
	Country	Guatemala
	Contact	Jorge Arriola Duque Technical Director jorgearrioladuque@gmail.com
	Role	Technical guidance of the NSP as part of the NSP Steering Committee; Liaison between the NSP Implementing Unit, service providers and the cattle farms members of FEGAGUATE for information sharing, outreach, communication and knowledge generation and management.
	Commitment	<input checked="" type="checkbox"/> Official support letter attached
	Name of organisation	Faculty of Veterinarian Medicine and Livestock Science -FMVZ/USAC-
	Type of institution	University
	Country	Guatemala
	Contact	MSc. Carlos Enrique Saavedra Vélez Coordinador de la Unidad de Vinculación FMVZ unidadvinculacionfmvz@gmail.com
	Role	Technical guidance of the NSP as part of the NSP Steering Committee; support to improve access to quality information regarding GHG emissions and potential for removals in the livestock sub-sector and support related fields of research through the coordination with the NSP Implementing Unit of studies and professional practices by students.
	Commitment	<input checked="" type="checkbox"/> Official support letter attached
1.6 NAMA Support Organisation (NSO)	<i>For information - Please propose a NSO for the implementation (Annex 5 is the same as Annex 3, attached)</i>	
	Name of organisation	<i>Tropical Agricultural Research and Higher Education Center (CATIE)</i>
	Type of institution	International Research and Training Center
	Country	Costa Rica
	Contact	MSc. Claudia Sepúlveda

2. Project Concept

2.1. Executive summary

[~ 400 words]

- In 2013, Guatemala approved its National Bovine Livestock Policy and in 2017, Guatemala elaborated its National Low-carbon and Sustainable Bovine Livestock Strategy (NLCSLS). Together, the National Bovine Livestock Policy and the NLCSLS conform Guatemala's Nationally Appropriate Mitigation Action (NAMA) for the cattle sub-sector as they refer to a sector-wide and national in scope program, country-driven and anchored in before mentioned policies and development strategies that Guatemala will implement as part of its commitment to reduce greenhouse gas (GHG) emissions. As such, the policies and related financial mechanisms will serve to create an enabling environment and channel financial flows into low-carbon investments in the cattle subsector.*

The NLCSLS is to be implemented nationwide over 15 years, starting in a priority area that covers the departments of Izabal, Petén and Alta Verapaz (Phase 1, 5 years). This region was selected as over 50% of Guatemala's cattle can be found in this area and expansion of cattle rearing in the past 10 to 15 years has taken place mainly in this area. The proposed NSP would be the key instrument to implement Phase 1 of the NLCSLS during 5 years in the priority area. In Phase 2 and 3 (10 years), more livestock farms and pastures in the priority area as well as in other regions would be phased-in; this is however not part of the present proposed NAMA Support Project (NSP), but refers to its geographic expansion and upscaling in the ten years following the implementation of the NSP.

The NSP contributes directly to reaching the reductions in GHG emissions as stated in Guatemala's NDC and is an integral part of the mitigation options in Guatemala's Low Emissions Development Strategy (LEDS). The improvement of the national capacity to provide technical support will be detrimental for the implementation of low-carbon strategies. For this reason, the NSP would hire technical assistance to work with cattle producers and their organizations and to strengthen the capacity of public and private sector for continued and sustainable technical assistance after the NSP (Phase 1 of the NLCSLS) finalizes.
- In a period of 5 years, the NSP will promote sustainable low carbon cattle production through a series of measures that will contribute to increase the resilience of the subsector, the increase of CO₂ removal, the reduction of CO_{2e} emissions in the cattle subsector, the reduction of the carbon footprint of national milk and meat production, and the increase productivity and competitiveness of the subsector. The measures include: improvement of existing pastures, intensive rotational grazing, improved nutrition/diets, improved manure management, silvopastoral systems, the management of natural regeneration and scattered trees within pastures, more efficient water management, improvement of animal husbandry practices, renewable energy at farm level, producers' organizational capacity strengthening, low/neutral carbon certification and value chain development.*
- To promote the change to sustainable low carbon livestock production, existing national forestry incentive programs will be mobilized, credit programs with banks and cooperatives will be established, and new financial products will be developed as part of the financial mechanisms. The participation of the private and public sectors in the implementation of the proposed project is key.*
- This NSP would result in 40,000 ha of improved and cultivated pastures and 300 farms with improved practices, that result by the end of the NSP (5 years) in the following changes in the prioritized area: (i) a reduction of the milk carbon footprint from 5.8 to 3.9 kg CO_{2e}/kg milk; (ii) a reduction of the meat carbon footprint from 16.5 to 11.2 kg CO_{2e}/kg meat; (iii) avoided GHG emissions of 152,996 tCO_{2e}; (iv) 9,296 tCO_{2e} in removals; (v) an increment of the stocking density from 0.89 to 1.25 LU/ha; (vi) an increase of the production of milk per*

	<p>year from 159 kg/ha/year to 234 kg/ha/year; and (vii) an increase of the meat production from 97 kg/ha/year to 184 kg/ha/year.</p> <p>Furthermore, the implementation of good practices and the strengthening of public and private technical assistance capacity will be the basis for increasing the scope of the NSP to over 2,000 farms and 210,000 ha of pasture in the following 10 years through the implementation of Phase 2 and 3 of the NLCSLS with national funds (and eventually funds negotiated with members from the international donor community).</p>
<p>2.2 Barrier analysis</p> <p>[~ 500 words]</p>	<p>Some of the central barriers, which have been preventing a transformational change towards low carbon cattle production in Guatemala are:</p> <ul style="list-style-type: none"> <p>By law, the Ministry of Agriculture, Livestock and Food (MAGA) is the public-sector institution responsible for the continuous improvement of the livestock sector, technical assistance and training support to producers; however, extension workers lack knowledge on low-carbon cattle production and have limited access to extension methods and materials. The private sector provides only limited technical assistance to producers, but has shown interest in becoming more involved in transforming the sector to low-carbon production, while increasing its productivity and competitiveness (both MAGA and the private sector are key partners in the development of Guatemala’s LEDS in the period 2016-2017/8). A related institutional barrier is that the producers’ organizations are weak (e.g. few members, few services, financially not sustainable) and their relationship with the public sector is poor.</p> <p>The key barrier is thus the limited national capacity to provide technical assistance to transform from extensive cattle raising that uses practices that lead to high GHG emissions, low productivity and environmental deterioration, to low-carbon livestock production and high environmental stewardship. The latter involves the introduction of sustainable production and animal husbandry practices (e.g. improvement of existing pastures, intensive rotational grazing, silvopastoral systems, the management of natural regeneration, improvement of animal husbandry practices, amongst others).</p> <p>The government and private sector have recognized these barriers as well as possible solutions in the National Bovine Livestock Policy (MAGA, 2013) and the National Low-carbon and Sustainable Bovine Livestock Strategy (NLCSLS), but at present few concrete actions have been taken. The government (MAGA) is planning to start the implementation of the NLCSLS in 2018.</p> <p>Extensive cattle raising and the use of other outdated practices and technologies are other obstacles as they result in low productivity, profitability and competitiveness of the sector, as well as damage the environment and emit large quantities of GHG. Lack of good quality and adequate information on aspects such as implementation and results/benefits of technologies/practices limit their adoption. Also, lack of access to quality technical assistance and adequate financial instruments limit the producers to invest and modernize their operations. These barriers will be addressed through the NSP (see 2.4).</p> <p>The government, through the “Agricultural Development Council” (CONADEA/MAGA) and the “High-level Livestock Working Group” (Mesa Ganadera) is trying to address several value chain and market related aspects and in 2017 discussions with CHN Bank started regarding new financial instruments for the sector.</p> <p>At present CATIE, with support from the USAID/LEDS Project, is implementing a pilot Project in 15 municipalities to estimate the carbon balance in livestock farms, design low carbon model farms and to develop a catalogue of good practices (refining the practices and technologies already identified and included in Guatemala’s LEDS and National Low-carbon and Sustainable Livestock Strategy) to support present and future extension programs of MAGA and the private sector. Also, CATIE has generated scientific information on carbon sequestration and GHG emissions in Central America similar to the priority area for the NSP.</p> <p>In addition, TNC together with the USAID/LEDS Project is developing (2018) a manual with the how’s, the why’s, costs and benefits (GHG reduction and CO₂</p>

	<p>removal as well as co-benefits) of different practices and their adaptations to different agroecological zones in Guatemala.</p> <p>Under the NSP, this information can be made available to public and private sector extension staff and producers organizations in order to orient individual producers in their decision regarding investing in new low-carbon practices and technologies.</p>
<p>2.3 Project rationale</p> <p>[~ 300 words]</p>	<p>Project rationale (see logframe in Annex 2):</p> <ul style="list-style-type: none"> <p>The starting situation includes the limited national capacity to provide technical assistance to transform from extensive cattle raising to low-carbon livestock production. The NSP seeks to improve the extension services provided to cattle farmers in the form of policy, management, technical and operational support and improved and increased engagement of both public and private actors. The lack of capacity would be addressed in the NSP by hiring quality technical assistance to work directly with livestock producers and their organizations and to strengthen the capacity of government and private sector for continued and sustainable technical assistance after the NSP finalizes.</p> <p>The NSP would have a technical and administrative team that would function as an independent Project Implementing Unit (PIU) with three field offices, but linked directly to the Ministry of Agriculture, Livestock and Food (MAGA) and with the strategic and technical orientation of a Steering Committee (SC) in which, besides CATIE as NSO, both public sector (e.g. MAGA, MARN, INAB, MINFIN), private sector (e.g. Lala, Association for the development of dairy products-ASODEL (Trebolac, Parma, Peten leche, etc.), and producers organizations (e.g. Chamber of Agriculture- CAMAGRO, Federation of cattle producers-FEGAGUATE, Chamber of milk producers,...), and the academic world (e.g. Faculty of Veterinarian Medicine and Livestock Science from the San Carlos University (FMVZ/USAC) are represented. The SC would provide technical guidance to the implementation of the NSP and would coordinate with the "High-level Livestock Working Group" (Mesa Ganadera, formally constituted by Ministerial Decree 49-2016, integrated by public and private institutions with the main purpose of providing follow-up to and supervision of the implementation of the National Bovine Livestock Policy) at the institutional and political level. The Steering Committee would also help to overcome another barrier: the lack of coordination between key stakeholders in the sector.</p> <p>The starting situation also involves the use of outdated practices and technologies that lead to high GHG emissions. Under the NSP, the proposed introduction of sustainable production and animal husbandry practices will lead on the one hand to reduction of GHG emissions and an increase of CO₂ removals and on the other hand to increase of productivity and through lower production costs and carbon-certification of farms and products to increased competitiveness.</p> <p>Good quality information on aspects such as implementation and results/benefits of technologies/practices, as well as the opportunities and constraints existing in the value chain is a fundamental precondition for investment decisions and adoption of technologies/practices. Extension and training services will be implemented through farm-schools (demonstration farms) where male and female farmers can see how things work and what the benefits are; technical assistance will be provided on the producers' individual farms.</p> <p>Also, the NSP will develop with private banks and cooperatives new financial products for the bovine livestock sector in order to facilitate access to finance for the introduction of new GHG emission reducing/CO₂ removing practices and technologies. In addition, value chain development and access to carbon-certifications to improve access to markets are important aspects of the proposed NSP.</p> <p>Increasing human and social capital of producers' organisations will be essential under the NSP and it is expected that when organisations increase the services they provide, both membership and financial sustainability will increase. The organizations will also play a key role in the implementation of the NSP as they are vehicles for the efficient delivery of technical assistance and training.</p>

	<p><i>The NSP's main objective is to transform the traditional extensive cattle raising into low-carbon livestock production model that can be upscaled at national level and will be adopted in a first phase (NSP) at 300 farms who will reduce their GHG emissions and increase CO₂ removals in bovine livestock production, reducing the milk and beef carbon footprint. At least 40,000 ha of pasture will have improved pasture and at least 300 farms will have adopted intensive rotational grazing, improved existing pastures, improved nutrition/diets, improved manure management, silvopastoral systems, more efficient water management systems, improved animal husbandry practices, renewable energy at farm level, amongst others.</i></p> <p><i>These are mainly small farmers in Petén, Izabal y Alta Verapaz who depend on livestock production for their livelihoods; in this area there are at least seven producers' organizations with over 1,000 members that will be strengthened. The 300 farms/households (20% headed by women) will have access to newly developed or already existing financial mechanisms (<i>incentives and credit</i>) to introduce and adopt the necessary practices and/or technologies. On average, these farms use approximately 149 ha of pasture under the traditional extensive cattle raising model. At the end of the Project, farms have increased productivity, farms and products (milk, dairy products and beef) are certified (low/neutral certification), competitiveness of the sector has improved, leading to increased income and improved livelihoods.</i></p> <p><i>The project rationale is based on improving production efficiency at animal and herd levels and intensifying production in the exiting pasture lands and avoiding the introduction of new pastures; as such, the NSP will contribute to stopping the progress of the agricultural frontier.</i></p>
<p>2.4 Project concept incl. business model, financial support mechanism, and capacity building</p> <p>[~ 2500 words]</p>	<ul style="list-style-type: none"> • <i>There is a direct link between GHG emission intensities and the efficiency with which producers use natural resources. For livestock production systems, nitrous oxide, methane and carbon dioxide emissions are losses of nitrogen, energy and organic matter that undermine efficiency and productivity. Possible interventions to reduce emissions are therefore to a large extent based on technologies and practices that improve production efficiency at animal and herd levels (Livestock's Long Shadow; FAO, 2006). For ruminants – cows, mainly -- the greatest promise involves improving animal and herd efficiency. This includes better management of grazing lands as this improves productivity and creates carbon sinks. Additionally, using better feeds and feeding techniques, which can reduce methane (CH₄) generated during digestion as well as the amount of CH₄ and nitrous oxide (N₂O) released by decomposing manure. Manure management that ensures recovery and recycling of nutrients and energy, plus the use of energy saving devices, also have a role to play. Improved breeding and animal health interventions to allow herd sizes to shrink (meaning fewer, more productive animals) also contribute. The combination of the different strategies will contribute to the sustainable intensification of the livestock sector that will allow the release of areas less suitable for livestock production towards conservation areas, which will help to increase carbon removal, resilience to climate change and conservation of biodiversity. In addition, there are several co-benefits from a transformation towards a sustainable low emissions livestock production model, including: (i) increase in the generation of employment in rural areas; (ii) increase in farm income from the sale of firewood, poles, wood and fruits; (iii) increase of farm income due to increased productivity, reduction of production costs and generation of environmental services; and (iv) increased competitiveness to enter international markets in which green and carbon certifications are recognized (Livestock's Long Shadow; FAO, 2006).</i> • <i>At present and under the current production model, bovine livestock production in Guatemala is not competitive, technologies are outdated, productivity of the national herd is low, production costs are high, formal relationships between producers and industry are limited, there is little value-adding, and sales are often made through middlemen and without adequate market information (National Bovine Livestock Policy. MAGA, 2013).</i> • <i>Technologies/interventions and/or practices to be supported under Guatemala's Livestock NAMA and this NSP, are amongst others:</i>

-intensive rotational grazing, the establishment of improved pastures and their proper utilization and management.

-improved nutrition/diets, conservation of forage to supplement periods of shortage of pasture, ensilage, seed banks/producers seed networks for improved pastures, and forage banks.

-silvopastoral systems (e.g. scattered trees in pastures; grazing in rows of fodder shrubs and / or trees with different spatial arrangements, depending on whether they are timber or fruit species, and strips of grasses alone or in alternation with strips of herbaceous legumes); live fences; and / or wind breaks.

-integrated management of animal excrements/manure.

-use of renewable energy on farms to decrease or eliminate the use of fossil energy in different farms activities (e.g. biodigesters and solar panels).

-improved animal and reproductive health management practices.

-efficient water usage

-keeping and use of records on farms (productive, reproductive, GHG emission reduction, income and cost records).

-carbon-certification of livestock farms for the application of good environmental practices, carbon neutrality, or GHG mitigation; these can generate added value in the national or international market for milk, dairy products and meat. This can be achieved through strategic alliances between private actors (producers and industry) and / or between private and public actors (public-private institutions).

- *The financial benefits from the introduction of practices and technologies include: (i) increased milk and beef production; (ii) improved quality of milk, resulting in higher prices on the national market; (iii) reduced production costs (less use of insecticides/fungicides, fertilizers, maintenance of traditional fencing, amongst others); (iv) production and sale of timber and other forest products; and (v) reduced energy costs.*
- *There are several studies, experiences and pilot projects in Central America and Guatemala on which the proposed NSP is based.*

One example are the USAID/LEDS Project case studies on existing cattle farms with good practices. For instance, Finca La Aurora in Sta. José Pinula, Guatemala (2016), showed that in the period 2009-2014, by introducing intensive rotational grazing and improvement of existing pastures, a land use change was feasible from pasture to reforestation, while (i) increasing milk production from 12 liters/cow in 2011 to 20 liters/cow in 2014; (ii) improving the diet and thus reducing methane emissions as well as improving the quality of the milk (protein value changed from 2.8% to 3.2% and fat from 3.7% to 4.5%); (iii) increasing the production of green fodder from less than on average 0.5 kg of green fodder/m² in 2009 to 3.85 kg of green fodder/m² in 2014; (iv) increasing livestock density from 0.9 LU/ha to 6.7 LU/ha without negative effects on soil compaction; and (v) reducing the milk carbon footprint from 0.64 kgCO_{2e}/liter to 0.35 kg CO_{2e}/liter.

The rate of return for the La Aurora Farm was calculated at 1 year and 5 months (USAID/LEDS, 2016).

- *As part of the business model of the NSP, it is important to know the profitability represented by investments in for instance silvopastoral practices; since it is that information that is essential for the producers to make the decision whether to take a loan and invest in new practices or not. Some conclusions of studies on the subject in Central America (Production and profitability of silvopastoral systems-Case studies in Central America. CATIE, 2010), are:*
 - *The introduction of trees in pastures with densities between 20 and 30 trees/ha offer more economic and ecological benefits than degraded pastures with few or no trees. From the economic point of view, improved shade increases the production of milk and/or meat in a range of 10% to 22% compared to pastures without trees. This is attributed to the fact that the shade reduces the caloric stress of livestock, which allows them to spend less energy and consume more food. In addition, for livestock farms in Nicaragua, López et al. (2007) found a contribution to the total annual*

farm income from the sale of wood from scattered trees in pastures that varied between 4.7% and 9%.

- The establishment of live fences represent savings of 16% in comparison with the dead fences (Villanueva et al., 2008). Live fences enriched with timber species and found under conditions of the humid tropic of Costa Rica can generate increases of up to 15% in the income of dairy farms (Holmann et al., 1992).
- Forage or fodder banks favor an increase in milk production between 10% to 20% (Ibrahim et al., 2001). They can also generate rural employment, especially when fodder banks are managed under systems that involve cutting, hauling, chopping and offering fodder to livestock (Sánchez 2007).
- A study in the area of El Chal, Petén (part of the area prioritized for the NSP), showed that supplementing foraging in pastures with a fodder leucaena bank, milk production in dual-purpose cows underwent a major change of 3.72 to 4.34 kg milk/cow/day. The greatest effect of leucaena bank supplementation on milk production occurred during the rainy season, because the cows showed an increase in milk production of 23.8% compared to the management of only pasture without access to the leucaena bank.
- The average investment required to establish proposed practices and technologies integrally in participating farms implies that the producers need access to finance (loans and incentives). Incentives are foreseen especially for those proposed technologies and practices that are profitable in the long-run, whereas small farmers need short-term returns. Under the NSP, a combination of financial mechanisms is foreseen for the adoption of low carbon practices and technologies, namely:
 - new financial products (lines of credit with prime interest rates) for small-scale livestock producers;
 - credit guarantees for those with limited access to credit as a result of lack of collateral; and
 - access to the national forestry incentive programs (PROBOSQUE-Decree 2-2015) and PINPEP- Decree 51-2010) to partially cover the costs of adoption of silvopastoral practices.

The Trust called Guate Invierte is an existing financial instrument that through a guarantee fund and agricultural insurance facilitates access to credit for small and medium producers. The National Rural Development Bank (BANRURAL) has different credit instruments, including the Guarantee Fund supported by USAID. However, other entities of the national banking and financial system as well as cooperatives will be invited to develop new financial products that stimulate and accelerate investment for the development of a sustainable low-emission livestock production. Cooperatives such as MiCoope and Cooproleche R.L. or Financial institutions such as FUNDEA have already expressed interest.

- To facilitate capacity building and training, model (demonstration) farms will be set up throughout the region where the NSP will be implemented (16 in total). On these farms all practices and technologies will be introduced and the members of the household will receive special training from the technical team so they too can help with awareness raising/training and explain the why, the how, and what are the benefits of practices and technologies to other producers. The demonstration farms will be used by the technical team for training and technical assistance will take place on each individual farm.
- The Project Implementing Unit (PIU) will comprise 20 extension workers well qualified and experienced and well trained by the project to fill possible knowledge gaps. In the end, it is expected that a minimum of 300 farms will adopt the different practices and technologies, will modernize their operations and access credit and incentive programs; and thus, help reach the GHG reduction, CO₂ removal and increased productivity targets as set in the Logframe.

- *Technical assistance to male and female members of the households will also be provided with regard to market access and value chains and value-adding as this is key to translate increased production into an increase in family income.*
- *The project technical team will work closely together with extension staff from MAGA and the private sector; and under the NSP specific training will be provided to these technicians in order to create local capacities for continuous technical assistance to producers.*
- *Besides the extension workers, the PIU will comprise a project coordinator and 3 field office coordinators (to effectively and efficiently cover the geographical area and maintain operational costs as low as possible). The profile of these coordinators includes besides project management capabilities, knowledge of and experience with livestock raising, silvopastoral systems and climate change mitigation. In addition, the NSP will have a Rural Organization strengthening and value chain specialist and a Monitoring and Evaluation (M&E) and knowledge management specialist. As part of the capacity building, also national and international study tours are foreseen; for instance, to countries in the region where a sustainable and low-carbon cattle production model is already being put into practice.*
- *The PIU will report to the Steering Committee that will be set up with the purpose of strengthening the political and technical institutional arrangements (public sector, private sector, academia, international centres, cooperation, etc., that participate along the production chain) as part of the governance system for the development of a low emissions and resilient to climate change livestock sector. This platform will play an important role in the continuous improvement of the favourable conditions for the reconversion of the livestock sector and the achievement of the goals established in the National Low-carbon and Sustainable Bovine Livestock Strategy (NLCCLS).*
- *Strengthening of producers' organizations is another important and integral part of the technical assistance that will be provided under the NSP. This includes the required technical, social and organizational knowledge to improve the management, functioning and overall performance of the producers' organizations. The possibility to improve the economic conditions of small and poor farmers relies largely on production improvements, improved market opportunities and increased product value as well as stronger representation and bargaining power of their organizations within the value chains. These, in turn, require investments in human and social capital and comprehensive know-how in different areas ranging from production and post-production techniques to finance, accounting, governance and basic comprehension of legal contracts, negotiation and market trends. This also includes bringing producers' organizations and dairy and beef industry together to formalize market arrangements and move away from the informal market structure.*
- *In order to facilitate on-farm record keeping for the purpose of decision making by the producer, but also to be able to measure whether the NSP targets are being reached, an on-line application will be developed to be used by producers and project technical staff (MAGA and private sector extension workers).*
- *As access to quality information regarding GHG emissions and potential for removals in the livestock sub-sector is limited, the NSP would also work together, in a limited way, with academic centres in generating key data to improve on future GHG inventories. Possible fields of research could include: (i) development of the country specific enteric fermentation emission factor by type of livestock; (ii) calculation of carbon accumulation in soils under intensive rotational grazing practices; (iii) calculation of emissions with improved pastures; (iv) analysis of the CO₂ capture capacity of improved pastures that emit less N₂O; (v) the effect of diet on the reduction of CH₄.*
The inclusion of these topics in the research catalogues of the Guatemalan System of Climate Change Sciences, Universities (EPS and professional practices) and International Research Centres could be considered.
- *The key milestones for reaching the NSP objectives include that: (i) 300 farms (20% female headed) will adopt the different practices and technologies, will modernize their operations and access credit and incentive programs, and (ii)*

	<p><i>the government upscales and implements the model for sustainable and low carbon bovine livestock production developed and implemented in the selected priority area (NSP), in other regions in the country during a period of 10 years (implementing this way the National Low-carbon and Sustainable Bovine Livestock Strategy (NLCSLS).</i></p>
<p>2.5 Embedding [~ 700 words]</p>	<p><i>The NSP is directly linked to and embedded in several climate change laws and policies as well as agriculture and livestock development policies and strategies. The following are the main legal and planning instruments:</i></p> <ul style="list-style-type: none"> • <i>Guatemala’s 2013 Climate Change Framework Law (Decree 7-2013) created the government structure to address its climate change priorities: reducing vulnerability to environmental disasters, building adaptation capacity, and mitigating greenhouse gas (GHG) emissions, which are laid out in the 2009 National Climate Change Policy (Governmental Agreement 329-2009).</i> • <i>In compliance with article 11 of this law a “National Action Plan on Climate Change-PANCC” was developed and approved by the National Climate Change Council in 2016. Reducing GHG emissions in the livestock sub-sector is an integral part of the PANCC.</i> • <i>The National Development Plan “K’atun Nuestra Guatemala 2032” (SEGEPLAN, 2014), affirms that the national planning system will work on policies, plans and budget based on results management, territorial and sectoral policies and will monitor and record public investment with transparency. “K’atun Nuestra Guatemala 2032” includes clear and concrete targets for GHG mitigation for all sectors, including agriculture and livestock.</i> • <i>In its Nationally Determined Contributions (NDC, 2015), the country committed to a reduction of 11.2 percent of total GHG emissions projected to the year 2030 based on the 2005 inventory. In the same NDC, the country offers a more ambitious reduction of up to 22.6 percent of its total GHG emissions projected to the year 2030 (on the basis of the 2005 inventory), conditioned on new and additional technical and financial support from the international community.</i> • <i>Through the USAID/LEDS project (2014-2019), Guatemala receives support to build institutional capacity to respond to climate change. In formulating Guatemala’s LEDS, the government is working with key private sector counterparts, including industry associations, farmer associations, and cooperatives, to implement practices and technologies that reduce GHG emissions, improve competitiveness, and increase manufacturing efficiencies in the Guatemalan economy. The LEDS formulation has enabled Guatemala to develop more consistent and up-to-date GHG inventories, generate more precise sectoral baselines and emissions forecasts, and effectively measure and report on climate mitigation activities; it is also one of the key operational instruments for implementing concrete mitigation actions and for the country to meet its commitments in the NDC.</i> <p><i>The LEDS (Draft LEDS 2018-2050, Government of Guatemala) includes four specific measures for the cattle sub-sector:</i></p> <ol style="list-style-type: none"> <i>(1) Intensive rotational grazing and pasture management (promotion of intensive grazing with rotation and supplementation with forage produced on farms, promote associations of grasses with legumes, promote the use of improved pastures).</i> <i>(2) Establishment and improvement of silvopastoral systems (e.g. dispersed trees within pastures, live fences, fodder banks, pastures and specific tree arrangements) to increase carbon sequestration in cattle farms.</i> <i>(3) Integral management of manure (promote adequate storage, treatment and manure application practices to soils, promotion of biodigesters in cattle farms and dairy operations for the production of biogas and energy from manure).</i> <i>(4) Efficient management and use of water for cattle production (improve the efficiency of existing irrigation systems, promote rainwater harvesting systems and promote the installation of efficient mini-irrigation systems).</i> <ul style="list-style-type: none"> • <i>In 2013, the National Bovine Livestock Policy was approved and in 2017, Guatemala elaborated its National Low-carbon and Sustainable Bovine</i>

Livestock Strategy (NLCSLS). This national strategy gives life to the National Bovine Livestock Policy (MAGA, 2013) and involves concrete measures in the cattle sub-sector that contribute to the mitigation of GHG emissions and achieving Guatemala's targets in its NDC.

Together, the National Bovine Livestock Policy and NLCSLS conform Guatemala's Nationally Appropriate Mitigation Action (NAMA) for the cattle sub-sector as they refer to a sector-wide and national in scope program, country-driven and anchored in before mentioned policies and development strategies that Guatemala will implement as part of its commitment to reduce GHG emissions. As such, the policies and financial mechanisms will serve to create an enabling environment and channel financial flows into low-carbon investments.

The NLCSLS will be implemented nationwide in 15 years. Implementation will happen in three, 5-year phases starting in a priority area that covers the departments of Izabal, Petén and Alta Verapaz (Phase 1). The proposed NSP would be the key instrument to implement Phase 1 of the NLCSLS during 5 years in the priority area. The priority area was selected as over 50% of Guatemala's cattle can be found in this area and expansion of cattle rearing in the past 10 to 15 years has taken place mainly in this area. In Phase 2 and 3, more livestock farms and pastures in the priority area as well as in other regions would be phased-in; this is however not part of the proposed NSP, but refers to its upscaling.

The sector policy (NLCSLS) mitigation ambition is to reduce the milk carbon footprint from 5.8 kgCO_{2e}/l milk to 2.2 kgCO_{2e}/l milk in 15 years and to reduce the beef carbon footprint from 16.5 kgCO_{2e}/kg beef to 7.9 kgCO_{2e}/kg beef in the same period.

- *Synergies will be possible with initiatives from the private sector, such as ASODEL that has developed an environmental and best practices guide for milk producers; and has agreed with its members from the milk industry to pay a better price for milk produced using good practices and that has a lower carbon footprint.*
- *From a socio-economic perspective, small-scale cattle farming represents the main income source and livelihood of many rural families, while contributing as well to their food and nutritional security by providing high quality protein. Estimates from the National Agricultural Census of 2003, reveal that 62.1% of the farms (with less than 5 animals per farm) produce milk for self-consumption and another 31.6% of the farms (with herds between 5 and 49 animals per farm) belong to small producers who market part of their production and use for self-consumption the rest. These data highlight the importance of cattle raising as a means of livelihood for a significant number of rural families in the country.*

The sustainable development co-benefits of the NSP relate to the increase of income for the livestock raising small and poor producers; as such the NSP will have a positive effect on improving livelihoods and reducing poverty. Increase of income will come from increased milk and beef production, the sale of poles, wood and fruits from silvopastoral systems, and less production costs, amongst others. In addition, the competitiveness of the sub-sector in international markets will improve as consequence of reduced production costs and farm and product carbon certifications. Due to a better productive performance in the sub-sector there will be an increase in the generation of employment in the rural area.

- *Additionality of the NSP lies in the expected GHG abatement benefits which have been calculated for 5 years (end of NSP) as follows: (i) a reduction of the milk carbon footprint from 5.8 to 3.9 kg CO_{2e}/kg milk; (ii) a reduction of the meat carbon footprint from 16.5 to 11.2 kg CO_{2e}/kg meat; (iii) avoided GHG emissions: 152,996 tCO_{2e}; and (iv) removed CO₂: 9,296 tCO_{2e}.*
- *Without the NSP, cattle producers will continue the traditional model of extensive cattle raising that uses practices that lead to high GHG emissions, low productivity and environmental deterioration. Furthermore, without the NSP national capacity to provide technical assistance to transform bovine livestock production to a sustainable and low-carbon production will not be developed and*

financial mechanisms for modernization and adoption of low-carbon practices and technologies will remain undeveloped and will not be put in place.

3. Project Ambition

3.1 Potential for transformational change

[~ 600 words]

The potential for transformational change of the NSP can be characterized as follows:

- *Catalytic effect:*

The NSP will be transformational in that cattle producers will start to change from the traditional model of extensive cattle raising that uses practices that lead to high GHG emissions, low productivity and environmental deterioration, towards low-carbon production. The NSP will be a starting point for the development of low-carbon production as MAGA, the private sector, producers and dairy and beef industry would become aware of the (co)benefits of GHG mitigation practices and technologies, and thus will undertake concrete actions and invest in GHG mitigation. The NSP would also accelerate the implementation of the National Low-carbon and Sustainable Bovine Livestock Strategy (NLCOLS) and the Low Emissions Development Strategy for Guatemala (LEDS), as well as the “National Action Plan on Climate Change-PANCC”.

The implementation of the NSP will mean a boost to the achievements of the targets in Guatemala’s NDC, as the estimated reduction of GHG emissions and CO2 removals during the 2020-2030 period (4.9 million tCO_{2e}) represent 12% of the 41.7 million tCO₂ reduction proposed by Guatemala in its NDC (2015), based on additional funding by the International Cooperation. It should be noted though, that in 2018, MARN might review the baseline data for 2005 (and the NDC), as emissions by Forestry and Other Land Use (FOLU) may have been underestimated; this might reduce the percentage this NSP would contribute to the a revised NDC.

- *Sustainability:*

The implementation of the NSP would represent an encouragement for MAGA to budget and implement phase 2 and 3 of the NLCOLS and elaborate and implement additional low-carbon policies in the agricultural sector. At national planning level, the implementation of the NSP would also send a positive signal to the National Planning Secretariat (SEGEPLAN) and the Ministry of Finance (MINFIN) to prioritize in the national budget low-carbon programs and investments.

At the same time, the implementation of concrete mitigation actions in each of the sectors, including agriculture, would be a positive message and incentive for the public and private sector to take the implementation of the PANCC and LEDS seriously and continue their execution.

The financial sector will develop new products oriented towards low-carbon investments; the experience under the NSP can then easily be up-scaled nationwide and beyond cattle sub-sector.

In addition, the NSP would trigger a close relationship between producers, their organizations and the financial banking sector and financial cooperatives. This relationship is expected to bring the livestock sub-sector, that has been operating largely in the informal sector, into the formal sector of Guatemala’s productive sector.

- *Replicability/scalability:*

The NSP has been elaborated in such a way that it envisages and enables a scaling up of practices and technologies that lead to low-carbon livestock production at national level. The proposed NSP would be the key instrument to implement Phase 1 of the NLCOLS during 5 years in the priority area (Izabal, Petén and Alta Verapaz). After that, MAGA, with national budget and eventually with additional support from the international community would implement phase 2 and 3; which is when more cattle farms and hectares of pastures in the priority area as well as in other regions with livestock production (Jalapa, Jutiapa y Santa Rosa, Chiquimula, Zacapa, Retalhuleu and San Marcos) would be

	<p><i>phased-in. The NLCSLS is thus expected to be implemented in a period of 15 years, starting with the 5 years of the NSP.</i></p> <p><i>The practices and technologies to be promoted and adopted under the NSP are relevant and applicable to other geographical areas. However, certain adaptations would be required, e.g. change in and grass species to be promoted in improved pastures and tree species in silvopastoral systems. As mentioned before, CATIE, the USAID/LEDS project (with TNC and ASODEL) are already working on the relevant manuals with these adaptations.</i></p>
<p>3.2 Financial ambition [~ 500 words]</p>	<ul style="list-style-type: none"> • <i>The average investment required to establish proposed practices and technologies integrally in participating farms/households implies that the producers need access to finance to invest in GHG mitigation activities (practices and technologies). This finance will come from loans on the one hand and incentives on the other. Incentives are foreseen especially for those proposed technologies and practices that are profitable in the long-run, whereas small farmers need short-term returns.</i> <p><i>Under the NSP, a combination of financial instruments is foreseen for the adoption of low carbon practices and technologies, removing this way existing barriers as specific financial products for this target group do not exist and access to existing lines of credit is often limited. Financial mechanisms include:</i></p> <ul style="list-style-type: none"> <i>-new financial products (lines of credit with adequate interest rates) for small-scale cattle producers;</i> <i>-credit guarantees for those with limited access to credit as a result of lack of collateral; and</i> <i>-access to the national forestry incentive programs (PROBOSQUE-Decree 2-2015) and PINPEP- Decree 51-2010) to partially cover the costs of adoption of silvopastoral practices.</i> <p><i>The expected uptake of credit has been estimated at Euro 7,500,000, and the requirements to the existing forestry incentive programs at Euro 1,200,000 on the basis of an estimated average investment of Euro 29,000 at each farm (300) if all practices and technologies are fully implemented throughout the whole farm and its operations.</i></p> <p><i>The loans will be financed through the formal banking system and cooperatives and carried by the producers and the incentives program would be covered by Guatemala's national budget. While the incentive programs PINPEP and PROBOSQUE have been formally created by law, for the NSP the requirements of funds will need to be negotiated each year by the National Forestry Institute (INAB) with the Ministry of Finance.</i></p> <p><i>All investments are low-carbon related investments and would not be made by the producers under the Business as Usual (BAU) traditional model of extensive cattle raising. The investments include for instance: electric fencing (solar power) for intensive rotational grazing, the establishment of improved pastures, water caption systems, establishment of forage banks and silvopastoral systems, integrated management of manure, biodigesters, solar panels for energy supply in dairy operations or for other on-farm activities, to comply with specific requirements for carbon certification of cattle farms, etc.</i></p> • <i>In addition to the funding mobilised directly through financial mechanisms, other funds (Euro 9,300,000) will be mobilised indirectly, e.g. for extension services, capacity building, training, development of extension materials, studies, establishment of model/demonstration farms, alliances with financial institutions for the development of new financial products, strengthening of producers organizations and their linkages and strategic alliances with the private sector dairy and beef industry, development of a low-carbon certification program, development of an application for on-farm registration of data, monitoring and evaluation and knowledge management, amongst others.</i> • <i>The NSP does not envisage a financial contribution from other donors.</i>

3.3 Mitigation ambition

[~ 400 words]

The mitigation potential of the outlined NSP can be described as follows:

- According to the LEDS draft (GHG baseline for Guatemala. MARN and USAID/LEDS, 2017) and the 2005 GHG inventory, GHG emissions from the agricultural sector are projected to double by 2050. Approximately 40% of the sectors' emissions are related to the livestock (36% enteric fermentation and 4% manure management).
- The direct mitigation potential of the NSP in 15 years, is an emissions reduction of at least 8.5 million tCO_{2e} and at least 112,500 tCO₂ in removals. During the 2020-2030 period it is expected to avoid 4.9 million tonCO_{2e}, representing 12% of the 41.7 million tCO₂ reduction proposed by Guatemala in its NDC (2015), based on additional funding by International Cooperation; it should be noted though, that in 2018, MARN might review the baseline data for 2005 (and the NDC), as emissions by FOLU may have been underestimated (this might reduce the percentage this NSP would contribute to a revised NDC).
- Underlying assumptions and reference data sources to estimate the GHG emissions reduction included an exhaustive analysis of the potential growth of cattle herds on the basis of present reproductive factors and projections for the geographic areas in which the NSP would be implemented; the projected herd was disaggregated by type of animal. In addition, growth of milk and meat production and demand were also projected. Methane emission factors from enteric fermentation were estimated based on Energy Intake (EI) depending on animal weight, expected growth and grazing practices, following the 2003 IPCC Good Practices Guides (GPG) using the following assumptions: Animals are confined in areas with sufficient forage requiring modest energy expense to acquire feed, and Digestible Energy (DE) is currently 52%, and with the implementation of the NSP it increases 0.3%. Based on these calculations, the emissions of methane from enteric fermentation (ton CH₄) and from manure management (ton CH₄) and the emissions of N₂O applied directly to pastures (ton N₂O) were estimated. Finally, the direct emissions (fermentation, manure and soils) for each liter of milk (kg CO_{2e}/l milk) and the direct emissions (fermentation, manure and soils) and for each kilogram of beef (kg CO_{2e}/kg beef) after channel conversion, were calculated. These calculations led to a baseline of 5.8 kg CO_{2e}/l milk and 16.5 kg CO_{2e}/kg beef.
- Carbon sequestration was estimated by multiplying the estimated number of trees in each system (silvopastoral systems 100 trees/ha, trees in pastures 35 trees/ha, and live fences 100 trees/km) by the growth rate of "Palo blanco" and the NSP foreseen targets (1,200 ha of silvopastoral systems, 1,500 ha of disperse trees in pastures, and 1,200 km of live fences). The direct mitigation effect of the NSP in tCO_{2e} for the end of the NSP implementation (5 years) are:
 - Reduction milk carbon footprint: 1.9 kg CO_{2e}/l milk (from 5.8 to 3.9 CO_{2e}/l)
 - Reduction of meat carbon footprint: 5.3 kg CO_{2e}/kg meat (from 16.5 to 11.2 kg CO_{2e}/kg meat)
 - Avoided GHG emissions: 152,996 tCO_{2e}
 - Removed CO₂ (Carbon sequestration): 9,296 tCO_{2e}
- The mitigation effects annually of the NSP in tCO_{2e} for the next 10 years are represented in the following two tables:

Direct NSP mitigation effects annually for the next 10 years, in tCO _{2e}					
	Year 1	Year 2	Year 3	Year 4	Year 5
Livestock emissions trend (BAU)	1,271,993	1,378,112	1,498,541	1,629,063	1,748,276
Project emissions projection	1,279,401	1,377,375	1,455,616	1,512,321	1,548,217
Avoided emissions	-7,408*	737	42,925	116,742	200,060

	Year 6	Year 7	Year 8	Year 9	Year 10
Livestock emissions trend (BAU)	1,842,245	1,934,865	2,025,582	2,126,933	2,206,347
Project emissions projection	1,565,335	1,560,263	1,536,069	1,489,918	1,430,050
Avoided emissions	276,909	374,602	489,513	637,015	776,297

*Emissions increase as Energy Intake increases, while digestibility does not on the first year.

- The indirect reductions triggered or influenced by the project would mainly be a reduction in deforestation, since the NLCSLS assumes that areas with pastures for cattle are not expanding even though the production in cattle producing areas increases.
- Rebound effects: Emissions that can increase due to the implementation of the NSP are related to the increase of the cattle herd; however, this projected increase has been factored-in in the estimates and the end result is a reduction of emissions in comparison to the baseline.

Another possible rebound effect and that has not been factored-in, is that the transportation-related emissions could increase (more cattle, more movements, more fuel consumption). Questions raised in relation to this rebound effect, but that could not be quantified include: how much would the trips to transport this cattle increase?, would trips of farm supervisors increase?, and how many more gallons of fuel would be used for these purposes? However, in general, the percentage of transport emissions on total emissions per kg of milk are low. This is most likely also the case for beef production. Thus, the increased emissions expected by transportation will not be significant compared to potential emission reductions.

Because electric fences will be used, the demand for electricity, which has an EF of 0.47 Kg CO_{2e} / kWh, increases. However, this will be mitigated in the NSP as investments foresee the use of fences operated with solar panels and the electrical fences will not be connected to the network.

4. Expected Budget and Financing Structure (in EUR)

4.1 NSP Implementation: Overall cost and financing contributions (Estimate)

Please estimate the financing contributions for the implementation of the overall NSP from the different financing sources. (double click on the table allows working in excel)

NSP - Implementation	Total cost (EUR)	Nama Facility	National budget	private sector	other donors	total finance
1. Financial mechanism(s)						
1.1 Credit	7,500,000			7,500,000		7,500,000
1.2 Incentives	1,200,000		1,200,000			1,200,000
2. TA (Expert services / consulting)	6,800,000	6,800,000				6,800,000
3. Other direct and indirect costs	2,500,000	2,500,000				2,500,000
Total <gross>	18,000,000	9,300,000	1,200,000	7,500,000		18,000,000

1% of the overall NF budget has been reserved for M&E (mid-term and final evaluations).

With regard to how secured the different funding sources are:

- The funds for on-farm investments are available, and under the NSP new financial products will be elaborated to promote sustainable and low carbon bovine development. Several financial institutions have already expressed their interest in developing new products for low-carbon and green investments. Approval of credits will depend on the review of each individual request by participating Financial Institutions.

- *The funds for incentives for forestry, including silvopastoral practices are available under national Programme for the establishment, recovery, restauration, management, production and protection of forests in Guatemala (PROBOSQUE) and Forest Incentives program for owners of small parcels with forest or agroforestry vocation (PINPEP) incentive programs, but require negotiation with the Ministry of Finance on a yearly basis. Approval by INAB authorities of each individual request is required.*

4.2 NSP Detailed Preparation Phase (DPP): Funding requirements from the NAMA Facility

Please provide the overall funding requirements for the DPP of the NSP requested to the NAMA Facility. (double click on the table allows working in excel)

NSP - Preparation	Total (Euro)
1. Personnel	100,000
2. Travel and allowances	150,000
3. Procurement of materials and equipment	10,000
4. Other direct and indirect costs	100,000
Total <gross>	360,000