



Risk Assessment and Capacity
Development in Costa Rica

Probabilistic Climate Risk Assessment for Coffee, Sugarcane, and Extensive Cattle Production

January 2026

Prepared for:



Prepared by:



Global Risk Modelling Alliance

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Probabilistic Climate Risk Assessment for Coffee, Sugarcane,
and Extensive Cattle Production

Product 8

(Products: 7a, 7b, 7c, 7d, 7e)

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1 INTRODUCTION

The Global Risk Modelling Alliance (GRMA), supported by the InsuResilience Solutions Fund (ISF), aims to strengthen the capacity of countries and cities to conduct climate and disaster risk analyses with a focus on financial decision-making. The initiative seeks to fill critical gaps in modelling and data, thereby enhancing climate and disaster risk assessments at both national and sub-national levels.

To achieve this goal, the GRMA works closely with local partners to identify and jointly define each country's specific needs, providing open-access risk management tools, data resources, and operational expertise in risk financing.

In Costa Rica, the GRMA has established a collaboration with the government—through its institutions under the leadership of SUGESE—to strengthen national capacities for climate risk management. This partnership will deliver relevant models and analytical tools to inform the country's national strategies for risk financing and disaster risk mitigation.

The program is being implemented in phases, beginning with the assessment of specific needs and culminating in the integration of advanced risk-modelling tools into public policy frameworks.

The project is funded by Germany's KfW Development Bank and administered by Frankfurt School on behalf of the GRMA.

The INGENIAR–CIMNE Consortium was selected to provide risk modelling services within the framework of the collaboration between the GRMA and the Government of Costa Rica, through an application focused on four risk assessment projects:

- Strategic Project: Demonstration of risk assessment methodologies for critical infrastructure in Heredia.
- Operational Project 1: Disaster and climate risk assessment for road infrastructure – National Route 2 (RN2), Pan-American Highway.
- Operational Project 2: Flood and drought risk analysis for small and medium-sized agricultural producers.
- Operational Project 3: Exposure and risk assessment for small and medium-sized hotels and lodges participating in the Fu-turismo program.

Implementation is carried out through the CAPRA-ROBOT modelling platform, developed by INGENIAR, which will also serve as an educational tool within the Training Program that runs throughout the entire duration of the consultancy.

This report corresponds to Product 8 (Products of Task 7): *Probabilistic estimation of climate risk in coffee production, sugarcane production, and extensive cattle ranching*, and specifically addresses products 7b “Probabilistic estimates of fluvial and pluvial flood and agricultural drought risk analysis”, 7c “Results of stress test simulations for one agricultural drought and one excessive rainfall”, 7d “Technical report on developed or improved model/data/methodology and replicability”, and 7e “Documentation of capability development, activities undertaken, participation, and feedback” of the Terms of Reference of this consultancy. It is, therefore, a delivery specifically related to Operational Project 2. This report presents the results of the probabilistic risk assessment for the agricultural sector, particularly sugarcane and coffee crops, and the extensive cattle ranching production system, considering the following hazards: drought, flooding, and heavy rainfall (the latter exclusively for coffee), all influenced by climate change.

This assessment builds upon and complements aspects previously presented in earlier products: (i) Product 3 “Exposure and Vulnerability Models” of this consultancy contains details on the exposure and vulnerability model applied to agricultural systems; and (ii) Product 4 “Climate Hazard Models” contains details of the meteorological forcing models and climate hazard models developed for drought and flooding.

1.1 Scope of the Strategic Project 2

This project consists of the assessment of climate risk, considering flooding, heavy rainfall, and drought, in the national portfolio of coffee, sugarcane, and extensive cattle ranching, primarily focused on small and medium-sized producers, particularly those implementing NAMA practices. However, as added value, the entire national portfolio of the aforementioned products is modeled in order to visualize the contrast between NAMA and non-NAMA producers.

The project is carried out through the activities presented in Table 1. The corresponding schedule is presented in Figure 1. All added values presented were agreed upon directly with the GTT of this project.

Table 1. Tasks of the Strategic Project 2.

Activity	Description	Task in the ToR	Products in the ToR
Climate Model	Refers to the modeling of meteorological forcing and the incorporation of climate change projections.	T2.1, T2.2	D2.1a–f, D2.2a–e
National Flood Model	A national-scale flood model will be developed to be applied in the modeling of the entire road infrastructure portfolio.	T2.1	D2.1a–f
Drought Events	Selection of drought events from the simulations performed, for baseline climate and future climates under climate change scenarios.	T2.2	D2.2b
Extreme Rainfall Events	Selection of very high precipitation events from the simulations performed, for baseline climate and future climates under climate change scenarios.	Added value	—
Crop Exposure	Development of a crop exposure database, distributed nationwide in cultivated land units for each product considered.	T7.1	D7a

Livestock Exposure	Development of an extensive livestock exposure database, distributed in livestock production units.	T7.1	D7a
Crop Vulnerability	Refers to the parameterization of crop water response models for the included products.	T4.3	D4a–d
Livestock Vulnerability	Refers to the modeling of variations in stocking rate per production unit as a function of variations in available dry matter for feed.	T4.3	D4a–d
Flood Vulnerability (Crops and Livestock)	Refers to the modeling of soil waterlogging and its impact on biomass production (crop or pasture).	T4.3	D4a–d
Risk Assessment	Application of the methodologies presented herein to assess risk through actuarial metrics used in catastrophic risk modeling.	T7.2	D7b–d
Deterministic Assessment (Stress Test)	Results of selected large simulated events will be reported to illustrate infrastructure conditions under extreme events.	T7.3	D7b–d
Yield Calibration	Simulated yields will be compared with those reported in available agricultural surveys or statistical yearbooks to establish consistency.	T7.2	D7b–d
Investment Curve	As added value, a portfolio of risk management actions will be evaluated to determine the optimal combination that reduces risk under fixed and increasing investment amounts.	Added value	—
Agricultural Insurance Sizing	An agricultural insurance sizing exercise will be conducted to demonstrate the use of risk assessment in the design of financial protection instruments.	Added value	—

Task	15 Jan 25		Month												15 Apr 26	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Operational Project 2: Flood and Drought Risk for Small and Medium Agricultural Producers																
Climate Model																
National Flood Model																
Drought Events																
Crop Exposure																
Livestock Exposure																
Crop Vulnerability																
Livestock Vulnerability																
Flood Vulnerability (Crops and Livestock)																
Risk Assessment																
Deterministic Assessment (Stress Test)																
Yield Calibration																
Investment Curve																
Agricultural Insurance Sizing																

Figure 1. Schedule of activities for the Strategic Project 2. (Blue cells indicate implementation. Green cells indicate product delivery. Red cells correspond to this product).

2 CATASTROPHE RISK MODELING METHODOLOGY

The objective of probabilistic catastrophic risk modeling is to estimate the probability distribution of losses that may occur within a set of exposed elements, following the occurrence of a hazard event (Cardona, 1986a;b;c; 1989; 1990, Bernal et al., 2021). Probabilistic modeling enables forecasting of future loss levels by accounting for the specific hazards present in the territory and the inherent uncertainties in their estimation, as well as the intrinsic vulnerability of the exposed elements and its respective uncertainty.

2.1 Conceptual Approach to Risk Modeling

Probabilistic risk modeling involves estimating the potential consequences that a set of exposed elements may suffer as a result of hazardous events. Robust risk modeling is fundamental for building a sustainable and resilient development process, as it enables the consideration of trade-offs between potential harms and benefits. In other words, such a process can only be effectively guided when supported by a risk model that is sufficiently robust, both in terms of credible impact estimations and in providing a sound technical foundation for decision-making without arbitrariness.

The general procedure for probabilistic disaster risk modeling—considering climate change—is illustrated in Figure 2.

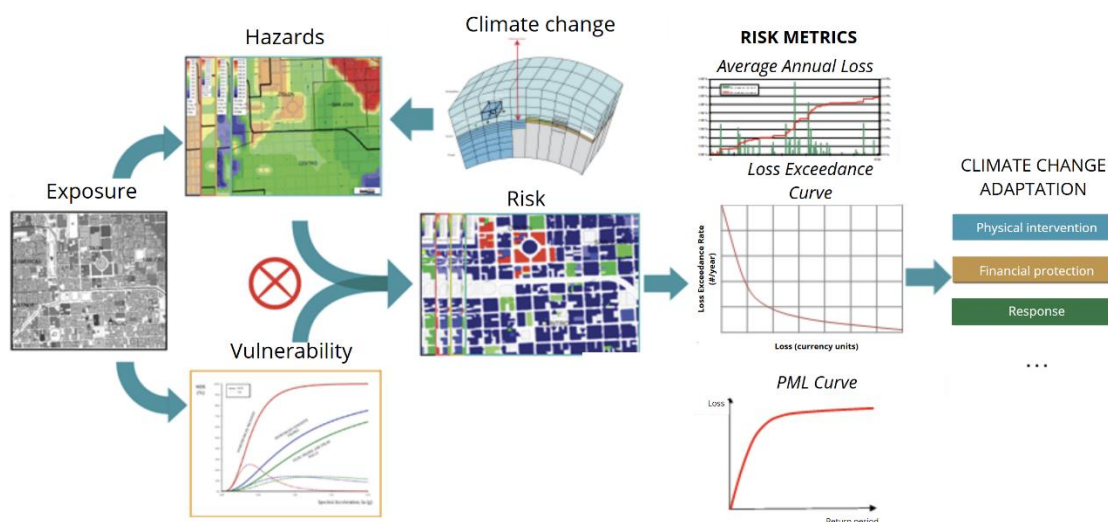


Figure 2. Components of risk modeling and their interrelation.

As illustrated in Figure 2, once risk has been evaluated using actuarial metrics, such as Expected Annual Loss, the Loss Exceedance Curve, and Probable Maximum Loss, it becomes possible to establish an objective relationship with risk management measures and their effectiveness. This means the model can be used to design intervention strategies composed of multiple measures, each with a quantifiable capacity to reduce risk.

Following this approach, risk in this study is evaluated based on three fundamental factors:

- *Hazard* is defined as a set of stochastically simulated events that are collectively exhaustive and mutually exclusive; that is, they cover all possible ways in which the hazard may manifest,

assuming independent events whose frequencies follow a natural power law (i.e., equivalent to a recurrence curve).

- *Exposed elements* refer to immovable assets, infrastructure, or agricultural production that are subject to hazards and susceptible to damage or disruption.
- *Vulnerability* refers to the propensity or predisposition of exposed elements to be adversely affected. Assessing vulnerability requires a specific model for each type of exposed element and each type of hazard—there is no unified representation. However, the modeling process results in a common impact metric (economic loss), which makes the different models additive and comparable in risk terms.

The first fully probabilistic approach to the risk problem from an actuarial perspective was proposed by Filip Lundberg in 1903 (Lundberg, 1903). In 1930, Harald Cramér formalized Lundberg’s theory into what is now known as Ruin Theory (Cramér, 1930). Lundberg defined an income-outcome model in which an insurance company begins operations with a given amount of capital, which increases over time as premiums are collected. Simultaneously, losses (which the company must cover) occur randomly over time. If, due to claim payments, the company’s capital falls below zero, it is considered bankrupt. Lundberg was interested in determining the probability of an insurance company’s insolvency.

Ruin Theory assumes that the occurrence of claims is not deterministic. Lundberg demonstrated that the occurrence of losses over time can be modeled as a Poisson process. Later, it was shown that any renewal process is valid within the framework of Ruin Theory (Andersen, 1957). A renewal process is a type of continuous-time, discrete-state stochastic process widely used across scientific and engineering disciplines to model the random occurrence of events. In this context, “events” refer to loss occurrences, regardless of their origin. This is why Ruin Theory—or insolvency theory—is well-suited to modeling the impacts associated with any type of phenomenon, whether natural or not, and is applicable to risk management beyond the insurance sector, including social, economic, environmental, and broader development contexts.

A renewal process is defined by a single parameter: its intensity or rate. In risk assessment, this parameter corresponds to the loss exceedance rate, which is the inverse of the average time between events that exceed a given loss threshold p . Therefore, when estimating the risk of a portfolio of exposed elements (i.e., the probability of exceeding a loss amount p within a time window), its exceedance rate $v(p)$ must be calculated based on the probability of occurrence of any hazard event capable of surpassing p . This defines a renewal process that enables estimation of the probability of loss p being exceeded within any given period.

2.2 Risk Quantification

From a mathematical standpoint, risk modeling aims to characterize a stochastic process of loss occurrence over time (i.e., a loss process). A loss process has key characteristics that shape the modeling approach adopted in this study, which is commonly used in actuarial catastrophic modeling, safety and reliability engineering, the aerospace industry, and other fields.

Risk is determined by the convolution of hazard and vulnerability, at the location of the exposed elements and for all such elements. In probabilistic loss modeling, both hazard and vulnerability are represented probabilistically. Hazard is characterized by both temporal and spatial probability distributions. The temporal occurrence of hazard scenarios is modeled as a renewal process, which entails fitting a probability model to the time between two consecutive events.

The uncertainties associated with hazard and vulnerability are defined by their own nature—temporal and spatial for hazard, and intensity-dependent for vulnerability. As such, the primary output of the model is a specific probability distribution of loss for each hazard event. The probability density function of loss for exposed element j , conditional on the occurrence of hazard event i (i.e., $f(p_j|E_i)$), is calculated as:

$$f(p_j|E_i) = \int_0^{\infty} f(p_j|s)f(s|E_i)ds \quad \text{Equation 1}$$

where the first term of the integral pertains to vulnerability ($f(p_j|s)$, the probability density of loss given an intensity s), and the second term relates to hazard ($f(s|E_i)$, the probability density of intensity given the occurrence of event E_i).

The total loss from event i is the sum of all individual losses (p_j) from the exposed elements. Since these are random variables, proper arithmetic must be used to determine the total event loss. The sum is computed over the probability moments of the variables p_j , as follows:

$$E(p|E_i) = \sum_{j=1}^{NE} E(p_j) \quad \text{Equation 2}$$

$$\sigma^2(p|E_i) = \sum_{j=1}^{NE} \sigma^2(p_j) + 2 \sum_{k=1}^{NE-1} \sum_{j=2}^{NE} cov(p_k, p_j) \quad \text{Equation 3}$$

where $E(p|E_i)$ is the expected loss of event i , $\sigma^2(p|E_i)$ is its variance, NE is the total number of exposed elements, $E(p_j)$ is the expected loss for element j , $\sigma^2(p_j)$ is its variance, and $cov(p_k, p_j)$ is the covariance between losses in two different exposed elements.

Using the probability moments of the total loss from an event, a Beta distribution is fitted, with the following probability density function (f_p):

$$v(p) = \sum_{i=1}^N Pr(P > p|E_i) \cdot F_A(E_i) \quad \text{Equation 4}$$

where $v(p)$ is the exceedance rate for loss p , N is the total number of hazard events, $F_A(E_i)$ is the annual frequency of event i , and $Pr(P > p|E_i)$ is the probability of exceeding p given that event i occurred. The summation includes all hazard events that can generate losses. The inverse of $v(p)$ is the return period of loss p (Tr), which is simply the expected time between events that exceed loss p .

$$Tr = \frac{1}{v(p)}$$

Equation 5

The loss exceedance curve contains all the necessary information to probabilistically characterize the loss occurrence process associated with hazard events. Figure 3 shows an example of a loss exceedance curve.

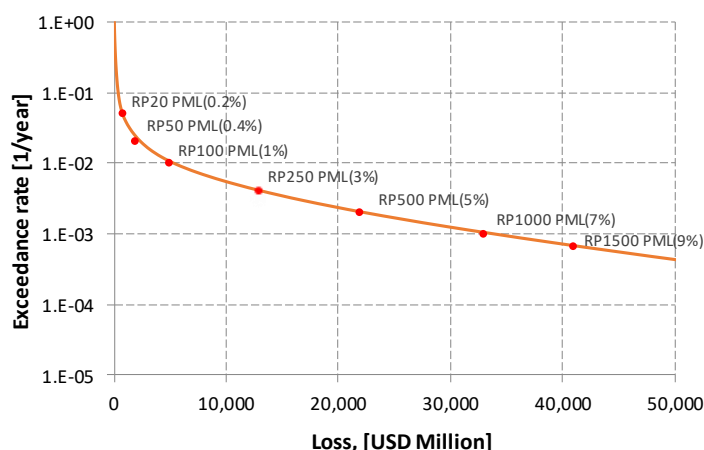


Figure 3. Example of a loss exceedance curve. The vertical axis shows the exceedance rate. The horizontal axis shows the associated loss. (RP = Return Period; PML = Probable Maximum Loss).

The calculation in Equation 4 corresponds to the estimation of the exceedance rate for all loss amounts across all exposed elements, for all events in the hazard model, and for all hazards. As shown in Figure 4, the probabilistic risk assessment can be summarized in the following steps: 1) For each hazard event, the loss for every exposed element is determined; 2) the total event loss is calculated as the sum of individual losses; 3) once all event losses are quantified, exceedance rates are calculated.

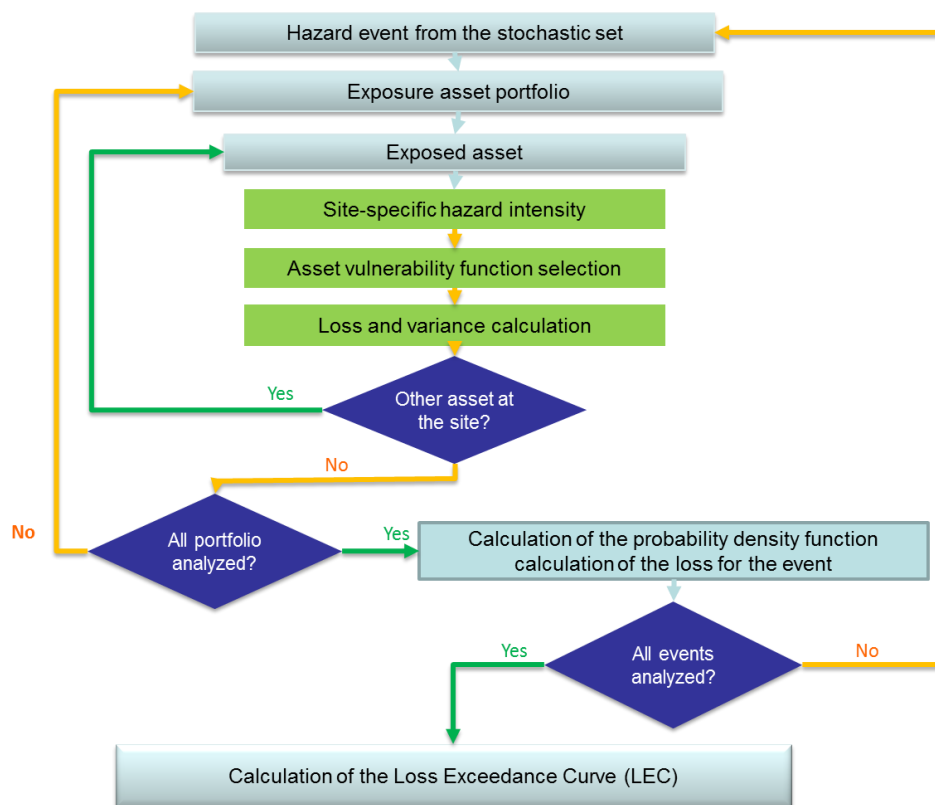


Figure 4. Flow diagram of probabilistic risk assessment.

2.3 Risk Metrics

From the loss exceedance curve, several risk metrics can be derived, each serving different purposes in decision-making and risk management processes. These metrics offer a comprehensive representation of risk, typically condensed into one or a few indicators, rather than presenting the full set of event-specific losses or the entire exceedance curve.

2.3.1 Average Annual Loss (AAL)

The AAL represents the expected value of annual losses. It reflects the average annual amount which, when accumulated over time, would be equivalent to all future losses. Conceptually, the AAL corresponds to the fair pure premium required annually to cover all possible losses. It can be calculated as the area under the loss exceedance curve:

$$PAE = \int_0^{\infty} v(p) dp \quad \text{Equation 6}$$

Alternatively, based on event-specific loss data, AAL can also be calculated as:

$$PAE = \sum_{i=1}^N E(P|E_i) F_A(E_i)$$

Equation 7

Where $(P|E_i)$ is the expected loss from event i , and $F_A(E_i)$ is the annual frequency of occurrence of event i . The expected loss given the occurrence of a specific event depends on the vulnerability of the exposed elements.

AAL is a crucial risk indicator because it integrates into a single value the impact of hazardous events on vulnerable exposed elements. It is the most robust risk metric—not only because it summarizes the loss occurrence process in one number, but also because it is relatively insensitive to uncertainty, as it reflects the mathematical expectation of annualized losses.

2.3.2 Probable Maximum Loss (PML)

While the loss exceedance curve is the primary output of risk assessment, the PML curve is often preferred, as the concept of a return period is generally easier to interpret. As previously explained, the return period is the expected time between events that exceed a certain loss, and it is mathematically the inverse of the exceedance rate. The loss exceedance curve and the PML curve contain equivalent information.

From the PML curve, loss values can be determined for any selected return period. Choosing a return period to reference a PML value depends entirely on the risk aversion of the decision-maker. Figure 5 shows an example of a PML curve, where a selected return period of 400 years on the horizontal axis corresponds to a loss value on the vertical axis. This indicates that such a loss is expected to be exceeded, on average, once every 400 years.

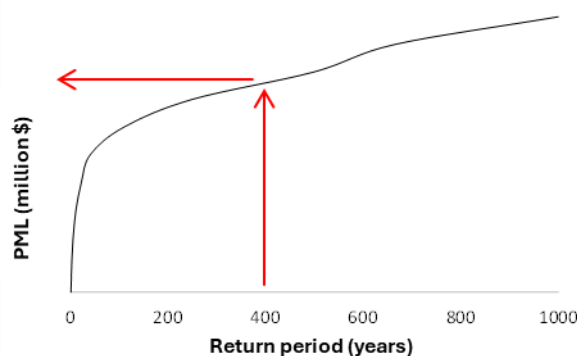


Figure 5. Example of a PML curve.

2.4 Limitations of the Risk Assessment

This section presents several widely recognized limitations of probabilistic risk assessment, which are strongly related to the quality of the available data.

It should be noted that the limitations described here complement those previously indicated in all products of this consultancy, which addressed: the assessment methodology (Inception Report), the information on pre-existing geological hazard models (Product 2 “Review geohazard data and proposal on applying in risk assessment”), the exposure and vulnerability models developed by this consultancy (Product 3 “Exposure and Vulnerability Models”), and the hydrometeorological hazard models with climate change developed by the consultant (Product 4 “Climate Hazard Models”).

Therefore, this section does not seek to repeat what has already been stated in those previously submitted products, but rather to provide a general overview of the known limitations of probabilistic risk assessment.

Probabilistic disaster risk assessment critically depends on the availability and resolution of the information used to model hazards, exposure, and vulnerability. A common limitation is the insufficiency of historical records of extreme events, which makes it necessary to simulate the largest and most catastrophic events based on indirect information about the territory and the manifestation of the phenomena.

This limits calibration and validation processes, since there is no evidence of the occurrence of most of the simulated events, as they have not yet occurred. This is especially true under climate change conditions. Likewise, for modeling climate-related phenomena, hydrometeorological data in many contexts present temporal gaps, low spatial density of monitoring stations, or inconsistencies due to changes in measurement systems.

Table 2 summarizes the main limitations of the different modeling components, hazard, exposure, and vulnerability, and also provides some recommendations for reducing them

Table 2. Summary of identified limitations in the model components.

Layer	Condition Assessed	Limitation	Recommendation
Climate	Baseline climate and 36 future climate scenarios	It is not possible to anticipate the actual future climate. Only alternative plausible futures can be considered, and all must be evaluated.	Structural limitation. Cannot be reduced.
Drought Hazard	Meteorological forcing. Daily-scale simulations.	Simulations were generated for 1,000 years at locations within a grid over Costa Rica. Although the grid is as dense as allowed by available data sources, short-distance meteorological variability cannot be fully captured by the model.	Requires investment in research, monitoring equipment, and long-term data collection.
Flood Hazard	Watershed response	The watershed response model captures internal spatial variations affecting local attenuation and surface infiltration accumulation. However, if watersheds are highly modified, the model may not adequately represent their response.	Requires investment in research and detailed assessment of watershed management conditions, both current and future.

Flood Hazard	Hydraulic model	One-dimensional (1D) hydraulic model with limitations in representing floodplain overflow areas, particularly in river overflow zones. Model response within the channel, especially in deeper channels, is uncertain.	Requires investment in research on more advanced flood modeling approaches.
Exposure	Agricultural exposure	Access to information on producer locations is limited. Locations were approximated using land-use maps and remote sensing-based vegetation surface identification. Soil conditions are complex to approximate at the model scale, and it is unlikely that significantly better information could be obtained under current constraints.	Requires investment in maintaining an agricultural census. Further research on subsurface conditions at the national level would require substantial investment and long timeframes.
Exposure	Livestock exposure	Access to information on producer locations is limited. Locations were approximated using land-use maps and remote sensing-based vegetation surface identification. Livestock herds were randomly distributed across calculation units due to lack of detailed data on animal location or physiological status. Soil conditions are complex to approximate at the model scale.	Requires investment in the generation and maintenance of detailed exposure data beyond simple location information.
Vulnerability	Crop water response model	Water response models previously applied in regional projects were used. Although not specific to the exact varieties produced in the country, they are considered acceptable.	Requires investment in vulnerability model research. However, significant short-term improvements to existing models are unlikely.
Vulnerability	Feed requirement model	Feed requirement models previously applied in projects in other countries were used, in some cases in geographically different contexts. The models are considered sufficiently general for application in Costa Rica.	Requires investment in vulnerability model research. However, significant short-term improvements to existing models are unlikely.

Although Costa Rica stands out in the region for having solid and well-structured information systems in terms of inputs for modeling, inherent limitations of the probabilistic approach remain.

The main challenge lies in the fact that modeling is based on the projection of future events that have not yet occurred, which implies reliance on analytical assumptions regarding the extreme behavior of natural hazards and the response of exposed elements to them.

Therefore, even in contexts with good data availability, such as Costa Rica, uncertainty cannot be completely eliminated; it can only be explicitly managed within the risk assessment process.

2.4.1 Recommendations for Future Assessments

Based on the inherent limitations of the assessment, several general recommendations are proposed to strengthen the future use of probabilistic risk assessment models:

Institutional governance and formal custodianship of risk data

It is recommended that the competent national entities define a formal mechanism for the custodianship of the products generated (exposure databases, vulnerability models, hazard layers, AAL/PML results, and

associated metadata), including clear roles for their administration, version control, and maintenance. The sustainability of the probabilistic analysis requires that these inputs remain available as national technical assets and that their management does not depend exclusively on the consultant or on ad hoc initiatives, but rather be integrated into permanent structures for sectoral planning and agricultural risk management.

Periodic updating of climate scenarios and agricultural exposure characterization

Given that climate risk is conditioned both by the evolution of future meteorological forcings and by changes in the country's productive distribution, it is recommended to implement regular update cycles for drought and heavy rainfall scenarios, incorporating new generations of climate models, as well as systematic reviews of national agricultural exposure. This includes updating cultivated areas, production typologies, management practices, and the spatial location of extensive systems, in order to prevent the progressive obsolescence of AAL and PML metrics.

Incorporate the operational use of probabilistic metrics into planning instruments and financial management

The results obtained make it possible to move beyond an approach based solely on recent historical events, providing consistent estimates of average annual losses and extreme losses under alternative climate horizons. It is recommended that these metrics be explicitly incorporated into agricultural planning processes, adaptation strategies, the design of financial instruments and parametric or indemnity insurance schemes, as well as into cost-benefit evaluations of risk reduction measures. The institutionalization of the use of AAL and PML is key to ensuring that the model translates into recurring decision-making rather than remaining solely as a technical diagnosis.

Develop national capacities for interpretation, communication, and application of results under climate uncertainty

The simultaneous consideration of multiple global circulation models and SSP scenarios introduces an inevitable range of uncertainty that must be properly understood and managed. It is recommended to strengthen local technical capacities to interpret ranges of results, avoid deterministic readings of a single scenario, and consistently communicate plausible ranges of future losses. This includes training in risk concepts, climate sensitivity, and sectoral use of the products, ensuring institutional ownership of the probabilistic approach.

Implement a continuous framework for functional validation, feedback, and progressive model improvement

Although full statistical validation is not feasible due to limitations in detailed historical data, it is advisable to establish mechanisms for functional validation and progressive recalibration based on comparison with observed losses at an aggregate level, monitoring of relevant events, and review of critical assumptions (vulnerability, climate thresholds, productive responses). This process allows the model to evolve as a living tool, adjusting to new evidence and national experience, and ensuring that climate risk products remain useful for long-term decision-making.

3 RISK ASSESSMENT RESULTS

The risk assessment of the agricultural portfolio of Costa Rica yielded the results presented below, in terms of Average Annual Loss (AAL) and Probable Maximum Loss (PML), for droughts, fluvial flooding (river overflow) and pluvial flooding (due to soil waterlogging), and, as added value, for heavy rainfall (for coffee).

For each hazard, climate change is incorporated, as it modifies or conditions their occurrence and, therefore, alters the risk metrics. In Product 4 of this consultancy (product of Task 2: Climate hazard models), details regarding climate modeling and the incorporation of climate change into these hazards can be reviewed. Three global circulation models, four greenhouse gas emission pathways, and three target years in the future were considered, for a total of 36 possible versions of future climate. The models, emission pathways, and projection years are summarized in Table 7, including an abbreviated name by which the results associated with these climates are identified in this document.

Table 3. Future climate scenarios.

GCM	Pathway	Target year	Abbreviation	GCM	Pathway	Target year	Abbreviation
EC-Earth3	SSP1-2.6	2035	EC-SSP1-35	GFDL-ESM4	SSP3-7.0	2050	GFDL-SSP3-50
EC-Earth3	SSP2-4.5	2035	EC-SSP2-35	GFDL-ESM4	SSP5-8.5	2050	GFDL-SSP5-50
EC-Earth3	SSP3-7.0	2035	EC-SSP3-35	GFDL-ESM4	SSP1-2.6	2100	GFDL-SSP1-100
EC-Earth3	SSP5-8.5	2035	EC-SSP5-35	GFDL-ESM4	SSP2-4.5	2100	GFDL-SSP2-100
EC-Earth3	SSP1-2.6	2050	EC-SSP1-50	GFDL-ESM4	SSP3-7.0	2100	GFDL-SSP3-100
EC-Earth3	SSP2-4.5	2050	EC-SSP2-50	GFDL-ESM4	SSP5-8.5	2100	GFDL-SSP5-100
EC-Earth3	SSP3-7.0	2050	EC-SSP3-50	MPI-ESM1-2-LR	SSP1-2.6	2035	MPI-SSP1-35
EC-Earth3	SSP5-8.5	2050	EC-SSP5-50	MPI-ESM1-2-LR	SSP2-4.5	2035	MPI-SSP2-35
EC-Earth3	SSP1-2.6	2100	EC-SSP1-100	MPI-ESM1-2-LR	SSP3-7.0	2035	MPI-SSP3-35
EC-Earth3	SSP2-4.5	2100	EC-SSP2-100	MPI-ESM1-2-LR	SSP5-8.5	2035	MPI-SSP5-35
EC-Earth3	SSP3-7.0	2100	EC-SSP3-100	MPI-ESM1-2-LR	SSP1-2.6	2050	MPI-SSP1-50
EC-Earth3	SSP5-8.5	2100	EC-SSP5-100	MPI-ESM1-2-LR	SSP2-4.5	2050	MPI-SSP2-50
GFDL-ESM4	SSP1-2.6	2035	GFDL-SSP1-35	MPI-ESM1-2-LR	SSP3-7.0	2050	MPI-SSP3-50
GFDL-ESM4	SSP2-4.5	2035	GFDL-SSP2-35	MPI-ESM1-2-LR	SSP5-8.5	2050	MPI-SSP5-50
GFDL-ESM4	SSP3-7.0	2035	GFDL-SSP3-35	MPI-ESM1-2-LR	SSP1-2.6	2100	MPI-SSP1-100
GFDL-ESM4	SSP5-8.5	2035	GFDL-SSP5-35	MPI-ESM1-2-LR	SSP2-4.5	2100	MPI-SSP2-100
GFDL-ESM4	SSP1-2.6	2050	GFDL-SSP1-50	MPI-ESM1-2-LR	SSP3-7.0	2100	MPI-SSP3-100
GFDL-ESM4	SSP2-4.5	2050	GFDL-SSP2-50	MPI-ESM1-2-LR	SSP5-8.5	2100	MPI-SSP5-100

3.1 Results for the Coffee Portfolio

3.1.1 Impact of Heavy Rainfall on Coffee

Coffee cultivation is sensitive to climate variability, including changes in precipitation regimes and the occurrence of extreme events. The scientific literature specific to coffee has primarily addressed the relationship between seasonal accumulated precipitation and crop yield, showing that both rainfall deficits and excesses can negatively affect the productivity and stability of coffee production systems (Bilen et al., 2023). However, in climate and agroclimatic risk analysis, it is common to complement these seasonal approaches through the use of daily extreme precipitation indicators, which allow the characterization of heavy rainfall events with potential physical and productive impacts on agricultural systems.

In applied climatology and in climate change impact studies, heavy rainfall events are typically identified based on high daily precipitation thresholds or through standardized extreme indices, such as RX1day (annual maximum daily precipitation) and RX5day (maximum accumulated precipitation over five consecutive days). These indicators are widely used to assess events capable of generating surface runoff, soil saturation, local flooding, and physical damage to land surfaces and productive systems (Zhang et al., 2011; IPCC, 2021). Within this methodological framework, values on the order of tens of millimeters in a single day, frequently around 50 mm/day, are used in hydrological and agroclimatic assessments as an operational reference to represent heavy rainfall with potential environmental impact, particularly in humid tropical regions.

From this perspective, the adoption of a minimum threshold of 50 mm of daily precipitation does not imply the definition of a strict physiological limit for coffee cultivation. Rather, it constitutes an operational criterion widely used in the characterization of extreme events, aimed at identifying heavy rainfall conditions that may trigger adverse processes relevant to agricultural production, such as soil saturation, increased surface runoff, and deterioration of the physical conditions of the productive environment (IPCC, 2021).

3.1.1.1 Effect of Heavy Rainfall on Coffee Physiology and Yield

Various studies on coffee production systems agree that excess precipitation and the persistence of high humidity conditions constitute adverse factors for crop development. Recent systematic reviews indicate that a higher frequency of humid conditions is associated with increases in disease incidence, alterations in flowering and fruiting processes, and yield reductions, especially when these conditions coincide with phenologically sensitive stages of coffee (Bilen et al., 2023).

The response of coffee yield to precipitation is not linear. While adequate water availability is essential for crop growth and productivity, excessive rainfall or rainfall concentrated over short periods can negatively affect yield, either through indirect effects on the plant, such as increased fungal diseases, or through impacts associated with the deterioration of soil conditions and the root system (Bilen et al., 2023). In this regard, precipitation variability and extremes constitute a relevant factor of productive risk, even when the literature does not establish specific daily rainfall thresholds beyond which direct and immediate damage occurs.

Within this conceptual framework, very intense daily rainfall events, characterized by high accumulations over a short time interval, represent particularly critical conditions, as they increase the likelihood of prolonged soil saturation and the generation of environments favorable to pathogens, which translates into a higher probability of productive impacts in coffee production systems (Bilen et al., 2023).

3.1.1.2 Impacts of Heavy Rainfall on soil and Erosion in Coffee Plantation

In addition to the indirect effects on plant physiology, heavy rainfall has a significant impact on soil, especially in coffee systems established on hillsides. Experimental research in sloped coffee plantations has shown that these systems exhibit higher rates of surface runoff and water erosion compared to soils under natural forest cover, particularly during intense precipitation events (Stavi et al., 2023).

Erosion induced by heavy rainfall leads to the loss of topsoil, nutrient leaching, and degradation of soil structure, factors that negatively affect crop productivity in the medium and long term. These processes

are especially relevant in tropical regions, where heavy rainfall events can concentrate large volumes of precipitation over very short periods, exceeding the soil's infiltration capacity and exacerbating soil resource degradation processes (Stavi et al., 2023).

3.1.1.3 *Estimation of Yield Losses Associated with Heavy Rainfall*

The direct quantification of coffee yield losses attributable exclusively to daily heavy rainfall events is limited in scientific literature. However, climate impact studies and systematic reviews indicate that extreme climatic events, including intense and erratic precipitation, can generate agricultural yield reductions ranging from moderate to significant values, depending on the local context, topography, agronomic management, and coincidence with critical phenological stages of the crop (Bilen et al., 2023; IPCC, 2021).

In coffee production systems, it has been documented that the combination of excess moisture, increased disease incidence, and progressive soil degradation can translate into yield losses on the order of 10–30% under persistent adverse climatic conditions, especially when extreme events are repeated or concentrated over short periods (Bilen et al., 2023). These ranges are consistent with climate impact assessments in other sensitive perennial crops, in which precipitation extremes contribute substantially to interannual agricultural yield variability (IPCC, 2021).

Accordingly, for climate risk analysis purposes, it is methodologically consistent to represent the impact of heavy rainfall through vulnerability curves in which:

- Impact begins to manifest from daily heavy rainfall thresholds (≈ 50 mm/day), understood as operational indicators of extreme events.
- Impact severity increases progressively with event magnitude.
- A representative maximum loss level is reached (for example, on the order of 20% of yield) under extremely intense and infrequent events, without assuming total losses exclusively attributable to precipitation.

The available scientific evidence supports that heavy rainfall concentrated over short periods constitutes a relevant risk factor for coffee production, both due to its indirect effects on crop physiology and its physical impacts on soil. The use of daily heavy rainfall thresholds, such as values on the order of 50 mm/day, is aligned with established practices in climatology and extreme event assessment to identify events with the potential to generate runoff, soil saturation, and degradation of productive conditions (IPCC, 2021; Zhang et al., 2011).

Likewise, the literature on coffee production systems indicates that precipitation variability and extremes are associated with yield reductions, frequently in the range of 10–30%, when such events coincide with sensitive crop stages or are repeated over time (Bilen et al., 2023). Taken together, these elements provide a technically and scientifically coherent basis for the application of heavy rainfall thresholds and vulnerability curves in climate risk assessments of coffee cultivation in Costa Rica.

3.1.2 Average Annual Loss (AAL)

Table 4 presents the results of the Average Annual Loss (AAL) for the coffee cultivation portfolio in Costa Rica, considering the risk associated with drought, flooding, and heavy rainfall. The results are expressed in terms of absolute monetary value, in Costa Rican colones (CRC), as well as in relative terms with respect to the total exposed value of the coffee portfolio, through the percentage AAL (AAL %). The value can also be expressed in U.S. dollars (USD) using the projected average exchange rate for December 2025, with an exchange rate of 1 USD = 490 CRC. For the reader's reference, the total exposed value of the analyzed coffee portfolio amounts to ₡ 216,643,833,418, corresponding to the aggregate economic value of the crop within the study area.

AAL represents the mean value of expected annual losses over the long term, integrating the frequency and severity of the adverse events considered. In this sense, AAL can be interpreted as the average annual amount of economic losses that the coffee sector could experience as a consequence of drought or flooding events under a given climate.

For drought, under the baseline climate, the AAL reaches a value of approximately ₡ 6,140 million, which is equivalent to a relative expected annual loss of about 2.83% of the total portfolio value. This result indicates that, under current climatic conditions, drought constitutes one of the main hazards to the productive and economic stability of coffee cultivation in Costa Rica.

When analyzing climate change scenarios, it is observed that the AAL due to drought remains high and, in several cases, increases as more distant time horizons are considered, especially under high-emission pathways (SSP5). In the scenarios evaluated for 2035 and 2050, the relative AAL generally remains within ranges close to 2.1–2.5%, suggesting persistence of risk in the medium term. By 2100, some models and pathways, particularly under SSP5, show more pronounced increases in AAL, reaching relative values above 3% and even close to 4% of the exposed value. This implies that, under intensified climate change scenarios, drought could generate significantly higher average annual losses, increasing the economic vulnerability of the coffee sector.

In contrast to drought, the AAL associated with flooding presents considerably lower values across all evaluated climates. Under the baseline climate, the absolute AAL due to flooding is on the order of ₡ 14,598 CRC, corresponding to a relative AAL close to 0.000007% of the total portfolio value. Climate change scenarios show slight variations in absolute AAL due to flooding across models, SSP pathways, and time horizons. However, even under the most unfavorable scenarios, relative values remain on the order of tenths of a millionth, indicating that, at the scale of the national coffee portfolio, flooding represents a marginal economic risk.

The AAL associated with heavy rainfall events represents a relevant risk for coffee cultivation, particularly due to its potential impact on soil erosion, effects on flowering, fruit drop, and phytosanitary problems. Under the baseline climate, the absolute AAL due to heavy rainfall amounts to approximately ₡ 2,529 million, which is equivalent to a relative expected annual loss of about 1.17% of the total portfolio value. Although lower than that associated with drought, this value is significantly higher than that estimated for flooding, positioning heavy rainfall as an intermediate risk in terms of aggregate economic impact.

In the evaluated climate change scenarios, the AAL due to heavy rainfall remains relatively stable across climate models, SSP pathways, and time horizons, with relative values generally ranging between approximately 1.0% and 1.4% of the exposed value. Nevertheless, some scenarios show increases toward the end of the century, particularly under combinations of models and pathways that intensify climate variability, suggesting that heavy rainfall could constitute a persistent source of economic losses for the coffee sector in the medium and long term.

Table 4. Average annual loss by hazard and climate. Values in Costa Rican colones (CRC).

Climate	Coffee		Exposed value		₡ 216,643,833,418 \$429,848,876	
	Drought		Flood		Heavy rainfall	
	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)
Base	₡ 6,140,275,635	2.83	₡ 14,598	0.000007	₡ 2,529,072,022	1.17
EC-Earth3 SSP1 2035	₡ 4,600,979,372	2.12	₡ 14,926	0.000007	₡ 2,477,925,545	1.14
EC-Earth3 SSP1 2050	₡ 4,592,131,997	2.12	₡ 14,338	0.000007	₡ 2,438,598,263	1.13
EC-Earth3 SSP1 2100	₡ 4,647,306,811	2.15	₡ 14,265	0.000007	₡ 2,437,314,865	1.13
EC-Earth3 SSP2 2035	₡ 4,677,442,529	2.16	₡ 13,880	0.000006	₡ 2,396,075,411	1.11
EC-Earth3 SSP2 2050	₡ 4,595,450,091	2.12	₡ 14,170	0.000007	₡ 2,424,758,530	1.12
EC-Earth3 SSP2 2100	₡ 4,690,806,302	2.17	₡ 13,321	0.000006	₡ 2,323,679,102	1.07
EC-Earth3 SSP3 2035	₡ 4,673,606,836	2.16	₡ 13,557	0.000006	₡ 2,377,173,225	1.10
EC-Earth3 SSP3 2050	₡ 4,708,716,162	2.17	₡ 13,215	0.000006	₡ 2,342,692,944	1.08
EC-Earth3 SSP3 2100	₡ 4,763,122,237	2.20	₡ 12,594	0.000006	₡ 2,237,578,922	1.03
EC-Earth3 SSP5 2035	₡ 4,683,282,157	2.16	₡ 14,103	0.000007	₡ 2,408,188,839	1.11
EC-Earth3 SSP5 2050	₡ 4,645,313,543	2.14	₡ 13,804	0.000006	₡ 2,349,917,660	1.08
EC-Earth3 SSP5 2100	₡ 5,172,767,909	2.39	₡ 12,011	0.000006	₡ 2,188,894,313	1.01
GFDL-ESM4 SSP1 2035	₡ 4,812,310,538	2.22	₡ 15,393	0.000007	₡ 2,551,970,314	1.18
GFDL-ESM4 SSP1 2050	₡ 4,704,008,634	2.17	₡ 15,036	0.000007	₡ 2,505,020,890	1.16
GFDL-ESM4 SSP1 2100	₡ 4,757,527,613	2.20	₡ 15,342	0.000007	₡ 2,509,003,437	1.16
GFDL-ESM4 SSP2 2035	₡ 4,777,275,410	2.21	₡ 14,338	0.000007	₡ 2,481,623,471	1.15
GFDL-ESM4 SSP2 2050	₡ 4,634,540,571	2.14	₡ 14,250	0.000007	₡ 2,455,651,459	1.13
GFDL-ESM4 SSP2 2100	₡ 4,586,878,845	2.12	₡ 14,338	0.000007	₡ 2,437,682,045	1.13
GFDL-ESM4 SSP3 2035	₡ 4,744,211,935	2.19	₡ 14,190	0.000007	₡ 2,445,789,826	1.13
GFDL-ESM4 SSP3 2050	₡ 4,681,543,351	2.16	₡ 13,226	0.000006	₡ 2,346,235,607	1.08
GFDL-ESM4 SSP3 2100	₡ 5,096,670,932	2.35	₡ 11,369	0.000005	₡ 2,177,574,686	1.01
GFDL-ESM4 SSP5 2035	₡ 4,706,947,758	2.17	₡ 14,320	0.000007	₡ 2,458,112,210	1.13
GFDL-ESM4 SSP5 2050	₡ 4,652,650,033	2.15	₡ 13,552	0.000006	₡ 2,379,201,347	1.10
GFDL-ESM4 SSP5 2100	₡ 5,080,444,357	2.35	₡ 10,996	0.000005	₡ 2,132,895,651	0.98
MPI-ESM1-2-LR SSP1 2035	₡ 5,347,463,489	2.47	₡ 15,233	0.000007	₡ 2,695,535,266	1.24
MPI-ESM1-2-LR SSP1 2050	₡ 5,157,066,129	2.38	₡ 15,132	0.000007	₡ 2,700,829,250	1.25
MPI-ESM1-2-LR SSP1 2100	₡ 5,391,072,905	2.49	₡ 15,329	0.000007	₡ 2,876,070,997	1.33
MPI-ESM1-2-LR SSP2 2035	₡ 5,304,949,197	2.45	₡ 15,378	0.000007	₡ 2,820,720,024	1.30
MPI-ESM1-2-LR SSP2 2050	₡ 4,815,927,874	2.22	₡ 16,252	0.000008	₡ 3,048,462,268	1.41
MPI-ESM1-2-LR SSP2 2100	₡ 5,494,039,265	2.54	₡ 14,222	0.000007	₡ 2,671,070,390	1.23
MPI-ESM1-2-LR SSP3 2035	₡ 5,389,608,152	2.49	₡ 15,059	0.000007	₡ 2,738,810,307	1.26
MPI-ESM1-2-LR SSP3 2050	₡ 5,163,488,397	2.38	₡ 15,559	0.000007	₡ 2,950,638,412	1.36
MPI-ESM1-2-LR SSP3 2100	₡ 7,326,753,424	3.38	₡ 14,576	0.000007	₡ 2,656,064,083	1.23
MPI-ESM1-2-LR SSP5 2035	₡ 5,212,719,166	2.41	₡ 14,754	0.000007	₡ 2,651,273,269	1.22
MPI-ESM1-2-LR SSP5 2050	₡ 5,174,308,408	2.39	₡ 14,052	0.000006	₡ 2,568,571,837	1.19
MPI-ESM1-2-LR SSP5 2100	₡ 8,428,141,751	3.89	₡ 14,113	0.000007	₡ 2,851,884,108	1.32

Figure 6 graphically presents the relative Average Annual Losses (AAL) associated with the hazards considered, showing the baseline climate and those scenarios that generate the highest and lowest losses at the level of the entire portfolio, for the different projection years.

It is clearly observed that drought is the dominant hazard in terms of AAL for the coffee portfolio, followed by heavy rainfall. Between these two hazards, virtually the entirety of the expected annual losses is concentrated across all analyzed climate scenarios and time horizons. The AAL associated with drought reaches its maximum values under future climate change scenarios, particularly in those combining greater temperature increases and reduced water availability, highlighting the crop's high sensitivity to prolonged precipitation deficits.

In contrast, the flooding hazard presents practically negligible AAL values, both under the baseline climate and in future scenarios. This indicates that, at the aggregated portfolio level, the exposure and vulnerability of coffee cultivation to flooding events are very low, whether due to the location of production areas, topographic characteristics, or prevailing agricultural practices.

Regarding heavy rainfall, Figure 6 shows that this hazard presents intermediate AAL levels compared to drought and flooding. The difference between climates with minimum and maximum losses is not as pronounced as in the case of drought, but rather remains within similar ranges, with moderate variations across climate models and time horizons, with values close to 1.0% and 1.4%. This behavior suggests that, although heavy rainfall does not constitute the dominant hazard for coffee cultivation, it does represent a persistent source of economic risk, with potential impacts on productivity, soil stability, and crop health.

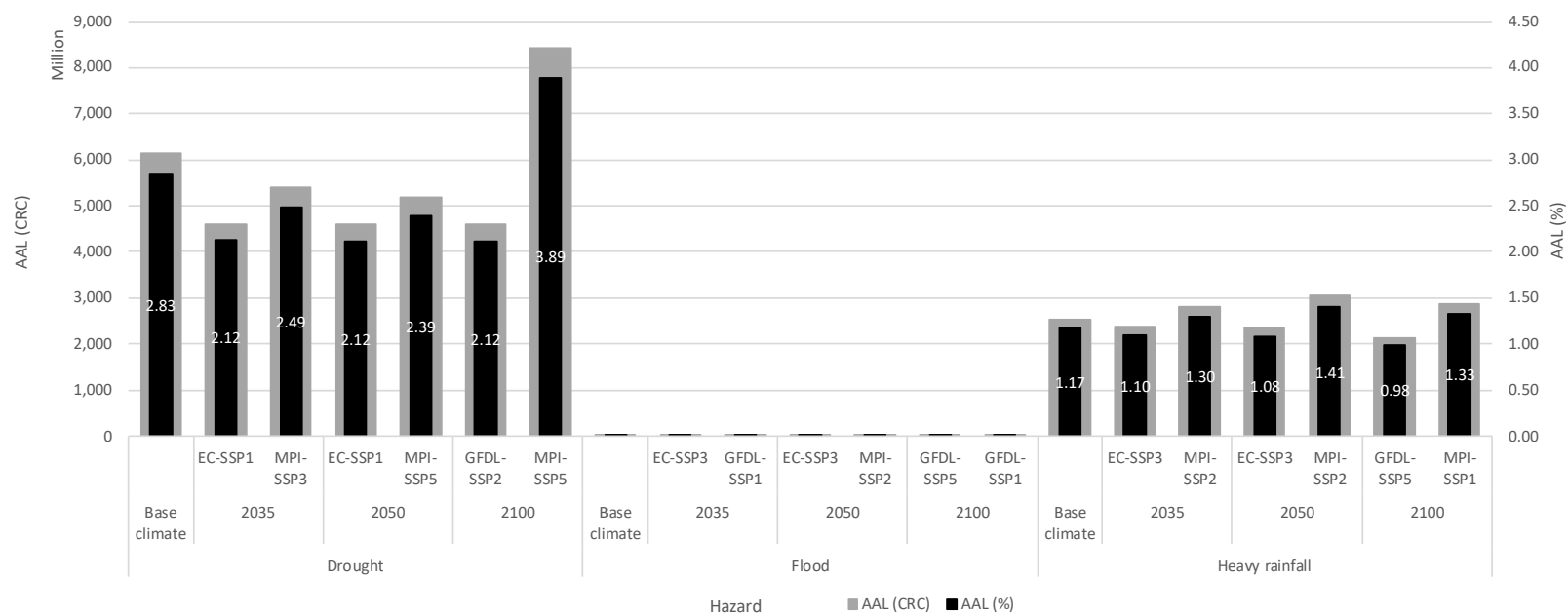


Figure 6. Average annual loss for coffee crops by hazard and climate.

Figure 7 presents the temporal evolution of the Average Annual Loss (AAL) associated with drought for coffee cultivation, considering the different combinations of global climate models (GCMs) and emission pathways. Each line represents a distinct climate projection, allowing analysis of how risk could vary over time under different climate change assumptions. In turn, Figure 8 shows the evolution of the AAL associated with the flooding hazard for the same scenarios and time horizons.

Figure 7 shows that drought risk exhibits high variability across climate models, especially toward more distant projection horizons. Although no common trend is identified across all scenarios, some models project significant increases in AAL by the year 2100, particularly under higher-emission pathways. This reflects the sensitivity of coffee cultivation to changes in water availability and to the duration of dry periods, which are critical factors during different stages of the production cycle.

In contrast, Figure 8 shows that the AAL associated with flooding is practically negligible across all projection years and for all combinations of models and scenarios considered. The observed variations are marginal and do not represent a relevant impact in terms of economic risk for the analyzed portfolio. This behavior indicates that, at an aggregated scale, flooding does not constitute a significant threat to coffee cultivation in Costa Rica.

Figure 9 shows the temporal evolution of the AAL associated with the heavy rainfall hazard. Unlike flooding, this hazard presents clearly non-zero AAL values in all analyzed scenarios, positioning it at an intermediate level relative to drought. In general terms, projections indicate moderate variability across models and scenarios, with relative AAL values remaining mostly within an approximate range of 1.0% to 1.4% throughout the analysis period. Some models show increases in AAL toward the 2050 horizon, followed by stabilization or slight reductions by 2100, while others project more stable behavior over time.

Overall, the results show that heavy rainfall constitutes a persistent source of economic risk for coffee cultivation under climate change scenarios. Although it does not reach the impact levels associated with drought, its contribution to the portfolio's AAL is systematically higher than that of flooding, reflecting the importance of considering the effects of intense precipitation events, such as soil erosion, physiological damage, and phytosanitary problems, in a comprehensive assessment of climate risk in the coffee sector.

The dispersion observed among the different projections highlights the inherent uncertainty in risk assessments that incorporate climate change scenarios. Each trajectory shown represents a possible future evolution of risk, without it being possible to determine which one will materialize, or even whether actual future risk will fall within the range of projections considered. This type of uncertainty, known as deep uncertainty, implies that metrics such as AAL should be interpreted as ranges of variation rather than as point values.

In this context, the maximum and minimum AAL values for each projection year define the range within which future risk could lie. As shown in Figure 9, this interval tends to widen toward the end of the century, reflecting increasing climate uncertainty as more distant time horizons and more divergent emission pathways are considered.

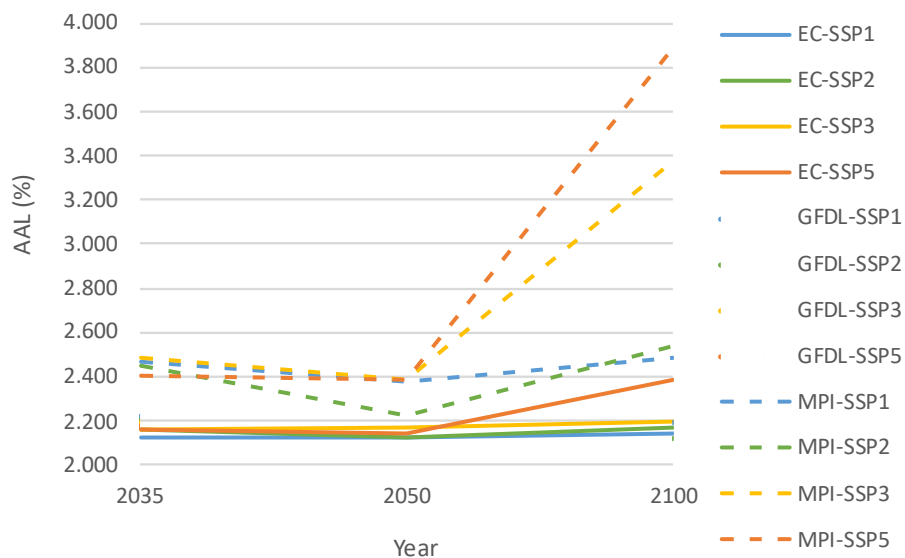


Figure 7. Average annual loss due to drought for the climate change scenarios considered.

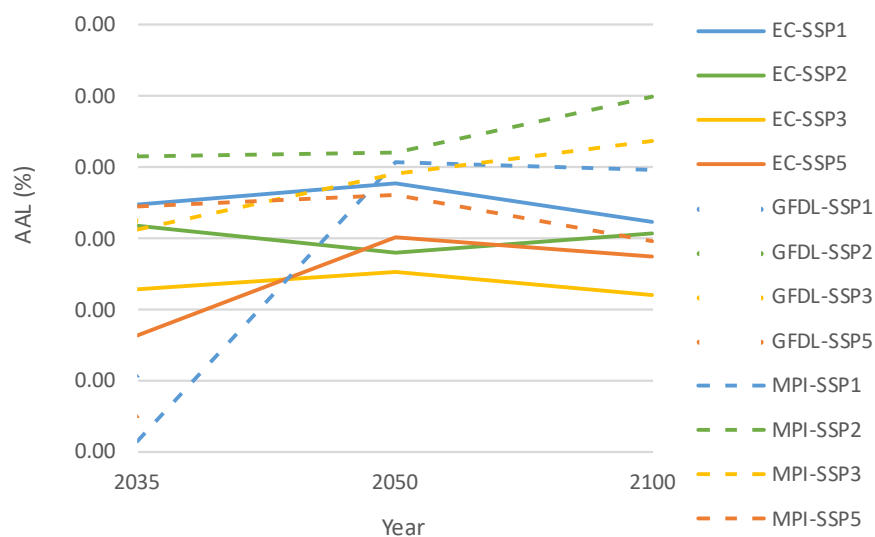


Figure 8. Average annual loss due to flooding for the climate change scenarios considered.

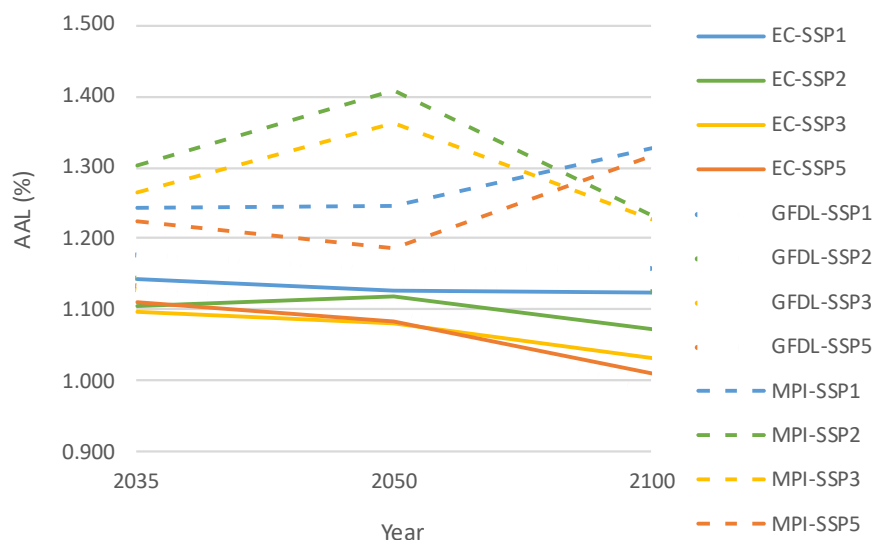


Figure 9. Average annual loss due to heavy rainfall for the climate change scenarios considered.

3.1.3 Probable Maximum Loss (PML)

As mentioned in Section 2.3.2, PML curves are an alternative way of presenting loss exceedance curves. That is, they are comprehensive representations of portfolio risk, incorporating both more recurrent events with lower relative losses and catastrophic events with very low frequency of occurrence. The PML curve format, expressed in terms of return period, allows for clearer communication of the level of risk associated with events across the full spectrum of occurrence frequencies, from very frequent events to rare, low-probability events.

Figure 10 presents the PML curves associated with drought, flooding, and heavy rainfall for coffee cultivation, considering the different combinations of global climate models and emission pathways. The curves show a progressive increase in relative loss as the return period increases, reflecting the growing severity of extreme events. In the case of drought, differences between climate scenarios are observed, particularly at longer return periods, highlighting the sensitivity of coffee to prolonged changes in water availability and to the duration of dry periods, which are critical during the crop's phenological stages.

For the flooding hazard, the PML curves show gentle slopes throughout the analyzed return period, indicating limited growth in relative loss even for infrequent events. PML values remain very low compared to the other hazards considered, and differences between climate scenarios and time horizons are limited in absolute terms.

In the case of heavy rainfall, the PML curves show a gradual increase in relative loss as the return period increases, with moderate slopes compared to drought. PML values consistently remain below those associated with drought, but well above those corresponding to flooding, confirming the intermediate nature of this hazard in terms of aggregate economic impact on coffee cultivation.

Across the different climate scenarios and time horizons, a limited dispersion among the curves is observed, indicating moderate variability in projected risk. This behavior suggests that, while heavy rainfall events may generate increasing losses as more extreme events are considered, their relative severity increases more gradually and less abruptly than in the case of drought. Overall, heavy rainfall represents a persistent source of risk, mainly associated with processes such as soil erosion, deterioration of productive infrastructure, and indirect impacts on crop development.

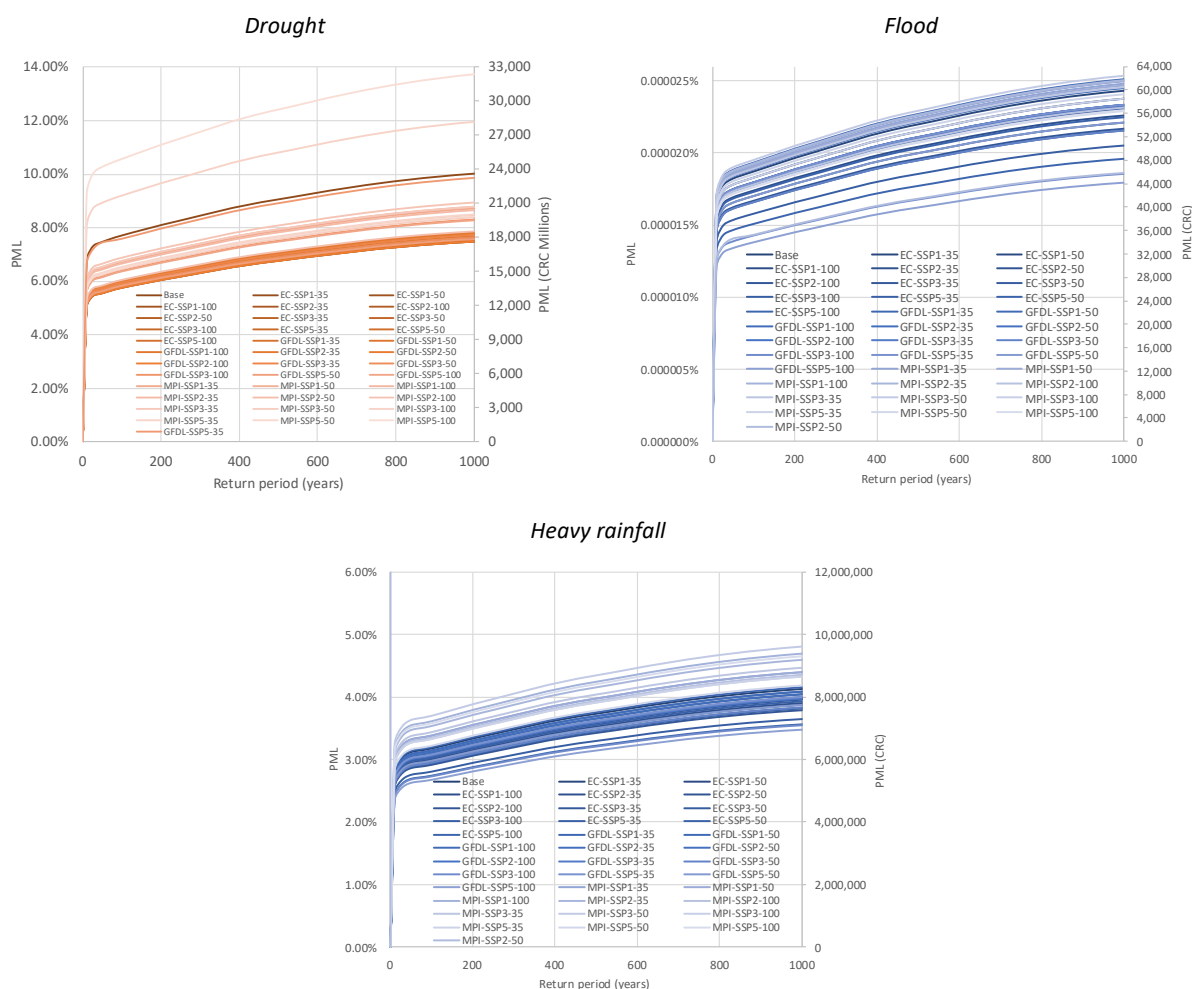


Figure 10. PML curves for coffee and all climates.

3.1.4 Aggregated Results by Administrative Units

Risk results are typically presented as aggregated portfolio outcomes and by location, as shown previously. However, it is important to visualize in which regions of the country risk is concentrated by aggregating it across different administrative geographic units. This allows for comparison of risk levels within geographic areas that have specific administrative jurisdictions and, therefore, clear sectoral or territorial responsibilities within disaster risk management.

Below, total average annual losses are presented, aggregated by cantons and provinces. In all cases, aggregated relative losses are shown, that is, the aggregated loss normalized by the exposed value within the unit considered. Only the baseline climate is presented in the comparison, in order to avoid overloading the document.

The comparisons presented make it possible to establish priorities regarding potential risk management actions to be implemented within the territory, from the perspective of the actor responsible for the specific geographic unit.

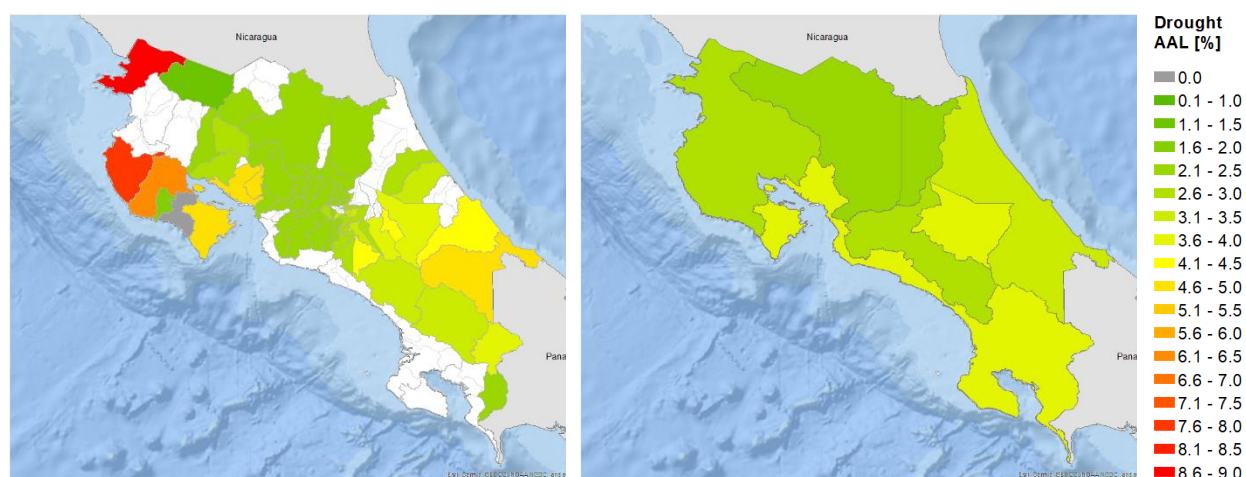


Figure 11. Average annual loss due to drought, by canton (left) and province (right).

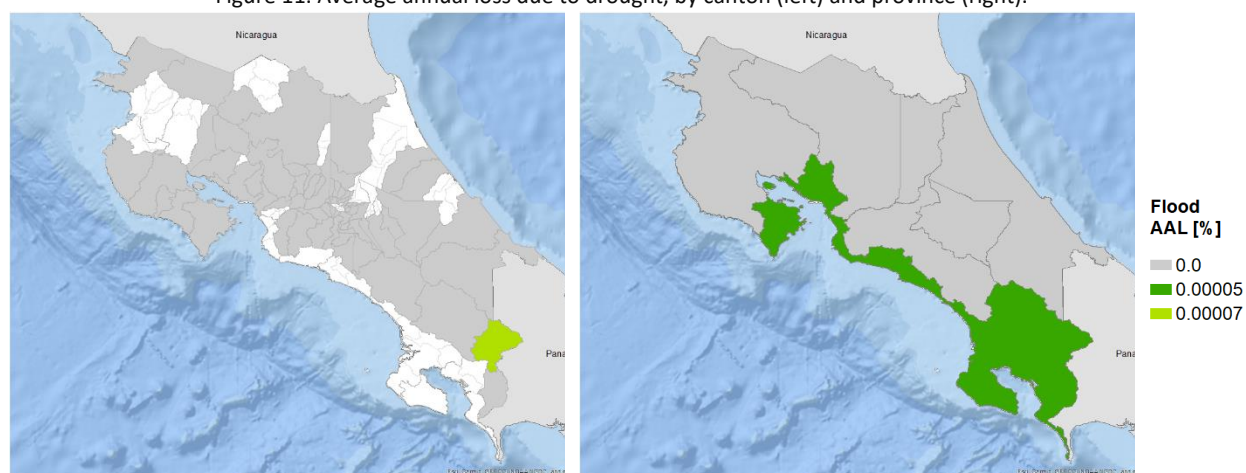


Figure 12. Average annual loss due to flood, by canton (left) and province (right).

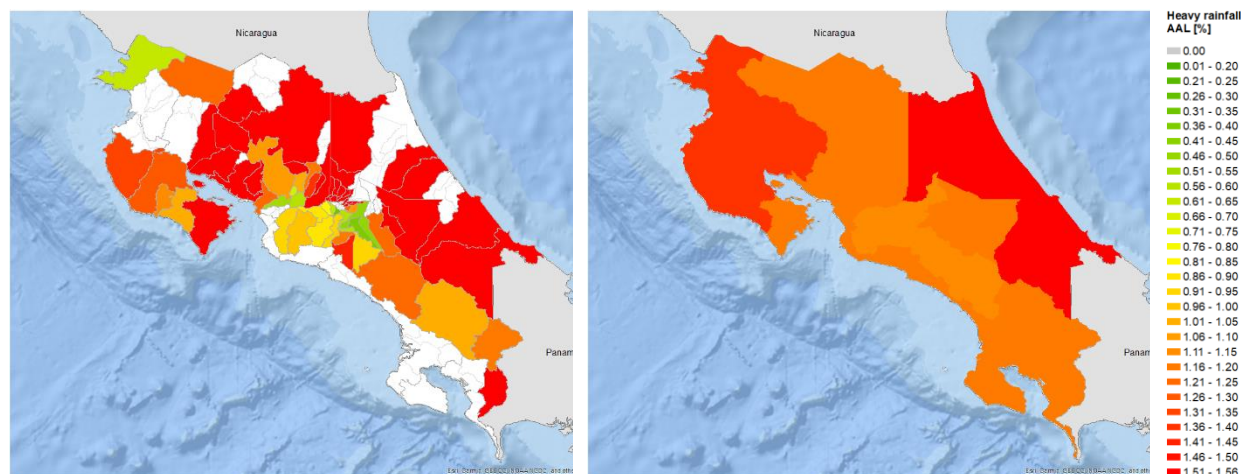


Figure 13. Average annual loss due to heavy rain, by canton (left) and province (right).

In the case of drought, the maps reveal marked spatial heterogeneity, with cantons showing higher AAL levels, especially in the North Pacific region, reflecting the crop's sensitivity to local climate variability and differences in soil types. The differences observed at the cantonal scale tend to smooth out when aggregated by province, although relevant regional contrasts remain. These patterns are associated with factors such as local climatic conditions, soil type, and dependence on precipitation during critical stages of the production cycle.

In contrast, the AAL associated with flooding shows considerably lower, practically negligible values. The few impacts identified are concentrated specifically in the southern part of the country.

In the case of heavy rainfall, the maps show a differentiated spatial pattern, with moderate AAL values across broad areas of the country. At the cantonal scale, these patterns indicate greater exposure of coffee cultivation to intense precipitation events across extensive regions. Cantons with lower AAL values are identified, represented by green tones, mainly in sectors of the Central Valley, suggesting lower relative impact from this hazard. When the information is aggregated at the provincial scale, spatial contrasts are maintained, allowing identification of regions with greater and lesser contributions to the risk associated with heavy rainfall at the national level.

3.2 Results for the Sugarcane Portfolio

3.2.1 Average Annual Loss (AAL)

Table 5 summarizes the results of the Average Annual Loss (AAL) for the sugarcane cultivation portfolio, considering the economic impacts derived from droughts and flooding, both under the baseline climate and under the different climate change scenarios and SSP pathways, evaluated for the years 2035, 2050, and 2100. AAL values are presented in absolute terms, expressed in Costa Rican colones (CRC), and in relative terms, as a percentage of the total exposed value of the portfolio, in order to facilitate comparison across climates and hazards. For reference, the exposed value of the analyzed sugarcane portfolio amounts to ₡ 58,573,290,149.

Under the baseline climate, the AAL associated with drought reaches approximately ₡ 908 million, corresponding to a relative expected annual loss of 1.55% of the total portfolio value. This result indicates that, even under current climatic conditions, drought constitutes a relevant risk factor for sugarcane production, although with a moderate incidence compared to other more climate-sensitive agricultural crops.

When considering climate change scenarios, a progressive reduction in AAL due to drought is observed in several models, especially under intermediate and low SSP pathways. In scenarios such as SSP2 and SSP3, and particularly toward the 2050 and 2100 horizons, the relative AAL is generally below 0.5%, and in some cases reaches values close to 0.05%. However, under certain models and high-emission pathways, such as SSP5, the AAL due to drought remains at higher levels, with relative values that may exceed 1% of the exposed value, particularly in short- and medium-term horizons. This suggests that, although sugarcane shows relatively greater tolerance to water deficit compared to other crops, drought risk does not disappear and may intensify under more extreme climate scenarios.

The AAL associated with flooding presents considerably lower values than those observed for drought across all evaluated climates. Under the baseline climate, the absolute AAL due to flooding is close to ₡ 127 thousand, equivalent to a relative AAL of approximately 0.00022% of the exposed portfolio value.

Across the different climate models, SSP pathways, and time horizons, the AAL due to flooding shows limited variation, consistently remaining within the same order of magnitude. Even under the most unfavorable scenarios, relative values remain extremely low, indicating that, at the scale of the aggregated portfolio, flooding has a limited economic impact on sugarcane cultivation.

Table 5. Average annual loss by hazard and climate. Values in Costa Rican colones (CRC).

Climate	Sugarcane		Exposed value	₡ 58,573,290,149
	Drought		Flood	
	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)
Base	₡ 908,068,412	1.55	₡ 126,989	0.00022
EC-Earth3 SSP1 2035	₡ 484,050,617	0.83	₡ 129,848	0.00022
EC-Earth3 SSP1 2050	₡ 261,741,441	0.45	₡ 124,731	0.00021
EC-Earth3 SSP1 2100	₡ 324,050,133	0.55	₡ 124,094	0.00021
EC-Earth3 SSP2 2035	₡ 146,332,510	0.25	₡ 120,744	0.00021
EC-Earth3 SSP2 2050	₡ 56,021,445	0.10	₡ 123,268	0.00021
EC-Earth3 SSP2 2100	₡ 29,619,706	0.05	₡ 115,887	0.00020
EC-Earth3 SSP3 2035	₡ 60,629,623	0.10	₡ 117,940	0.00020
EC-Earth3 SSP3 2050	₡ 14,738,804	0.03	₡ 114,961	0.00020
EC-Earth3 SSP3 2100	₡ 3,717,302	0.01	₡ 109,557	0.00019
EC-Earth3 SSP5 2035	₡ 327,795,352	0.56	₡ 122,688	0.00021
EC-Earth3 SSP5 2050	₡ 272,764,257	0.47	₡ 120,089	0.00021
EC-Earth3 SSP5 2100	₡ 17,282,748	0.03	₡ 104,486	0.00018
GFDL-ESM4 SSP1 2035	₡ 208,201,764	0.36	₡ 133,911	0.00023
GFDL-ESM4 SSP1 2050	₡ 325,615,634	0.56	₡ 130,806	0.00022
GFDL-ESM4 SSP1 2100	₡ 229,964,896	0.39	₡ 133,467	0.00023
GFDL-ESM4 SSP2 2035	₡ 49,128,305	0.08	₡ 124,731	0.00021
GFDL-ESM4 SSP2 2050	₡ 43,633,901	0.07	₡ 123,970	0.00021
GFDL-ESM4 SSP2 2100	₡ 21,507,906	0.04	₡ 124,732	0.00021
GFDL-ESM4 SSP3 2035	₡ 60,951,575	0.10	₡ 123,444	0.00021
GFDL-ESM4 SSP3 2050	₡ 29,429,869	0.05	₡ 115,055	0.00020

GFDL-ESM4 SSP3 2100	₡ 82,668,007	0.14	₡ 98,906	0.00017
GFDL-ESM4 SSP5 2035	₡ 68,859,991	0.12	₡ 124,570	0.00021
GFDL-ESM4 SSP5 2050	₡ 35,931,899	0.06	₡ 117,894	0.00020
GFDL-ESM4 SSP5 2100	₡ 124,034,335	0.21	₡ 95,655	0.00016
MPI-ESM1-2-LR SSP1 2035	₡ 1,161,414,997	1.98	₡ 132,515	0.00023
MPI-ESM1-2-LR SSP1 2050	₡ 877,088,633	1.50	₡ 131,640	0.00022
MPI-ESM1-2-LR SSP1 2100	₡ 1,327,441,061	2.27	₡ 133,349	0.00023
MPI-ESM1-2-LR SSP2 2035	₡ 1,248,444,807	2.13	₡ 133,781	0.00023
MPI-ESM1-2-LR SSP2 2050	₡ 733,529,939	1.25	₡ 141,381	0.00024
MPI-ESM1-2-LR SSP2 2100	₡ 876,377,764	1.50	₡ 123,723	0.00021
MPI-ESM1-2-LR SSP3 2035	₡ 1,290,423,057	2.20	₡ 131,003	0.00022
MPI-ESM1-2-LR SSP3 2050	₡ 1,387,305,437	2.37	₡ 135,357	0.00023
MPI-ESM1-2-LR SSP3 2100	₡ 1,302,709,654	2.22	₡ 126,798	0.00022
MPI-ESM1-2-LR SSP5 2035	₡ 1,149,933,198	1.96	₡ 128,350	0.00022
MPI-ESM1-2-LR SSP5 2050	₡ 829,194,627	1.42	₡ 122,243	0.00021
MPI-ESM1-2-LR SSP5 2100	₡ 824,898,166	1.41	₡ 122,775	0.00021

Figure 14 shows the relative Average Annual Losses (AAL) associated with hazards affecting sugarcane cultivation, considering the baseline climate and a selection of future climate scenarios representing the highest-impact conditions for different projection horizons.

The figure shows that drought constitutes the main source of risk for the sugarcane portfolio, concentrating virtually the entirety of the AAL across all evaluated scenarios. Losses associated with this hazard increase significantly under future climate change scenarios, reflecting the crop's high dependence on water availability throughout its production cycle.

In particular, future climate scenarios show a progressive increase in relative AAL due to drought toward more distant projection years, reaching maximum values under combinations of climate models and emission pathways that intensify water stress. This behavior highlights the crop's high vulnerability to prolonged periods of precipitation deficit, which directly affect productivity and expected yields.

In contrast, the flooding hazard presents practically negligible expected annual losses across all analyzed scenarios and periods. This is mainly because not all elements of the exposed sugarcane portfolio are affected by flooding events, and sugarcane cultivation exhibits a relatively higher tolerance to short-duration flooding (Gomathi et al., 2014; Teinseree et al., 2024), which is the most common type of event. Consequently, such events do not generate significant economic impacts on production at the aggregated portfolio level.

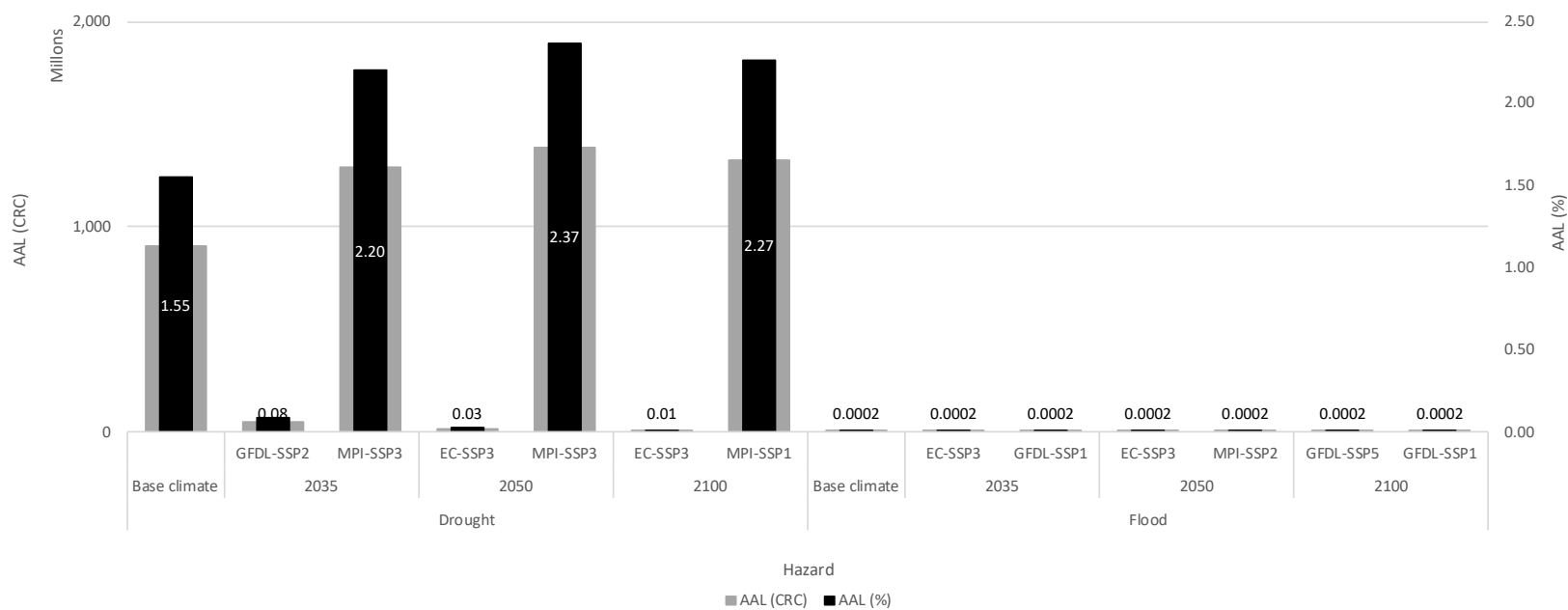


Figure 14. Average annual loss for sugarcane by hazard and climate.

Figure 15 shows the temporal evolution of the Average Annual Loss (AAL) associated with drought for sugarcane cultivation, considering the different combinations of global climate models (GCMs) and emission pathways. Each line represents an independent projection, allowing assessment of how production risk could behave under different climate change scenarios. Complementarily, Figure 16 presents the AAL associated with the flooding hazard for the same scenarios and time horizons.

In the case of drought, the risk shows moderate variations across scenarios, with more noticeable differences toward mid- and late-century horizons. Some models project gradual increases in AAL under higher-emission scenarios, while others show relative stability. This behavior reflects sugarcane's capacity to adapt to temporary water deficits, while also highlighting its sensitivity to changes in the duration and frequency of dry periods. It is worth noting that the uncertainty associated with drought losses is much greater than that for flooding, which is important for planning sugarcane climate resilience and adaptation.

In contrast, the AAL associated with flooding is practically negligible. Although some interannual and inter-model variations are observed, these are much smaller than those associated with drought, and occasional increases under certain scenarios do not result in significant economic impacts.

The dispersion observed among projections highlights the inherent uncertainty in climate risk assessments, and results should therefore be interpreted as plausible ranges of impact rather than precise forecasts.

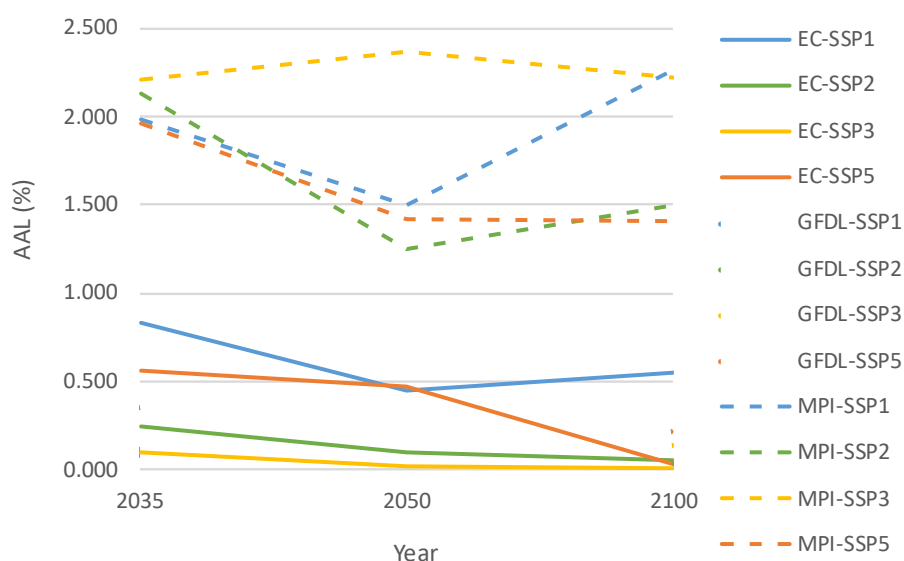


Figure 15. Average annual loss due to drought for the climate change scenarios considered.

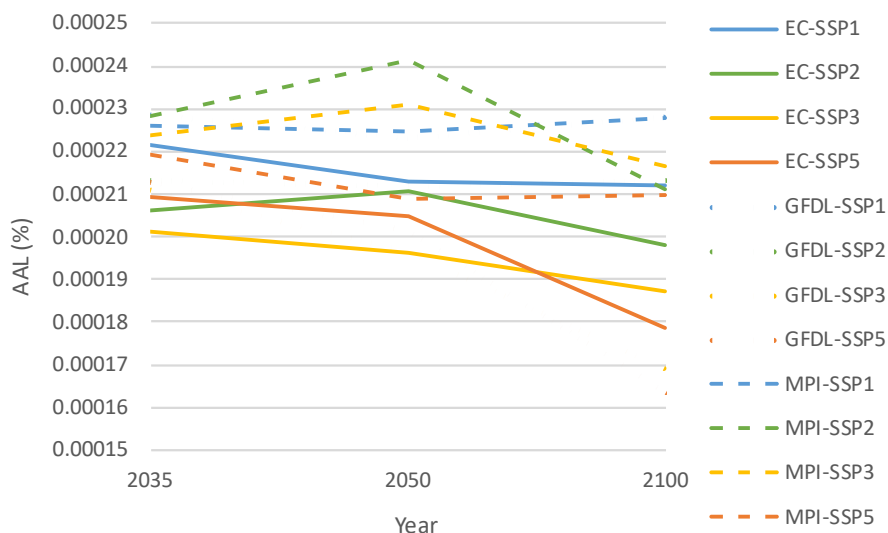


Figure 16. Average annual loss due to floods for the climate change scenarios considered.

3.2.2 Probable Maximum Loss (PML)

Figure 17 shows the PML curves for sugarcane under drought and flood hazards, considering multiple climate change scenarios. These curves allow evaluation of the potential magnitude of maximum losses as a function of return period, providing a comprehensive view of risk for this extensive agricultural system.

In the case of drought, the curves show more gradual and moderate growth compared to other crops, reflecting sugarcane's greater tolerance to temporary water deficits. However, increasing separation between climate scenarios is observed at longer return periods, indicating that more intense or prolonged dry events could generate significant losses, especially in areas with limited irrigation capacity.

For floods, the PML curves show rapid growth at short return periods, followed by clear stabilization. This pattern suggests that the most relevant impacts are associated with frequent events affecting harvest activities, rather than with extremely rare, low-probability events.

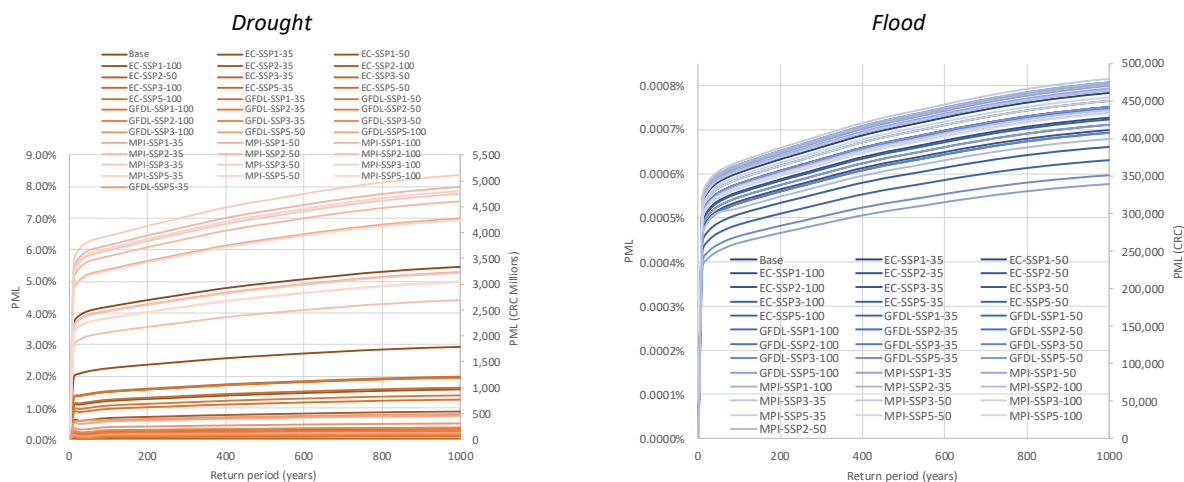


Figure 17. PML curves for sugarcane and all climates.

3.2.3 Aggregated Results by Administrative Units

Figures 18 and 19 show the relative Average Annual Loss (AAL), expressed as a percentage of the exposed value, for sugarcane cultivation under drought and flood hazards. The maps are presented at both cantonal and provincial levels, allowing identification of areas with higher concentrations of risk and their behavior at different spatial scales.

For drought, greater variability is observed among the different cantons of the country, with relatively higher values toward the Caribbean region, followed by cantons located in the central part of the country. At the provincial level, differences in risk are also observed, although values are distributed more uniformly.

In the case of floods, the maps show a concentration of risk in specific cantons in the northern part of the country, particularly in areas associated with alluvial plains and zones with limited natural drainage. When the information is aggregated at the provincial scale, these local concentrations are partially smoothed out, although a clear signal remains in those provinces with a greater presence of flood-prone areas.

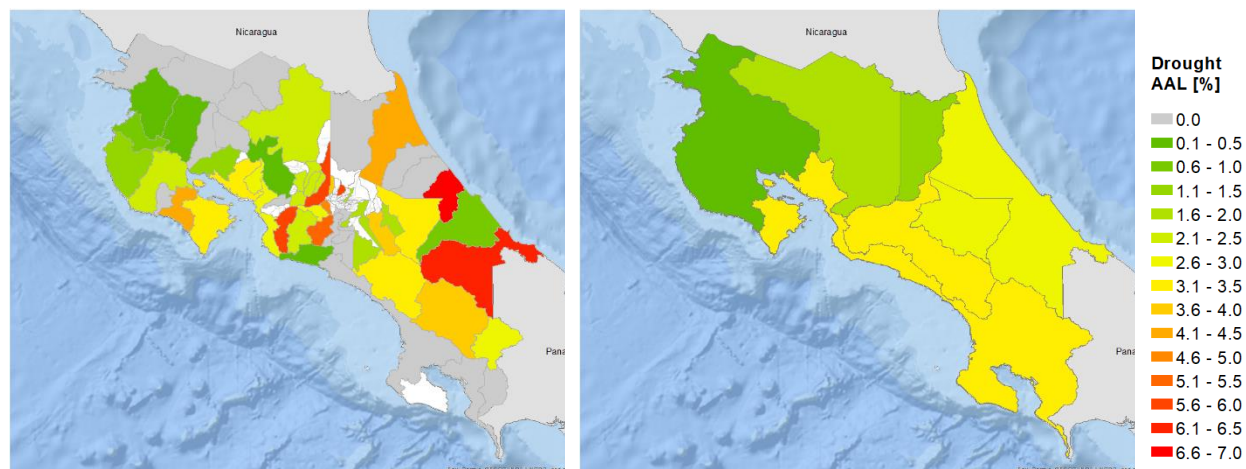


Figure 18. Average annual loss due to drought, by canton (left) and province (right).

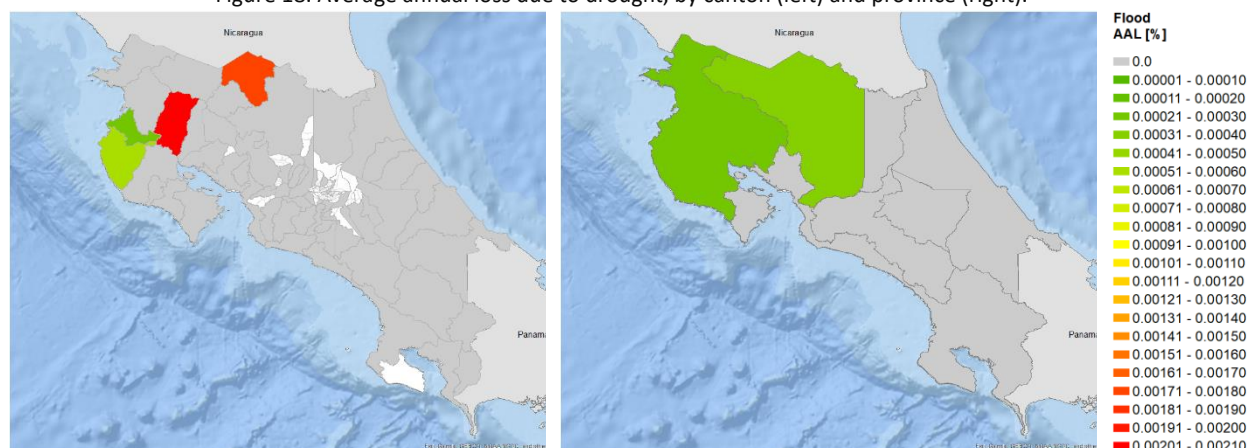


Figure 19. Average annual loss due to floods, by canton (left) and province (right).

3.3 Results for the Livestock Portfolio

3.3.1 Average Annual Loss (AAL)

Table 6 presents the results of the Average Annual Loss (AAL) for the national portfolio of extensive beef and dairy cattle production, considering the economic effects of droughts and flooding under the baseline climate and various climate change scenarios derived from CMIP6 models and SSP pathways, evaluated for the years 2035, 2050, and 2100. Losses are expressed in absolute terms (CRC) and as a percentage of the total exposed value of the portfolio, allowing assessment of the relative magnitude of climate risk affecting the sector. For reference, the total exposed value of the analyzed livestock portfolio amounts to ₡ 585,901,880,748, corresponding to the aggregate economic value of extensive livestock activity in the country.

Under the baseline climate, the AAL due to drought reaches approximately ₡ 1,417 million, equivalent to a relative expected annual loss of 0.24% of the total livestock portfolio value. This value reflects the structural sensitivity of extensive livestock systems to water deficits, particularly through reductions in pasture productivity and deterioration of livestock feeding conditions.

Under climate change scenarios, a general upward trend in drought risk is observed, especially toward the 2050 and 2100 horizons. Under intermediate and high emission pathways (SSP3 and SSP5), several models project progressive increases in AAL, reaching relative values above 0.5%, and even close to or exceeding 1% of the exposed value in some extreme scenarios by the end of the century. Results under SSP5 scenarios by 2100 are particularly notable, where AAL due to drought may exceed ₡ 8,000 million, with relative losses on the order of 1.4%. These values indicate a substantial increase in climate risk for livestock production, associated with more frequent, prolonged, or severe droughts, with cumulative impacts on the productive capacity of extensive systems.

In contrast to drought, the AAL associated with floods presents very low value across all evaluated climates. Under the baseline climate, the absolute AAL due to flood is close to ₡ 1.36 million, corresponding to a relative AAL of approximately 0.00023% of the exposed portfolio value. Across different climate models, SSP pathways, and time horizons, AAL values due to floods remain practically constant, with minimal variations and no clear upward trend. Even under intensified climate change scenarios, the contribution of flooding to the aggregated risk of the livestock portfolio remains marginal.

This behavior suggests that, at the national scale, flood-related losses in extensive livestock systems are highly localized and do not generate significant economic impacts when analyzed in aggregated form, although they may cause severe damage in specific areas.

Table 6. Average annual loss by hazard and climate. Values in Costa Rican colones (CRC).

Climate	Livestock		Exposed value	₡ 585,901,880,748
	Drought		Flood	
	AAL (CRC)	AAL(%)	AAL (CRC)	AAL(%)
Base	₡ 1,417,585,895	0.24	₡ 1,360,249	0.00023
EC-Earth3 SSP1 2035	₡ 2,137,245,794	0.36	₡ 1,390,874	0.00024
EC-Earth3 SSP1 2050	₡ 2,270,281,404	0.39	₡ 1,336,062	0.00023
EC-Earth3 SSP1 2100	₡ 3,017,651,401	0.52	₡ 1,329,245	0.00023
EC-Earth3 SSP2 2035	₡ 2,438,944,066	0.42	₡ 1,293,358	0.00022
EC-Earth3 SSP2 2050	₡ 2,014,499,438	0.34	₡ 1,320,393	0.00023
EC-Earth3 SSP2 2100	₡ 2,879,018,817	0.49	₡ 1,241,339	0.00021
EC-Earth3 SSP3 2035	₡ 2,423,618,654	0.41	₡ 1,263,328	0.00022
EC-Earth3 SSP3 2050	₡ 3,109,375,135	0.53	₡ 1,231,413	0.00021
EC-Earth3 SSP3 2100	₡ 3,500,343,351	0.60	₡ 1,173,525	0.00020
EC-Earth3 SSP5 2035	₡ 2,633,514,024	0.45	₡ 1,314,187	0.00022
EC-Earth3 SSP5 2050	₡ 2,550,762,493	0.44	₡ 1,286,343	0.00022
EC-Earth3 SSP5 2100	₡ 5,107,574,810	0.87	₡ 1,119,206	0.00019
GFDL-ESM4 SSP1 2035	₡ 1,098,081,872	0.19	₡ 1,434,399	0.00024
GFDL-ESM4 SSP1 2050	₡ 1,122,323,663	0.19	₡ 1,401,135	0.00024
GFDL-ESM4 SSP1 2100	₡ 1,715,936,901	0.29	₡ 1,429,645	0.00024
GFDL-ESM4 SSP2 2035	₡ 1,612,494,520	0.28	₡ 1,336,070	0.00023
GFDL-ESM4 SSP2 2050	₡ 1,586,019,654	0.27	₡ 1,327,912	0.00023
GFDL-ESM4 SSP2 2100	₡ 1,733,239,910	0.30	₡ 1,336,082	0.00023
GFDL-ESM4 SSP3 2035	₡ 1,374,849,167	0.23	₡ 1,322,278	0.00023

GFDL-ESM4 SSP3 2050	₡ 3,103,531,786	0.53	₡ 1,232,419	0.00021
GFDL-ESM4 SSP3 2100	₡ 7,477,239,392	1.28	₡ 1,059,439	0.00018
GFDL-ESM4 SSP5 2035	₡ 1,573,627,251	0.27	₡ 1,334,346	0.00023
GFDL-ESM4 SSP5 2050	₡ 3,099,990,887	0.53	₡ 1,262,831	0.00022
GFDL-ESM4 SSP5 2100	₡ 8,269,043,025	1.41	₡ 1,024,613	0.00017
MPI-ESM1-2-LR SSP1 2035	₡ 2,159,755,877	0.37	₡ 1,419,443	0.00024
MPI-ESM1-2-LR SSP1 2050	₡ 1,739,935,063	0.30	₡ 1,410,074	0.00024
MPI-ESM1-2-LR SSP1 2100	₡ 2,303,448,484	0.39	₡ 1,428,375	0.00024
MPI-ESM1-2-LR SSP2 2035	₡ 1,483,438,292	0.25	₡ 1,433,002	0.00024
MPI-ESM1-2-LR SSP2 2050	₡ 1,162,375,257	0.20	₡ 1,514,419	0.00026
MPI-ESM1-2-LR SSP2 2100	₡ 4,857,949,771	0.83	₡ 1,325,265	0.00023
MPI-ESM1-2-LR SSP3 2035	₡ 1,535,971,722	0.26	₡ 1,403,253	0.00024
MPI-ESM1-2-LR SSP3 2050	₡ 1,718,757,766	0.29	₡ 1,449,887	0.00025
MPI-ESM1-2-LR SSP3 2100	₡ 3,190,116,562	0.54	₡ 1,358,209	0.00023
MPI-ESM1-2-LR SSP5 2035	₡ 2,226,852,950	0.38	₡ 1,374,834	0.00023
MPI-ESM1-2-LR SSP5 2050	₡ 3,218,139,046	0.55	₡ 1,309,422	0.00022
MPI-ESM1-2-LR SSP5 2100	₡ 8,340,242,903	1.42	₡ 1,315,118	0.00022

Figure 20 presents the relative Average Annual Losses (AAL) associated with the climate hazards considered for extensive beef and dairy cattle production, incorporating the baseline climate and a selection of future climate scenarios for different projection horizons.

Similar to what was observed for agricultural crops, the analysis shows that drought is the hazard concentrating the highest level of risk for the livestock portfolio, accounting for the majority of the AAL across all evaluated scenarios. Losses associated with this hazard increase markedly under future scenarios, reflecting the high dependence of extensive livestock systems on water availability and pasture productivity.

In particular, climate change scenarios projected toward the end of the century show a significant increase in relative AAL due to drought, reaching the highest values under scenarios that intensify the frequency and duration of dry periods. This behavior is consistent with expected impacts on forage supply, livestock heat stress, and reductions in beef and milk production levels.

In contrast, the flood hazard presents practically negligible expected annual losses across all projection years and climate scenarios considered. This is mainly because, within the analyzed portfolio, only a small number of elements are directly affected by flooding. Consequently, extensive cattle production is not significantly exposed to these events, and the economic impacts of the more frequent floods on productive activity are minimal.

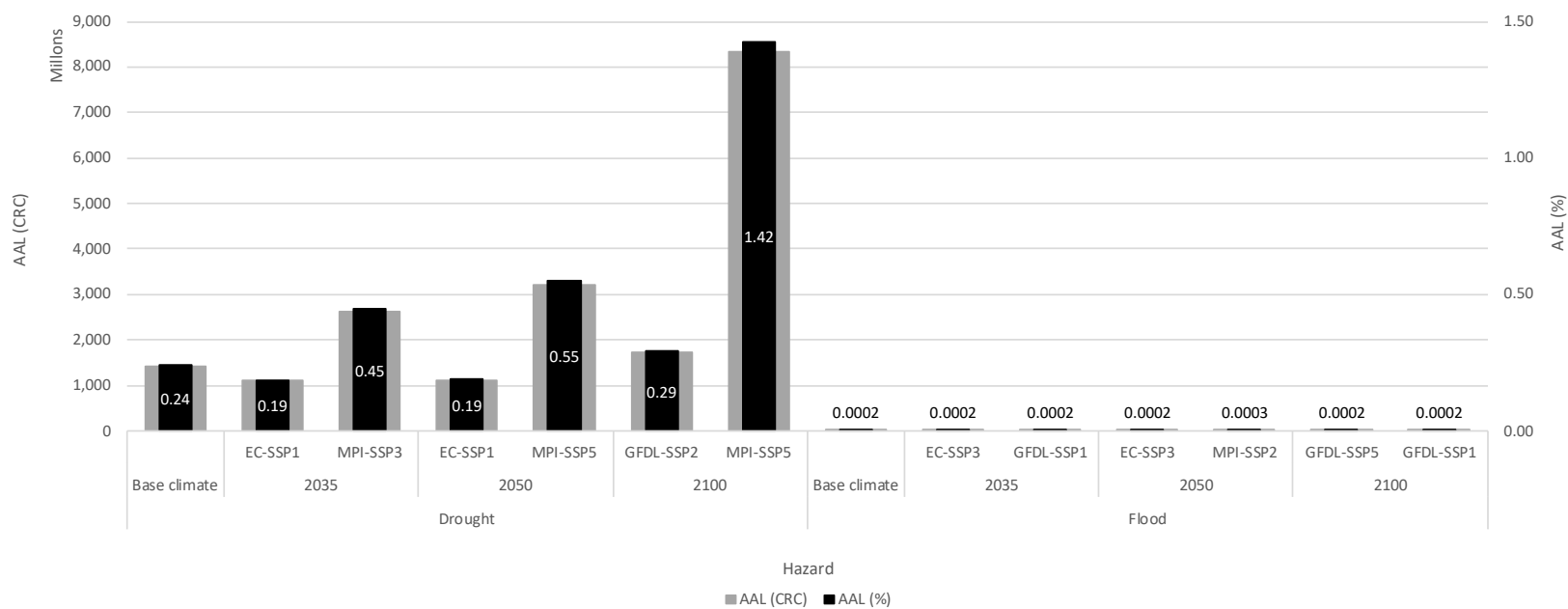


Figure 20. Average annual loss for livestock by hazard and climate.

Figure 21 presents the evolution of the Average Annual Loss (AAL) associated with drought for extensive beef and dairy cattle production in Costa Rica, under the different climate change scenarios and emission pathways. Likewise, Figure 22 shows the AAL associated with the flooding hazard.

The results for drought show a progressive increase in risk in most scenarios, particularly toward the end of the century and under higher-emission pathways. This pattern reflects the high dependence of extensive livestock systems on pasture availability and water resources, both of which are directly affected by prolonged periods of water deficit. Reduced forage productivity and livestock heat stress are key factors explaining the projected increase in AAL.

Regarding floods, the results suggest that, although flood events may generate localized losses, their aggregated impact is more limited compared to drought.

The breadth of the projection range reflects the livestock system's high sensitivity to climate variability, as well as the uncertainty associated with the future response of precipitation and temperature patterns.

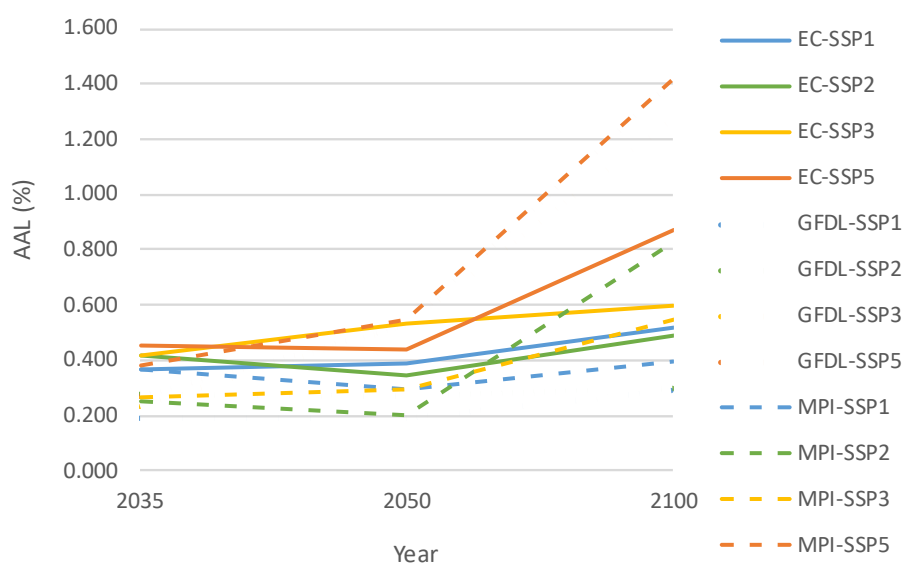


Figure 21. Average annual loss due to drought for the climate change scenarios considered.

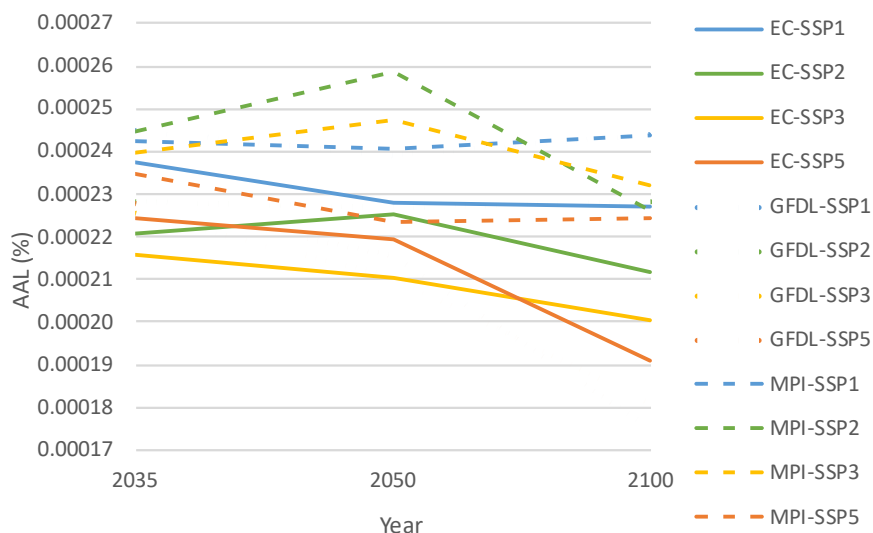


Figure 22. Average annual loss due to floods for the climate change scenarios considered.

3.3.2 Probable Maximum Loss (PML)

Figure 23 presents the PML curves associated with drought and floods for extensive beef and dairy cattle production in Costa Rica, under different climate scenarios. These curves allow analysis of the production system's response to climate events of varying severity and frequency, considering its direct dependence on natural resources.

The curves associated with drought show sustained growth in losses even at long return periods, highlighting the livestock system's high vulnerability to extreme dry events. This behavior is linked to reduced pasture productivity, water scarcity for livestock, and increased heat stress, effects that intensify under higher warming scenarios.

The PML curves for floods show gentler slopes, and their contribution to aggregated extreme risk is much lower compared to drought.

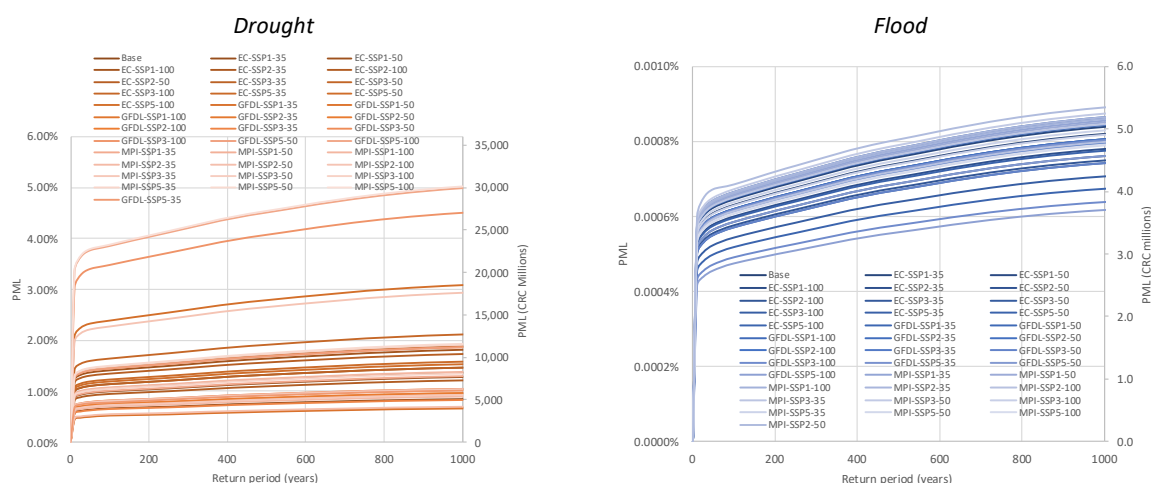


Figure 23. PML curves for livestock and all climates.

3.3.3 Aggregated Results by Administrative Units

Figures 24 and 25 present the spatial distribution of the relative Average Annual Loss (AAL), expressed as a percentage of the exposed value, for extensive beef and dairy cattle production in Costa Rica. For each climate hazard, maps are shown at both cantonal and provincial scales, allowing assessment of the territorial variability of risk.

The drought maps show a concentration of higher AAL values in specific regions, particularly in the North Pacific zone, where water and forage scarcity increase the vulnerability of the livestock system. This pattern reflects the high dependence of extensive cattle production on pasture availability and water resources, as well as the characteristics of predominant grasses in the region, which tend to have shallower root systems and therefore a lower capacity to withstand prolonged periods of water deficit. At the cantonal scale, greater spatial variability is observed, while at the provincial level, clear regional patterns persist, associated with higher recurrence of water deficits, heat stress, and limiting soil conditions.

In contrast, the AAL associated with floods shows a more dispersed distribution, with minimal impacts concentrated in particular cantons where topographic and drainage conditions favor water accumulation. Although relative values are lower than those observed for drought, the spatial extent of risk is greater than in agricultural systems, reflecting the broad territorial distribution of extensive livestock production across the country.

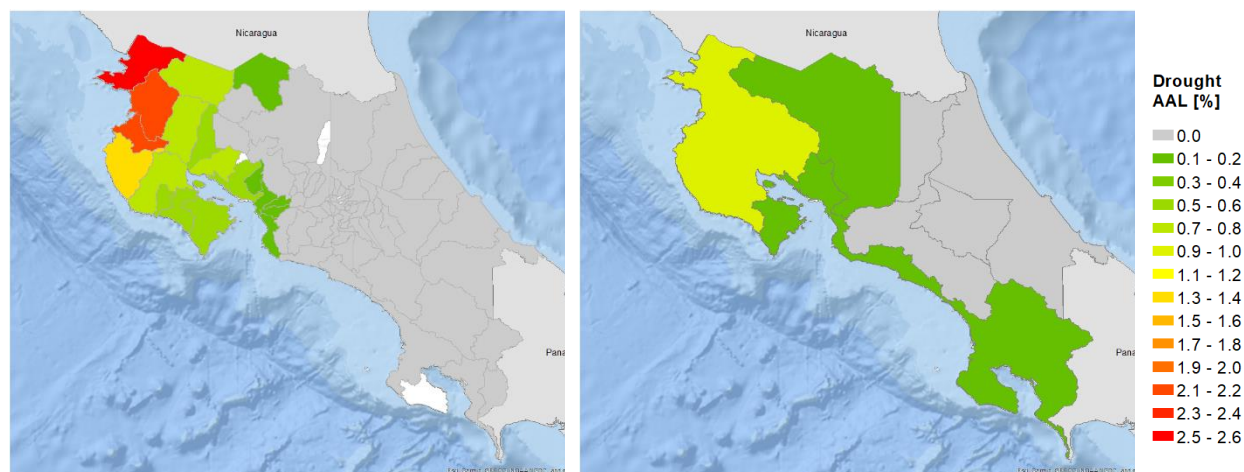


Figure 24. Average annual loss due to drought, by canton (left) and province (right).

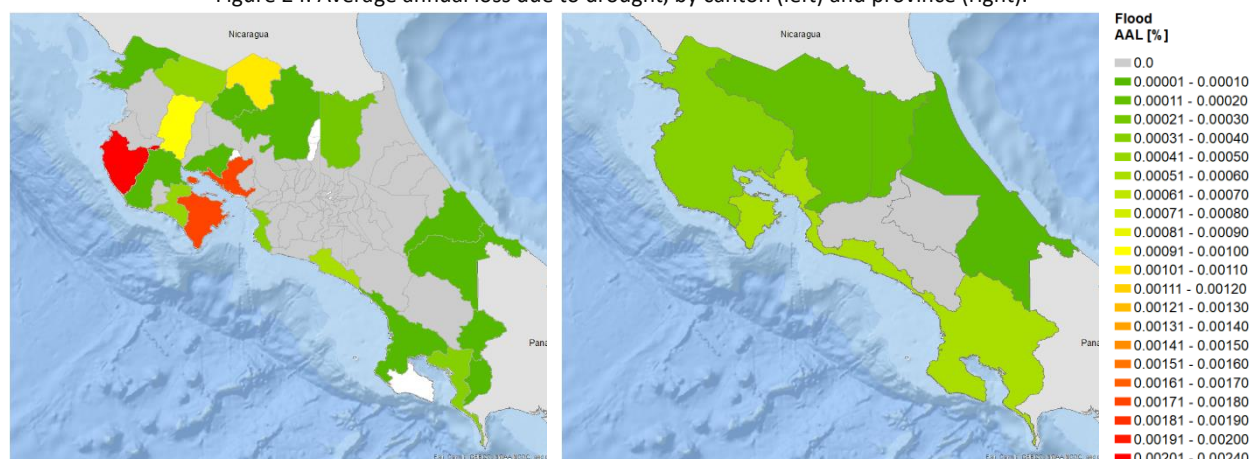


Figure 25. Average annual loss due to floods, by canton (left) and province (right).

3.4 Results Disaggregated by Type of Producer

As a complement to the results presented above, it is useful to aggregate risk figures by type of producer. This makes it possible to differentiate risk levels from an additional perspective beyond those previously presented.

In Costa Rica, the classification of agricultural producers into small, medium, and large is based on the size of the farm dedicated to primary agricultural or livestock production (that is, the number of hectares allocated to productive activity). This classification is defined in regulations of the Ministry of Agriculture and Livestock (MAG) for purposes of registration, technical assistance, and access to sectoral benefits.

For coffee, according to the Decree for certifying the status of Small and Medium Agricultural Producers (PYMPA):

- Small coffee producer: up to 15 hectares of coffee plantations.
- Medium coffee producer: more than 15 and up to 50 hectares.
- Large coffee producer: more than 50 hectares.

This classification reflects both production scale and access to markets and productive infrastructure; small producers typically allocate most of their production to local markets, while medium and large producers tend to have a higher degree of structured commercialization (for example, through cooperatives or contracts).

For sugarcane, according to parameters used for similar agricultural activities in technical decrees:

- Small sugarcane producer: up to approximately 25 hectares.
- Medium sugarcane producer: more than 25 and up to around 75 hectares.
- Large sugarcane producer: more than 75 hectares.

This threshold considers that sugarcane production is a larger-scale activity, with technical and machinery requirements that often exceed what is typical on smaller farms.

For cattle production, the classification distinguishes between beef and dairy production due to differences in production intensity:

Beef or dual-purpose cattle

- Small producer: up to 75 hectares of natural pasture or forage intended for cattle.
- Medium producer: more than 75 and up to 200 hectares.
- Large producer: more than 200 hectares.

Specialized dairy production

- Small dairy producer: up to 50 hectares.
- Medium dairy producer: more than 50 and up to 125 hectares.
- Large dairy producer: more than 125 hectares.

The differentiation between beef and dairy reflects that dairy production tends to require more intensive management and greater inputs per unit area, which is reflected in the land area thresholds.

Tables 7 through 9 present AAL results by type of producer considering drought. Table 10 presents these results for heavy rainfall in the case of coffee. Flooding is not included because results were relatively low (see previous sections). However, the complete set of results is included in the project dataset.

Table 7. AAL due to drought (million CRC) for each type of coffee producer.

Climate	Small producer		Medium producer		Large producer	
	Exposed value	€ 77,114	Exposed value	€ 4,197	Exposed value	€ 95,333
	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)
Base	€ 2,326	3.02	€ 1,290	2.92	€ 2,524	2.65
EC-Earth3 SSP1 2035	€ 1,664	2.16	€ 946	2.14	€ 1,991	2.09
EC-Earth3 SSP1 2050	€ 1,666	2.16	€ 945	2.14	€ 1,981	2.08
EC-Earth3 SSP1 2100	€ 1,706	2.21	€ 964	2.18	€ 1,977	2.07
EC-Earth3 SSP2 2035	€ 1,715	2.22	€ 971	2.20	€ 1,991	2.09

EC-Earth3 SSP2 2050	₺ 1,671	2.17	₺ 948	2.15	₺ 1,977	2.07
EC-Earth3 SSP2 2100	₺ 1,738	2.25	₺ 978	2.21	₺ 1,974	2.07
EC-Earth3 SSP3 2035	₺ 1,716	2.23	₺ 971	2.20	₺ 1,986	2.08
EC-Earth3 SSP3 2050	₺ 1,749	2.27	₺ 983	2.22	₺ 1,976	2.07
EC-Earth3 SSP3 2100	₺ 1,777	2.30	₺ 997	2.26	₺ 1,989	2.09
EC-Earth3 SSP5 2035	₺ 1,724	2.24	₺ 974	2.20	₺ 1,984	2.08
EC-Earth3 SSP5 2050	₺ 1,709	2.22	₺ 965	2.18	₺ 1,971	2.07
EC-Earth3 SSP5 2100	₺ 1,989	2.58	₺ 1,091	2.47	₺ 2,092	2.19
GFDL-ESM4 SSP1 2035	₺ 1,760	2.28	₺ 995	2.25	₺ 2,057	2.16
GFDL-ESM4 SSP1 2050	₺ 1,707	2.21	₺ 968	2.19	₺ 2,028	2.13
GFDL-ESM4 SSP1 2100	₺ 1,737	2.25	₺ 982	2.22	₺ 2,038	2.14
GFDL-ESM4 SSP2 2035	₺ 1,748	2.27	₺ 988	2.24	₺ 2,041	2.14
GFDL-ESM4 SSP2 2050	₺ 1,685	2.19	₺ 956	2.16	₺ 1,993	2.09
GFDL-ESM4 SSP2 2100	₺ 1,667	2.16	₺ 946	2.14	₺ 1,974	2.07
GFDL-ESM4 SSP3 2035	₺ 1,737	2.25	₺ 983	2.22	₺ 2,024	2.12
GFDL-ESM4 SSP3 2050	₺ 1,723	2.23	₺ 973	2.20	₺ 1,985	2.08
GFDL-ESM4 SSP3 2100	₺ 1,971	2.56	₺ 1,078	2.44	₺ 2,048	2.15
GFDL-ESM4 SSP5 2035	₺ 1,715	2.22	₺ 972	2.20	₺ 2,020	2.12
GFDL-ESM4 SSP5 2050	₺ 1,707	2.21	₺ 965	2.18	₺ 1,980	2.08
GFDL-ESM4 SSP5 2100	₺ 1,965	2.55	₺ 1,075	2.43	₺ 2,041	2.14
MPI-ESM1-2-LR SSP1 2035	₺ 2,049	2.66	₺ 1,136	2.57	₺ 2,163	2.27
MPI-ESM1-2-LR SSP1 2050	₺ 1,950	2.53	₺ 1,087	2.46	₺ 2,120	2.22
MPI-ESM1-2-LR SSP1 2100	₺ 2,069	2.68	₺ 1,147	2.59	₺ 2,175	2.28
MPI-ESM1-2-LR SSP2 2035	₺ 2,022	2.62	₺ 1,125	2.54	₺ 2,158	2.26
MPI-ESM1-2-LR SSP2 2050	₺ 1,777	2.30	₺ 1,005	2.27	₺ 2,034	2.13
MPI-ESM1-2-LR SSP2 2100	₺ 2,103	2.73	₺ 1,153	2.61	₺ 2,238	2.35
MPI-ESM1-2-LR SSP3 2035	₺ 2,063	2.68	₺ 1,145	2.59	₺ 2,181	2.29
MPI-ESM1-2-LR SSP3 2050	₺ 1,945	2.52	₺ 1,085	2.45	₺ 2,134	2.24
MPI-ESM1-2-LR SSP3 2100	₺ 2,652	3.44	₺ 1,479	3.35	₺ 3,196	3.35
MPI-ESM1-2-LR SSP5 2035	₺ 1,985	2.57	₺ 1,103	2.50	₺ 2,125	2.23
MPI-ESM1-2-LR SSP5 2050	₺ 1,961	2.54	₺ 1,088	2.46	₺ 2,126	2.23
MPI-ESM1-2-LR SSP5 2100	₺ 3,065	3.97	₺ 1,702	3.85	₺ 3,661	3.84

Table 8. AAL due to drought (million CRC) for each type of sugarcane producer.

	Small producer		Medium producer		Large producer	
	Exposed value	₺31,356	Exposed value	₺21,593	Exposed value	₺5,624
Climate	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)
Base	₺ 486	1.55	₺ 341	1.58	₺ 82	1.45
EC-Earth3 SSP1 2035	₺ 271	0.86	₺ 164	0.76	₺ 50	0.88
EC-Earth3 SSP1 2050	₺ 143	0.46	₺ 90	0.42	₺ 29	0.51
EC-Earth3 SSP1 2100	₺ 182	0.58	₺ 107	0.50	₺ 35	0.62
EC-Earth3 SSP2 2035	₺ 77	0.25	₺ 52	0.24	₺ 17	0.30
EC-Earth3 SSP2 2050	₺ 27	0.09	₺ 21	0.10	₺ 8	0.14
EC-Earth3 SSP2 2100	₺ 15	0.05	₺ 11	0.05	₺ 4	0.07
EC-Earth3 SSP3 2035	₺ 30	0.10	₺ 25	0.11	₺ 6	0.10
EC-Earth3 SSP3 2050	₺ 9	0.03	₺ 5	0.02	₺ 1	0.03
EC-Earth3 SSP3 2100	₺ 3	0.01	₺ 1	0.00	₺ 0.1	0.00
EC-Earth3 SSP5 2035	₺ 178	0.57	₺ 115	0.53	₺ 35	0.61
EC-Earth3 SSP5 2050	₺ 152	0.48	₺ 90	0.42	₺ 31	0.55
EC-Earth3 SSP5 2100	₺ 9	0.03	₺ 5	0.02	₺ 3	0.06
GFDL-ESM4 SSP1 2035	₺ 101	0.32	₺ 89	0.41	₺ 18	0.33

GFDL-ESM4 SSP1 2050	€ 171	0.54	€ 124	0.58	€ 31	0.54
GFDL-ESM4 SSP1 2100	€ 121	0.38	€ 86	0.40	€ 24	0.42
GFDL-ESM4 SSP2 2035	€ 26	0.08	€ 21	0.10	€ 2	0.04
GFDL-ESM4 SSP2 2050	€ 23	0.07	€ 17	0.08	€ 4	0.07
GFDL-ESM4 SSP2 2100	€ 10	0.03	€ 8	0.04	€ 3	0.06
GFDL-ESM4 SSP3 2035	€ 32	0.10	€ 25	0.12	€ 4	0.07
GFDL-ESM4 SSP3 2050	€ 17	0.05	€ 11	0.05	€ 2	0.04
GFDL-ESM4 SSP3 2100	€ 38	0.12	€ 31	0.14	€ 14	0.25
GFDL-ESM4 SSP5 2035	€ 35	0.11	€ 27	0.13	€ 6	0.12
GFDL-ESM4 SSP5 2050	€ 19	0.06	€ 14	0.06	€ 3	0.06
GFDL-ESM4 SSP5 2100	€ 53	0.17	€ 48	0.22	€ 22	0.40
MPI-ESM1-2-LR SSP1 2035	€ 601	1.92	€ 434	2.01	€ 126	2.24
MPI-ESM1-2-LR SSP1 2050	€ 456	1.45	€ 331	1.53	€ 91	1.61
MPI-ESM1-2-LR SSP1 2100	€ 701	2.24	€ 484	2.24	€ 142	2.52
MPI-ESM1-2-LR SSP2 2035	€ 657	2.10	€ 458	2.12	€ 133	2.37
MPI-ESM1-2-LR SSP2 2050	€ 400	1.28	€ 261	1.21	€ 72	1.29
MPI-ESM1-2-LR SSP2 2100	€ 472	1.51	€ 315	1.46	€ 89	1.58
MPI-ESM1-2-LR SSP3 2035	€ 657	2.09	€ 492	2.28	€ 142	2.52
MPI-ESM1-2-LR SSP3 2050	€ 734	2.34	€ 507	2.35	€ 146	2.60
MPI-ESM1-2-LR SSP3 2100	€ 684	2.18	€ 482	2.23	€ 137	2.43
MPI-ESM1-2-LR SSP5 2035	€ 592	1.89	€ 435	2.02	€ 123	2.18
MPI-ESM1-2-LR SSP5 2050	€ 421	1.34	€ 320	1.48	€ 88	1.56
MPI-ESM1-2-LR SSP5 2100	€ 454	1.45	€ 287	1.33	€ 84	1.49

Table 9. AAL due to drought (million CRC) for each type of livestock producer.

	Small producer		Medium producer		Large producer	
	Exposed value	€304,243	Exposed value	€125,654	Exposed value	€156,004
Climate	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)
Base	€ 668	0.22	€ 321	0.26	€ 429	0.27
EC-Earth3 SSP1 2035	€ 1,077	0.35	€ 437	0.35	€ 623	0.40
EC-Earth3 SSP1 2050	€ 1,142	0.38	€ 459	0.37	€ 670	0.43
EC-Earth3 SSP1 2100	€ 1,605	0.53	€ 578	0.46	€ 834	0.53
EC-Earth3 SSP2 2035	€ 1,252	0.41	€ 494	0.39	€ 692	0.44
EC-Earth3 SSP2 2050	€ 997	0.33	€ 424	0.34	€ 594	0.38
EC-Earth3 SSP2 2100	€ 1,495	0.49	€ 564	0.45	€ 820	0.53
EC-Earth3 SSP3 2035	€ 1,248	0.41	€ 485	0.39	€ 691	0.44
EC-Earth3 SSP3 2050	€ 1,635	0.54	€ 613	0.49	€ 861	0.55
EC-Earth3 SSP3 2100	€ 1,858	0.61	€ 678	0.54	€ 964.4	0.62
EC-Earth3 SSP5 2035	€ 1,370	0.45	€ 518	0.41	€ 745	0.48
EC-Earth3 SSP5 2050	€ 1,309	0.43	€ 509	0.40	€ 733	0.47
EC-Earth3 SSP5 2100	€ 2,765	0.91	€ 996	0.79	€ 1,346	0.86
GFDL-ESM4 SSP1 2035	€ 498	0.16	€ 270	0.21	€ 330	0.21
GFDL-ESM4 SSP1 2050	€ 508	0.17	€ 276	0.22	€ 338	0.22
GFDL-ESM4 SSP1 2100	€ 856	0.28	€ 421	0.33	€ 439	0.28
GFDL-ESM4 SSP2 2035	€ 773	0.25	€ 349	0.28	€ 490	0.31
GFDL-ESM4 SSP2 2050	€ 765	0.25	€ 347	0.28	€ 474	0.30
GFDL-ESM4 SSP2 2100	€ 858	0.28	€ 371	0.29	€ 505	0.32
GFDL-ESM4 SSP3 2035	€ 638	0.21	€ 315	0.25	€ 422	0.27
GFDL-ESM4 SSP3 2050	€ 1,626	0.53	€ 588	0.47	€ 889	0.57
GFDL-ESM4 SSP3 2100	€ 4,057	1.33	€ 1,432	1.14	€ 1,988	1.27
GFDL-ESM4 SSP5 2035	€ 763	0.25	€ 340	0.27	€ 470	0.30

GFDL-ESM4 SSP5 2050	₡ 1,638	0.54	₡ 579	0.46	₡ 884	0.57
GFDL-ESM4 SSP5 2100	₡ 4,524	1.49	₡ 1,566	1.25	₡ 2,179	1.40
MPI-ESM1-2-LR SSP1 2035	₡ 1,092	0.36	₡ 445	0.35	₡ 622	0.40
MPI-ESM1-2-LR SSP1 2050	₡ 845	0.28	₡ 377	0.30	₡ 518	0.33
MPI-ESM1-2-LR SSP1 2100	₡ 1,185	0.39	₡ 462	0.37	₡ 656	0.42
MPI-ESM1-2-LR SSP2 2035	₡ 701	0.23	₡ 335	0.27	₡ 447	0.29
MPI-ESM1-2-LR SSP2 2050	₡ 528	0.17	₡ 284	0.23	₡ 350	0.22
MPI-ESM1-2-LR SSP2 2100	₡ 2,638	0.87	₡ 930	0.74	₡ 1,290	0.83
MPI-ESM1-2-LR SSP3 2035	₡ 724	0.24	₡ 349	0.28	₡ 463	0.30
MPI-ESM1-2-LR SSP3 2050	₡ 840	0.28	₡ 371	0.30	₡ 508	0.33
MPI-ESM1-2-LR SSP3 2100	₡ 1,686	0.55	₡ 618	0.49	₡ 886	0.57
MPI-ESM1-2-LR SSP5 2035	₡ 1,125	0.37	₡ 457	0.36	₡ 645	0.41
MPI-ESM1-2-LR SSP5 2050	₡ 1,713	0.56	₡ 615	0.49	₡ 890	0.57
MPI-ESM1-2-LR SSP5 2100	₡ 4,604	1.51	₡ 1,620	1.29	₡ 2,116	1.36

Table 10. AAL due to heavy rainfall (million CRC) for each type of coffee producer.

Climate	Small producer		Medium producer		Large producer	
	Exposed value	₡ 77,114	Exposed value	₡ 4,197	Exposed value	₡ 95,333
	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)
Base	₡ 943	1.22	₡ 544	1.23	₡ 1,042	1.09
EC-Earth3 SSP1 2035	₡ 923	1.20	₡ 532	1.20	₡ 1,023	1.07
EC-Earth3 SSP1 2050	₡ 909	1.18	₡ 524	1.19	₡ 1,005	1.05
EC-Earth3 SSP1 2100	₡ 906	1.18	₡ 523	1.18	₡ 1,008	1.06
EC-Earth3 SSP2 2035	₡ 893	1.16	₡ 515	1.17	₡ 989	1.04
EC-Earth3 SSP2 2050	₡ 902	1.17	₡ 521	1.18	₡ 1,002	1.05
EC-Earth3 SSP2 2100	₡ 865	1.12	₡ 499	1.13	₡ 959	1.01
EC-Earth3 SSP3 2035	₡ 886	1.15	₡ 511	1.16	₡ 980	1.03
EC-Earth3 SSP3 2050	₡ 872	1.13	₡ 503	1.14	₡ 968	1.02
EC-Earth3 SSP3 2100	₡ 831	1.08	₡ 481	1.09	₡ 926	0.97
EC-Earth3 SSP5 2035	₡ 897	1.16	₡ 517	1.17	₡ 994	1.04
EC-Earth3 SSP5 2050	₡ 874	1.13	₡ 505	1.14	₡ 971	1.02
EC-Earth3 SSP5 2100	₡ 811	1.05	₡ 470	1.06	₡ 908	0.95
GFDL-ESM4 SSP1 2035	₡ 948	1.23	₡ 548	1.24	₡ 1,056	1.11
GFDL-ESM4 SSP1 2050	₡ 932	1.21	₡ 538	1.22	₡ 1,035	1.09
GFDL-ESM4 SSP1 2100	₡ 937	1.21	₡ 540	1.22	₡ 1,032	1.08
GFDL-ESM4 SSP2 2035	₡ 924	1.20	₡ 533	1.21	₡ 1,024	1.07
GFDL-ESM4 SSP2 2050	₡ 916	1.19	₡ 528	1.19	₡ 1,012	1.06
GFDL-ESM4 SSP2 2100	₡ 909	1.18	₡ 524	1.19	₡ 1,004	1.05
GFDL-ESM4 SSP3 2035	₡ 911	1.18	₡ 526	1.19	₡ 1,009	1.06
GFDL-ESM4 SSP3 2050	₡ 878	1.14	₡ 505	1.14	₡ 964	1.01
GFDL-ESM4 SSP3 2100	₡ 819	1.06	₡ 470	1.06	₡ 889	0.93
GFDL-ESM4 SSP5 2035	₡ 916	1.19	₡ 528	1.20	₡ 1,014	1.06
GFDL-ESM4 SSP5 2050	₡ 887	1.15	₡ 511	1.16	₡ 981	1.03
GFDL-ESM4 SSP5 2100	₡ 803	1.04	₡ 460	1.04	₡ 870	0.91
MPI-ESM1-2-LR SSP1 2035	₡ 991	1.29	₡ 576	1.30	₡ 1,128	1.18
MPI-ESM1-2-LR SSP1 2050	₡ 990	1.28	₡ 577	1.30	₡ 1,134	1.19
MPI-ESM1-2-LR SSP1 2100	₡ 1,045	1.36	₡ 612	1.38	₡ 1,219	1.28
MPI-ESM1-2-LR SSP2 2035	₡ 1,027	1.33	₡ 600	1.36	₡ 1,193	1.25
MPI-ESM1-2-LR SSP2 2050	₡ 1,100	1.43	₡ 646	1.46	₡ 1,302	1.37
MPI-ESM1-2-LR SSP2 2100	₡ 978	1.27	₡ 570	1.29	₡ 1,123	1.18
MPI-ESM1-2-LR SSP3 2035	₡ 1,002	1.30	₡ 584	1.32	₡ 1,153	1.21

MPI-ESM1-2-LR SSP3 2050	₺ 1,066	1.38	₺ 626	1.42	₺ 1,258	1.32
MPI-ESM1-2-LR SSP3 2100	₺ 973	1.26	₺ 567	1.28	₺ 1,117	1.17
MPI-ESM1-2-LR SSP5 2035	₺ 973	1.26	₺ 566	1.28	₺ 1,113	1.17
MPI-ESM1-2-LR SSP5 2050	₺ 945	1.23	₺ 549	1.24	₺ 1,075	1.13
MPI-ESM1-2-LR SSP5 2100	₺ 1,032	1.34	₺ 605	1.37	₺ 1,214	1.27

The results of Average Annual Loss (AAL) aggregated at the national scale show a systematic differentiation among producer types, highlighting how the structure of the agricultural portfolio conditions the distribution of expected annual risk under drought and heavy rainfall.

In the case of coffee under drought, Table 7, large producers concentrate the highest absolute annual loss amounts, reflecting their greater share of the national exposed value. However, when considering relative losses, all producer types (large, medium, and small) exhibit similar levels, indicating that expected annual severity does not decrease proportionally with production scale. Under future climate scenarios, this relationship is maintained: climate variations simultaneously alter losses across all producer types, widening the range of results, especially in MPI projections toward 2100, where relative losses exceed 3.5–4.0% across all segments, without substantially modifying the proportional pattern among sizes.

For sugarcane under drought, Table 8, absolute losses vary among producer types depending on the climate scenario, with small and medium producers showing the highest amounts in several cases. In several climates derived from EC-Earth and GFDL, relative losses remain low toward the end of the century for all producer types, whereas MPI scenarios present the highest relative AAL, on the order of 1.3–2.6%, showing an increase in relative percentage from small to medium and large producers. In this crop, differences among producer types are reflected variably in absolute losses depending on the scenario, while climate-related changes tend to affect all producers relatively consistently within each scenario.

In livestock production, Table 9, although baseline relative AAL values are considerably lower than in coffee or sugarcane (≈ 0.22 – 0.27%), disaggregation by producer type allows identification of relevant proportional increases under future climate scenarios. Small producers, who represent a significant share of the aggregated national exposure, show substantial absolute increases in the most extreme projections, while large producers once again concentrate the highest annual monetary losses. Under SSP5 by 2100 in models such as GFDL and MPI, relative losses reach levels close to 1.3–1.5% across all segments, multiplying the current expected annual risk several times. This behavior suggests that, even in systems where baseline risk is low, climate intensification can substantially amplify expected losses for all producer sizes, maintaining the absolute hierarchy while increasing the annual relative burden in each category.

Finally, for coffee under heavy rainfall, Table 10, differences among producer types remain dominated by the distribution of exposed value, with large producers concentrating the highest absolute losses, while all producers maintain comparable relative losses within a narrower and more stable range, around 1.0–1.4%. Unlike drought, the projected climate range is narrower, and future trajectories tend to gradually reduce expected annual loss in several EC and GFDL scenarios. In this case, the producer structure is preserved more consistently, with moderate climate variations that do not significantly alter the relative relationship among categories but rather shift the overall level of annual portfolio losses in a relatively uniform manner.

3.5 Verification of Results

Probabilistic modeling of catastrophic risk is based on the integration of available information on hazard, exposure, and vulnerability, combined with technical assumptions that allow representation of complex phenomena in the absence of complete observations. This approach aims to stochastically characterize the potential consequences of future events whose occurrence is scientifically plausible but that have not necessarily occurred in the territory under evaluation. In this sense, the results obtained do not constitute a direct extrapolation of historical experience, but rather an analytical construction intended to estimate low-frequency, high-severity impacts that exceed the range normally documented in disaster records.

Under these conditions, strict validation of risk results, understood as the statistical comparison of simulated losses against a sufficiently large set of empirical observations to evaluate model fit, is not feasible. Robust validation would require extensive and detailed loss databases covering a broad spectrum of hazard intensities, with systematic information at the individual producer level, specific construction typologies, and precise levels of stress experienced in each event. Such evidence does not exist and is not expected to exist in the future, as it would imply the repeated occurrence of severe events under comparable conditions and a level of instrumentation and record-keeping historically unavailable even in the most advanced risk management contexts.

Given this reality, an alternative procedure for result verification is proposed, based on the concept of the hybrid risk curve (Velázquez, 2014). The hybrid curve is a loss exceedance curve composed of two segments: one empirically derived segment, based on documented information from historical disaster databases, providing a retrospective view of risk for the evaluated portfolio; and a second segment corresponding to the analytical loss exceedance curve, evaluated through catastrophic modeling such as that implemented in this work, providing a prospective view of disaster risk. The envelope of both curves constitutes the hybrid risk curve. Figure 26 illustrates these curves.¹

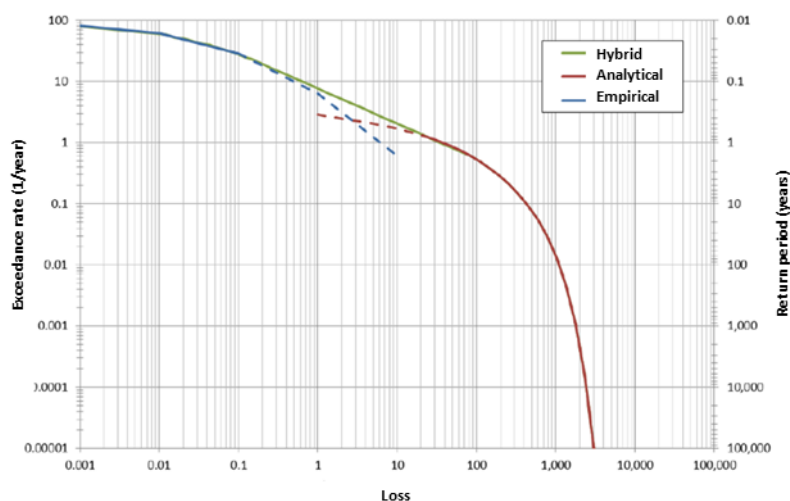


Figure 26. Illustration of analytical, empirical, and hybrid loss exceedance curves. Taken from Velázquez (2014).

¹ Throughout this section of the document, the loss exceedance curves are presented in graphical format on a logarithmic scale in order to facilitate visualization.

The hybrid risk curve has been used in the past as a complement to analytical risk modeling, with the purpose of capturing losses from very frequent events that may fall outside the scope and resolution of catastrophic models. Likewise, this approach provides insight into the analytical model's ability to describe historically recorded losses.

As shown in Figure 26, the empirical model's capacity to correctly represent exceedance rates of large losses is limited, just as the analytical model's capacity to appropriately represent exceedance rates of smaller events is also limited. For this reason, the two curves often overlap (although this is not a necessary condition). The overlap zone provides information about the extent to which the analytical model is capable of describing at least a portion of historical losses. This characteristic can be used as a validation process given the limitations previously mentioned.

Figure 27 shows two hypothetical cases of hybrid exceedance curves. In the first case, the analytical curve matches the empirical curve sufficiently well; that is, the catastrophic model demonstrates some capacity to represent historically recorded losses. In contrast, the second hybrid curve shows how the catastrophic model fails to appropriately express the exceedance rates of losses in the historical record. In other words, the model does not adequately capture risk in the overlap zone (and in this specific example, it underestimates it).

The above does not necessarily imply a deficiency in the analytical model, since such models are designed to capture information about events that have not yet occurred. Rather, it only illustrates the model's capacity, or lack thereof, to represent historical losses. It is important to keep in mind that, in catastrophic modeling, representing historical experience is never the primary objective of the models.

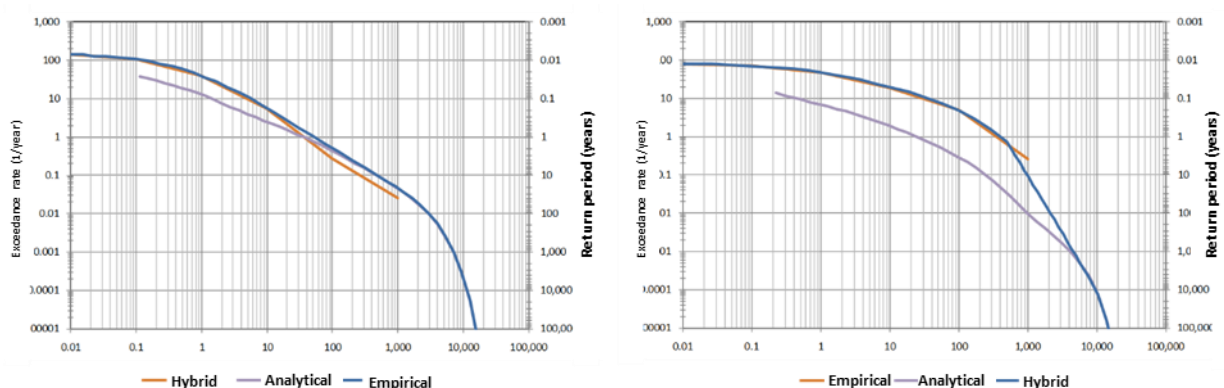


Figure 27. Examples of hybrid risk curves. The curve on the left corresponds to a valid analytical model, and the one on the right to a non-valid model, in terms of its ability to reflect historical losses.

As is evident, this alternative validation procedure is feasible only if a reliable and complete loss record exists, providing information from the historical period from which the empirical risk curve can be derived. If such a record does not exist, or if the data is insufficient or unreliable, it would not be possible to carry out this verification.

3.5.1 Costa Rica Disaster Database

Three potential sources of retrospective information on historical losses caused by natural events were consulted: the international EM-DAT database, the regional DesInventar system, and the national loss module administered by the Ministry of National Planning and Economic Policy (MIDEPLAN). Based on this review, it was identified that, for the specific case of Costa Rica, the institutional source maintained by MIDEPLAN provides the most complete and systematic record in terms of territorial coverage, level of sectoral disaggregation, and consistency in documenting losses associated with officially declared emergencies. It therefore constitutes the most robust repository available for characterizing historical economic impacts from disasters in the country.

Information on losses associated with natural events is structured within MIDEPLAN's Module on Losses Caused by Natural Phenomena. This system consolidates historical records of direct economic damage and losses associated with events that have required official emergency declarations, incorporating information dating back to the late 1980s. The database allows for disaggregated queries and analyses by territorial unit and by economic sector, serving as an institutional repository for systematizing the impacts of natural hazards such as floods, landslides, droughts, earthquakes, and other phenomena relevant in the national context.

3.5.2 Evaluation of the Empirical Risk Curve

The empirical loss exceedance curve is obtained directly from the information recorded in the MIDEPLAN database, based on a count of exceedances of arbitrary loss levels. The historical record can be understood as an observation of a loss process, as illustrated in Figure 28. By defining an arbitrary economic loss level p , it is possible to identify in the graph all events whose losses exceed p .

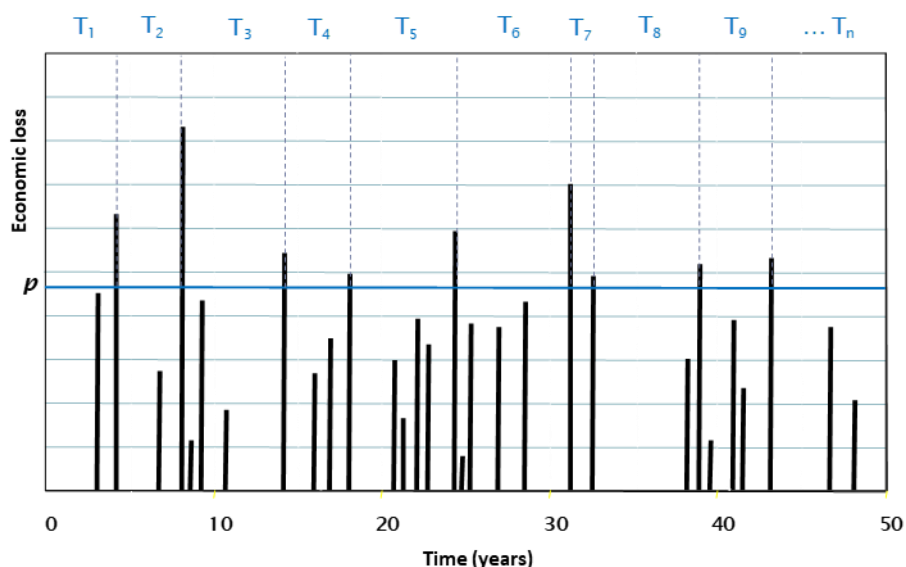


Figure 28. Hypothetical loss process.

For the indicated loss level p , the exceedance rate ($v(p)$) can be estimated as follows (Bernal et al., 2021):

$$v(p) = \frac{n-1}{T}$$

Equation 1

where n is the number of events that exceed the loss level p and T is the total number of years in the record. This estimator of the exceedance rate depends, as observed, on the number of times the evaluated loss level p is exceeded. This implies that there is an inverse relationship between the uncertainty in the estimate and the number of exceedances of that value. A very small loss will be exceeded many times and, therefore, its estimated exceedance rate will have lower uncertainty than that of a larger loss. Bernal et al. (2021) determined how the coefficient of variation (CV)² of the exceedance rate varies with the number of exceedances in the record, which follows the function presented in Figure 29.

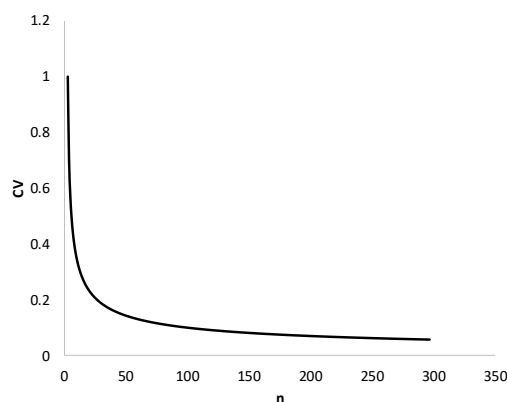


Figure 29. Variation of the coefficient of variation of the exceedance rate with sample size.

The behavior shown indicates that, for events involving large losses (catastrophic events), the estimation of the exceedance rate based on the historical record is highly uncertain (i.e., few events exceed that loss level), regardless of data quality or even the number of years available in the record. This is why analytical loss models are required, linking hazard, exposure, and vulnerability, in order to appropriately estimate exceedance rates for large loss amounts, since historical information is generally insufficient.

Based on this approach to estimating the exceedance rate, evaluating the loss exceedance curve is straightforward. The process consists of defining different reference loss levels p and calculating the corresponding exceedance rate for each. Figure 30 shows a diagram summarizing this procedure.

² The coefficient of variation of a random variable is defined as the ratio of its standard deviation to its mean.

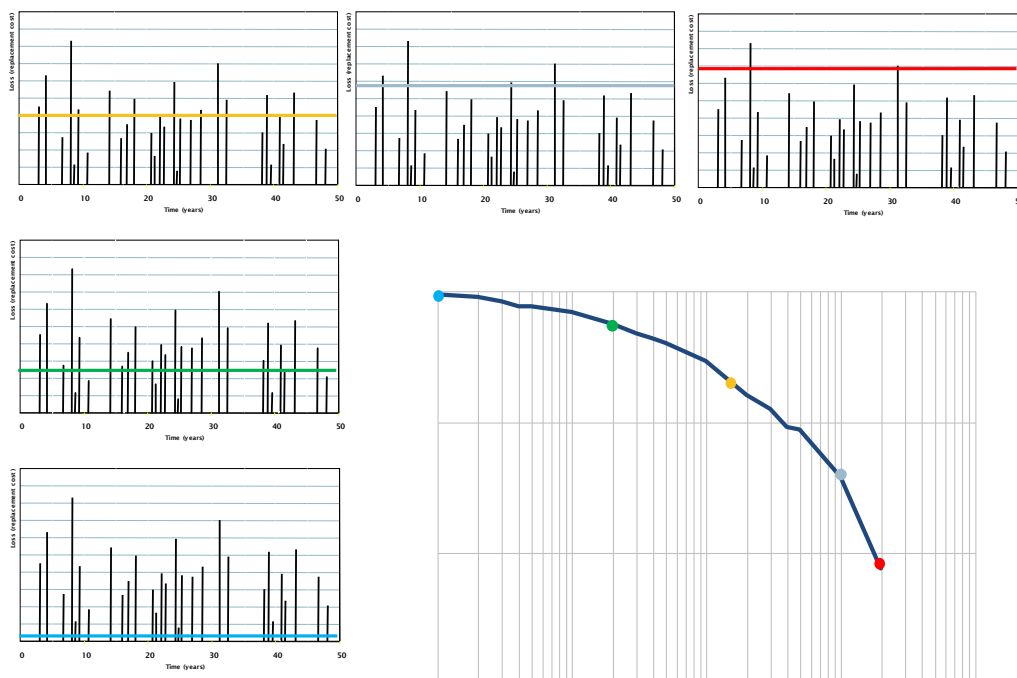


Figure 30. Illustration of the process for evaluating the empirical loss exceedance curve.

3.5.3 Comparison of Risk Curves

The procedure described above was applied to the multi-hazard risk results for the agricultural sector presented in the previous sections. A total PML curve was obtained, which was converted into an analytical loss exceedance curve directly in accordance with Section 2.3.2. The empirical curve was obtained by applying the described procedure to the loss records from the MIDEPLAN database corresponding to national-level impacts on the evaluated portfolios.

Figure 31 shows the comparison between the empirical and analytical risk curves for coffee. Figure 32 presents the comparison for sugarcane, and Figure 33 for livestock.

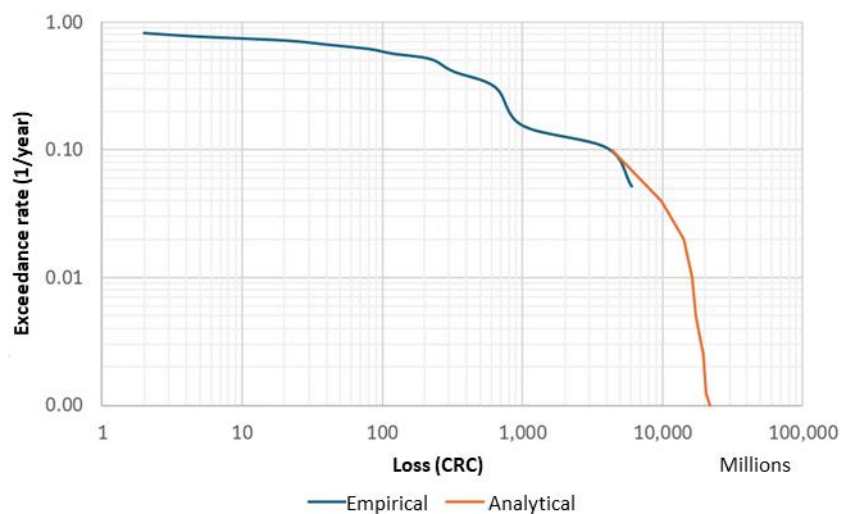


Figure 31. Empirical and analytical loss exceedance curves for coffee.

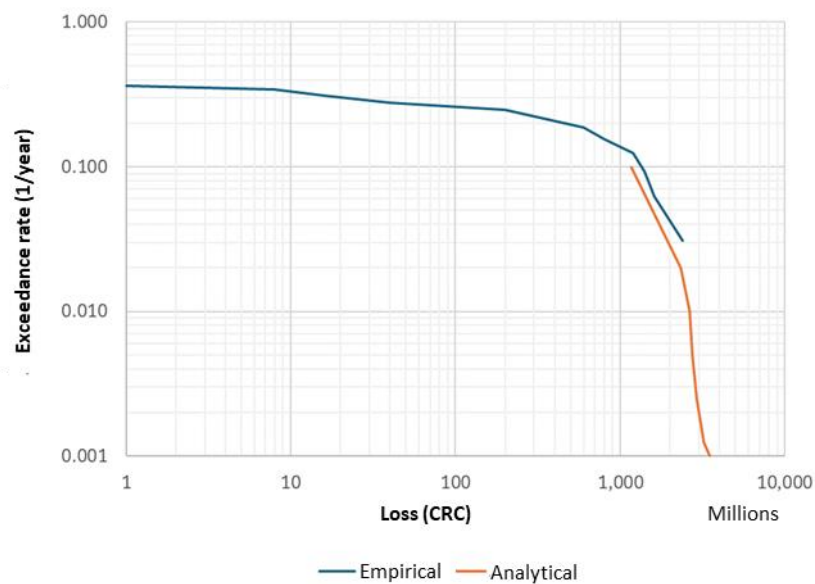


Figure 32. Empirical and analytical loss exceedance curves for sugarcane.

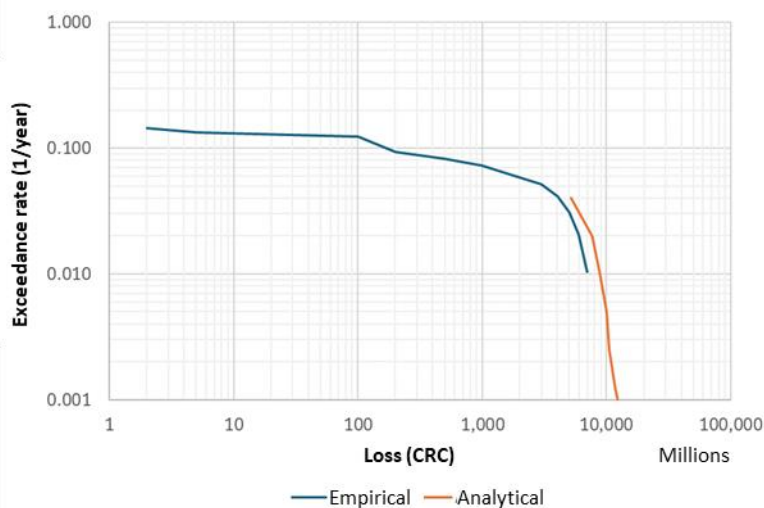


Figure 33. Empirical and analytical loss exceedance curves for livestock.

It can be observed that the fit between the curves, for the three portfolios, is very close. It is emphasized that this should not be interpreted as a strict validation process of the results, something that is not feasible in catastrophic modeling for the reasons previously explained, but rather as a comparison that allows determination that the analytical model developed here provides a sound extension of risk metrics when compared with losses observed during the historical period. The data used to generate the empirical risk curves are presented in Annex A.1.

4 DETERMINISTIC RISK ASSESSMENT

The present analysis evaluates the risk associated with a deterministic drought scenario with a 50-year return period ($Tr = 50$) affecting the different agricultural portfolios: coffee and sugarcane crops, and extensive beef and dairy cattle production. The exercise is conducted at the national scale, considering the complete portfolios of each productive activity and a drought hazard covering the entire territory of the country. Based on the combination of hazard, exposure, and the corresponding vulnerability functions, Average Annual Losses (AAL) were estimated, both in absolute terms (Costa Rican colones) and relative terms (percentage of exposed value), as an integrated metric of the economic impact associated with this extreme drought event.

The results obtained (Table 11) indicate that, under the $Tr50$ drought scenario, coffee cultivation presents the highest relative impact, with an AAL of ₡ 6,113 million, equivalent to 2.83% of the nationally exposed value. This behavior reflects coffee's high sensitivity to water deficit, particularly during critical phases of the phenological cycle, resulting in significant yield reductions under severe dry events.

In the case of sugarcane, an AAL of ₡ 901 million was estimated, corresponding to 1.55% of the exposed value. Although the relative impact is lower than that observed for coffee, the results show that extreme drought generates relevant economic impacts at the national scale, mainly associated with reductions in biomass and sucrose content under prolonged water stress conditions.

For extensive beef and dairy cattle production, the lowest relative loss is observed, with an AAL of ₡ 1,279 million, equivalent to 0.24% of the exposed value. This lower relative sensitivity is explained by the greater spatial and productive adaptability of extensive livestock systems; however, given the magnitude of the national livestock portfolio, even low percentages of impact translate into significant absolute economic losses.

Table 11. AAL due to a drought hazard with a 50-year return period. Values in million Costa Rican colones (CRC).

	Coffee		Sugarcane		Livestock	
	Exposed value	₡ 216,644	Exposed value	₡ 58,573	Exposed value	₡ 585,902
Climate	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)
$Tr50$ drought scenario	₡ 6,113	2.83	₡ 901	1.55	₡ 1,279	0.24

Additionally, for the same drought scenario, an analysis was conducted on a selected NAMA farm for each portfolio.

This analysis (Table 12) shows a substantial reduction in risk associated with the implementation of NAMA measures in the three evaluated production systems: coffee, sugarcane, and extensive beef and dairy cattle production. Unlike the national-scale analysis, these results correspond to representative individual farms and therefore directly reflect the effect of adaptation and management practices implemented at the farm level. These results represent the potential impact under effective implementation of NAMA measures at representative farms; the average effects across all producers may be lower depending on the level of adoption and the specific conditions of each farm.

The NAMA measures considered were those associated with improving shade provision, soil cover, soil moisture retention, and soil conservation practices. In coffee systems, these included agroforestry, efficient water use, soil conservation, and use of vegetative cover or mulch. In sugarcane systems, the measures included increasing the use of organic amendments, promoting the use and production of green manures, promoting and optimizing soil amendments, implementing soil conservation practices, using and incorporating biochar into the soil, minimum or zero tillage, optimal water resource management, use of vegetative cover at the farm level, and increasing tree cover. In extensive livestock systems, the measures included live fences, rotational grazing, pasture improvement, soil quality management, and maintenance of healthy pastures.

Additionally, NAMA measures are presented as an integrated package for the purposes of deterministic risk analysis. For a detailed financial treatment and consideration of the individual implementation of each NAMA measure, see Product 10 – Final Report.

In the case of coffee cultivation, the farm implementing NAMA measures presents an AAL of ₡ 684,846, equivalent to 4.55% of the exposed value, whereas in the absence of such measures, the AAL increases to ₡ 4,109,078, corresponding to 27.27% of the exposed value. This difference demonstrates a risk reduction of over 80%, associated with practices aimed at improving soil moisture retention, microclimatic regulation, and overall resilience of the production system to water deficit.

For sugarcane, the farm with NAMA measures records an AAL of ₡ 50,111 (6.67%), compared to ₡ 175,390 (23.33%) in the scenario without measures. Although the absolute loss value is lower compared to other systems, the result confirms that extreme drought can generate high relative impacts at the farm scale, and that the adoption of NAMA measures significantly reduces crop vulnerability.

In the case of extensive livestock production, the AAL decreases from ₡ 3,507,311 (8.33%) without NAMA measures to ₡ 1,402,925 (3.33%) with their implementation. This reduction reflects the benefits of practices such as improved pasture management, forage diversification, and increased resilient carrying capacity, which help mitigate the effects of drought on livestock productivity.

Table 12. AAL due to a drought hazard with a 50-year return period on a NAMA farm. Values in Costa Rican colones (CRC).

Tr50 drought scenario	Coffee		Sugarcane		Livestock	
	Exposed value	₡ 15,066,618	Exposed value	₡ 751,672	Exposed value	₡ 42,087,736
NAMA farm	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)	AAL (CRC)	AAL (%)
With NAMA measures	₡ 684,846	4.55	₡ 50,111	6.67	₡ 1,402,925	3.33
Without NAMA measures	₡ 4,109,078	27.27	₡ 175,390	23.33	₡ 3,507,311	8.33

For coffee cultivation, the risk associated with a deterministic heavy rainfall scenario with a 50-year return period was also evaluated, again considering a representative farm with and without the implementation of NAMA measures.

The results (Table 13) show that extreme rainfall constitutes a significant hazard at the farm scale, particularly due to its influence on erosion processes, disease incidence, and production losses.

The farm implementing NAMA measures presents an AAL of ₡ 1,369,693, equivalent to 9.09% of the exposed value, while in the scenario without measures the AAL rises to ₡ 3,424,231, corresponding to

22.73% of the exposed value. This represents a risk reduction of approximately 60% associated with the implementation of practices such as vegetation cover, drainage management, soil conservation, and agroforestry systems, which mitigate the impact of extreme precipitation events.

Table 13. AAL due to a rainfall hazard with a 50-year return period on a NAMA farm. Values in Costa Rican colones (CRC).

Tr50 rainfall scenario	Coffee	
	Exposed value	¢
		15,066,618
NAMA farm	AAL (CRC)	AAL (%)
With NAMA measures	¢ 1,369,693	9.09
Without NAMA measures	¢ 3,424,231	22.73

4.1 NAMA Farm for Sugarcane Cultivation

Figure 34 presents the location (light blue point) of the NAMA farm for sugarcane cultivation, and Figure 35 provides a close-up view of that unit.

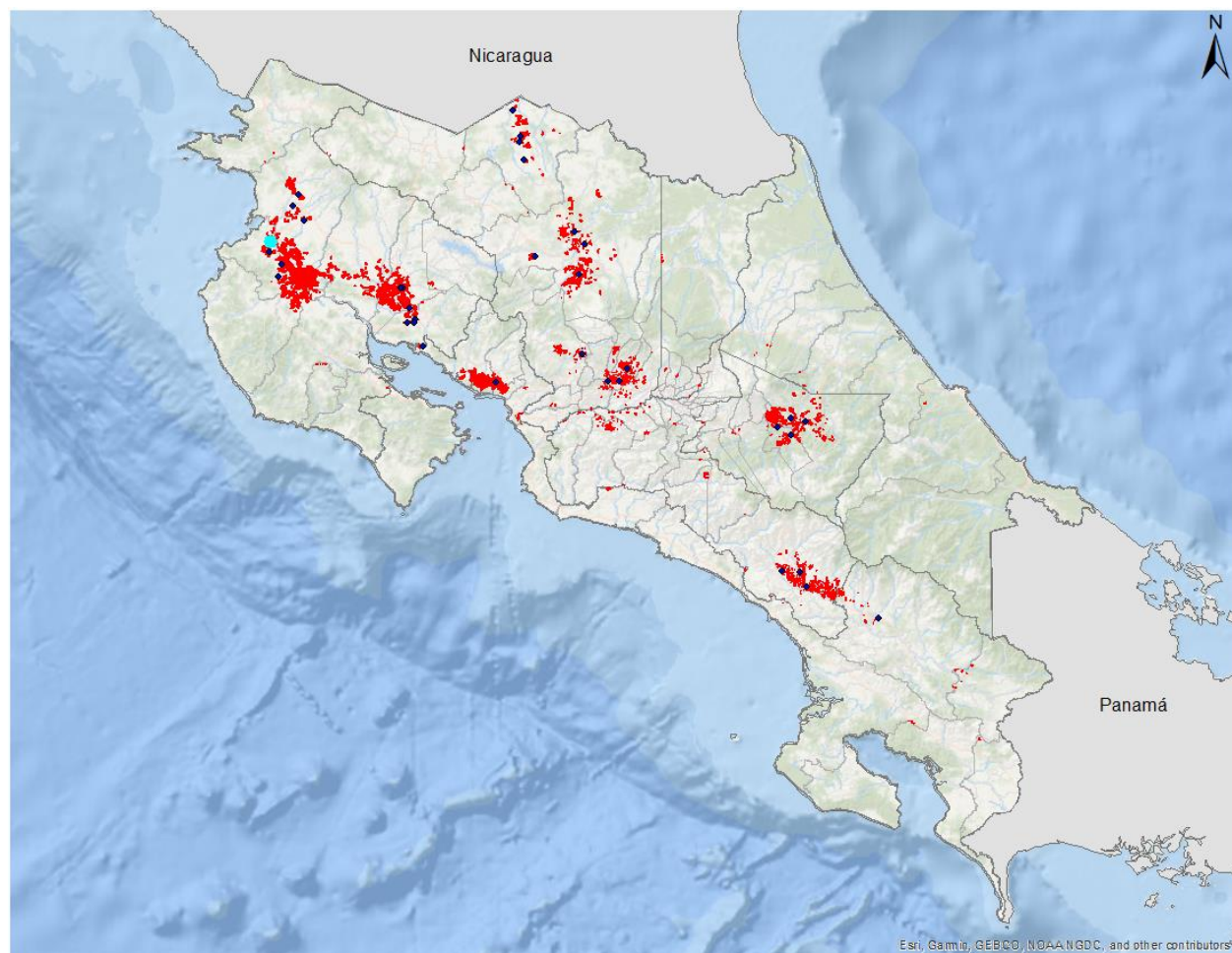


Figure 34. Location of the NAMA farm for sugarcane cultivation.

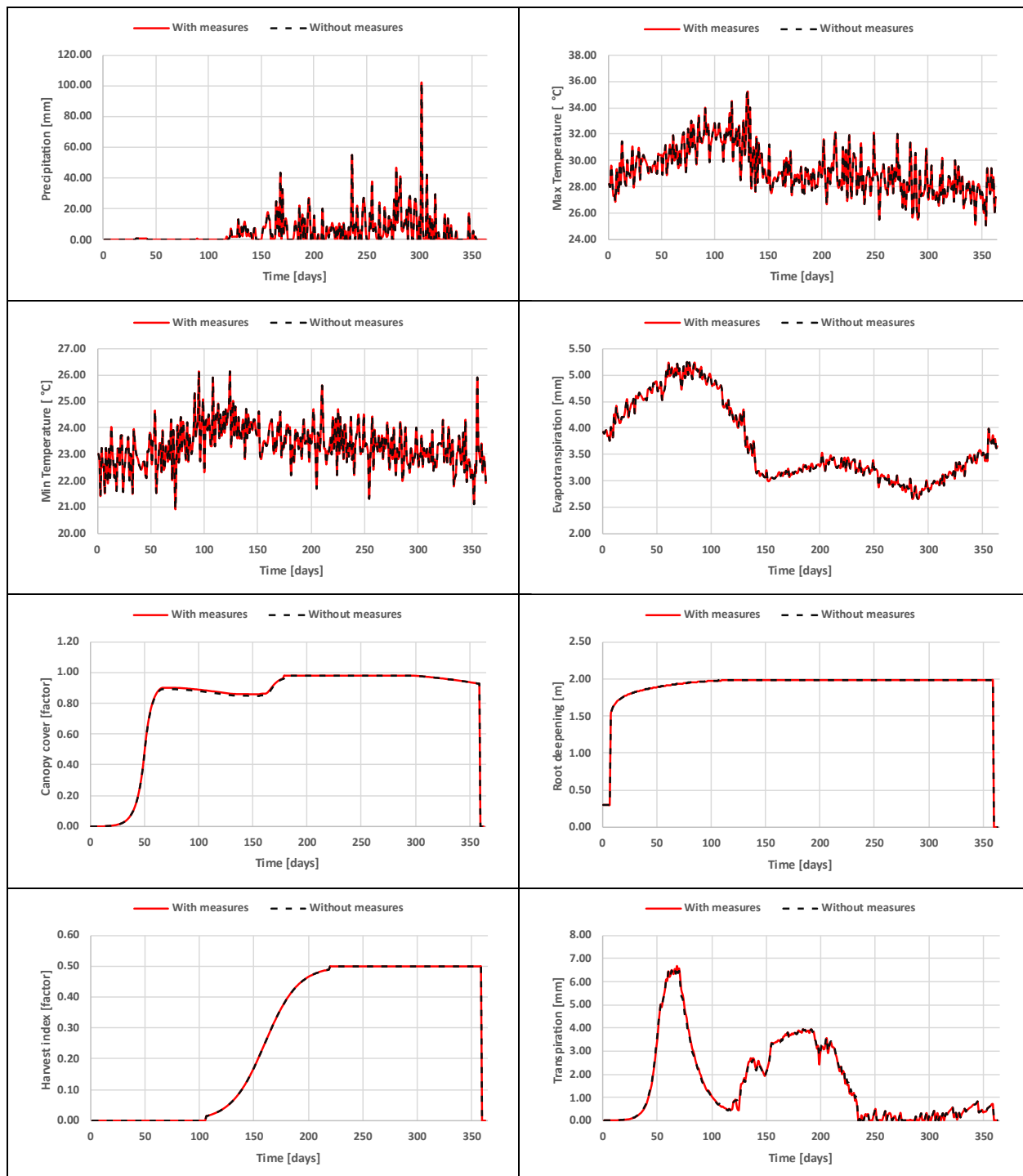


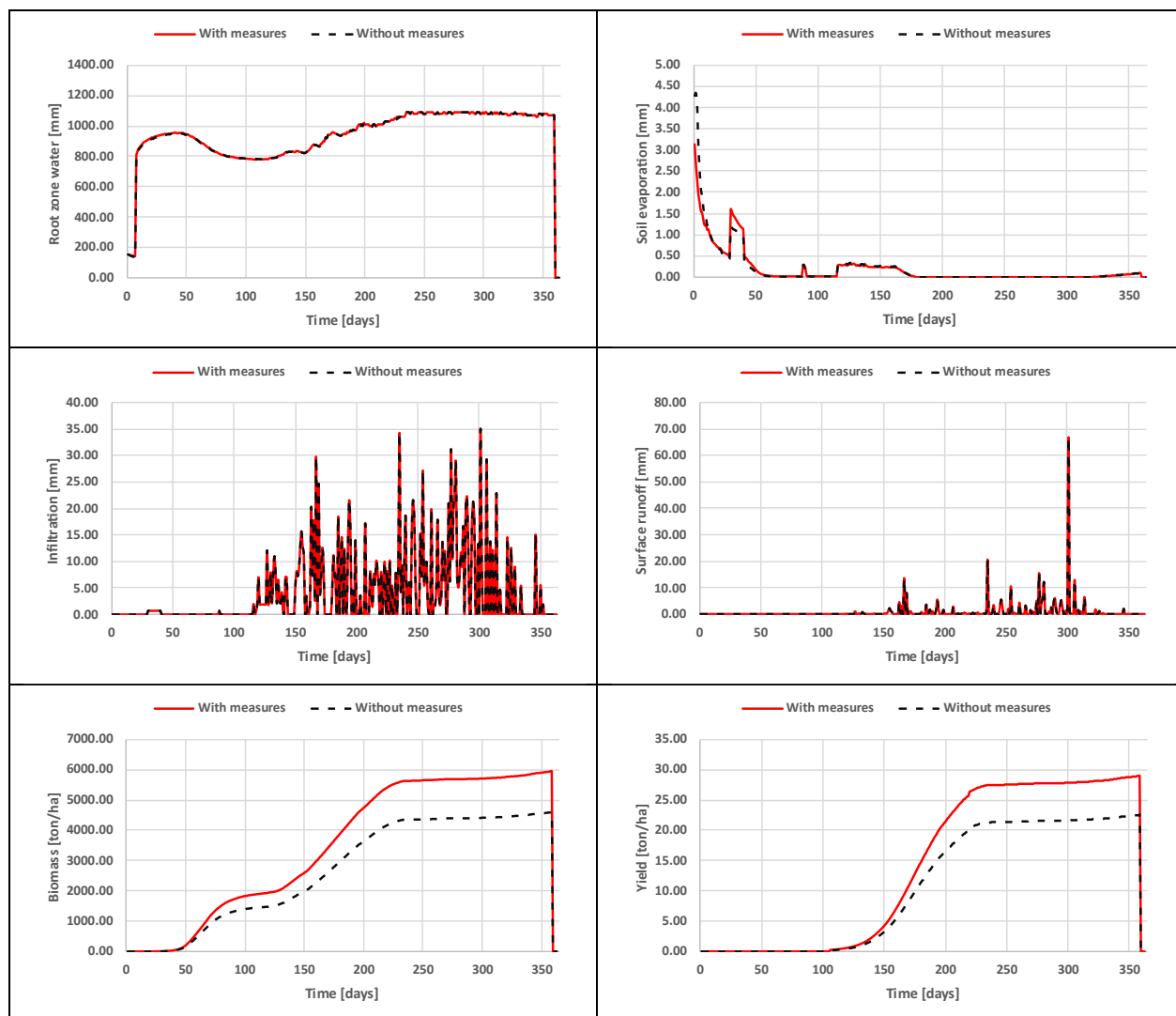
Figure 35. Coverage of the NAMA farm for sugarcane cultivation.

The following graphs present the temporal dynamics of the main climatic, crop, and soil–plant–atmosphere system variables under the drought scenario evaluated for the NAMA farm. In particular, time series are shown for precipitation, maximum and minimum temperature, and evapotranspiration, together with variables describing the development of the sugarcane crop, such as canopy cover, effective root depth, harvest index, accumulated biomass, and yield.

Additionally, hydrological and physiological system variables are included, such as crop transpiration, water content in the root zone, soil evaporation, infiltration, and surface runoff, which allow analysis of soil and crop response under water deficit conditions.

Each graph presents a comparison between scenarios with and without implementation of NAMA measures, enabling an integrated assessment of the effect of these measures on the water balance, crop growth, and productivity, as well as their contribution to reducing vulnerability to extreme drought events at the farm scale.





4.2 NAMA Farm for Livestock

Figure 36 presents the location (light blue point) of the NAMA farm for livestock, and Figure 37 provides a close-up view of that livestock unit.

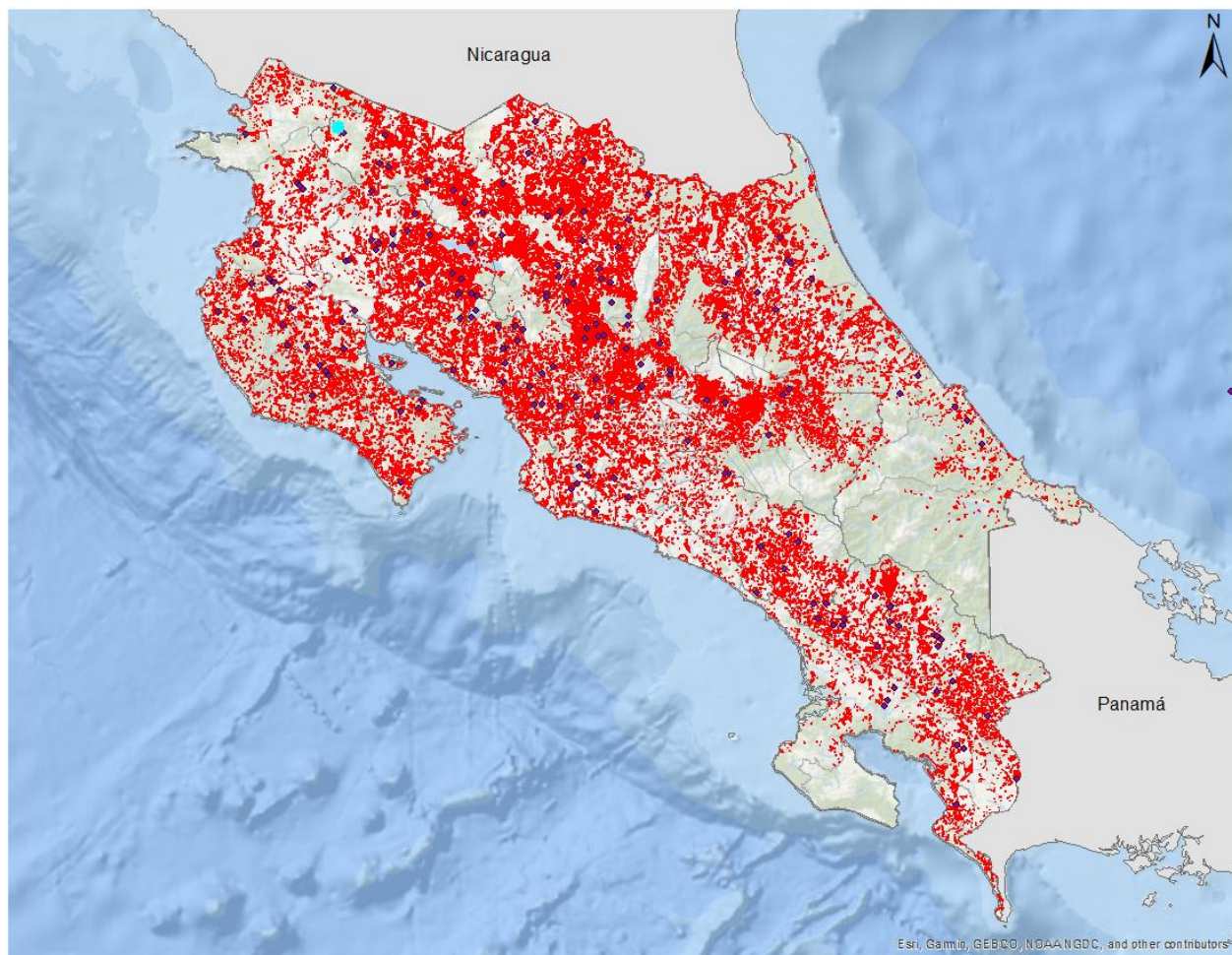


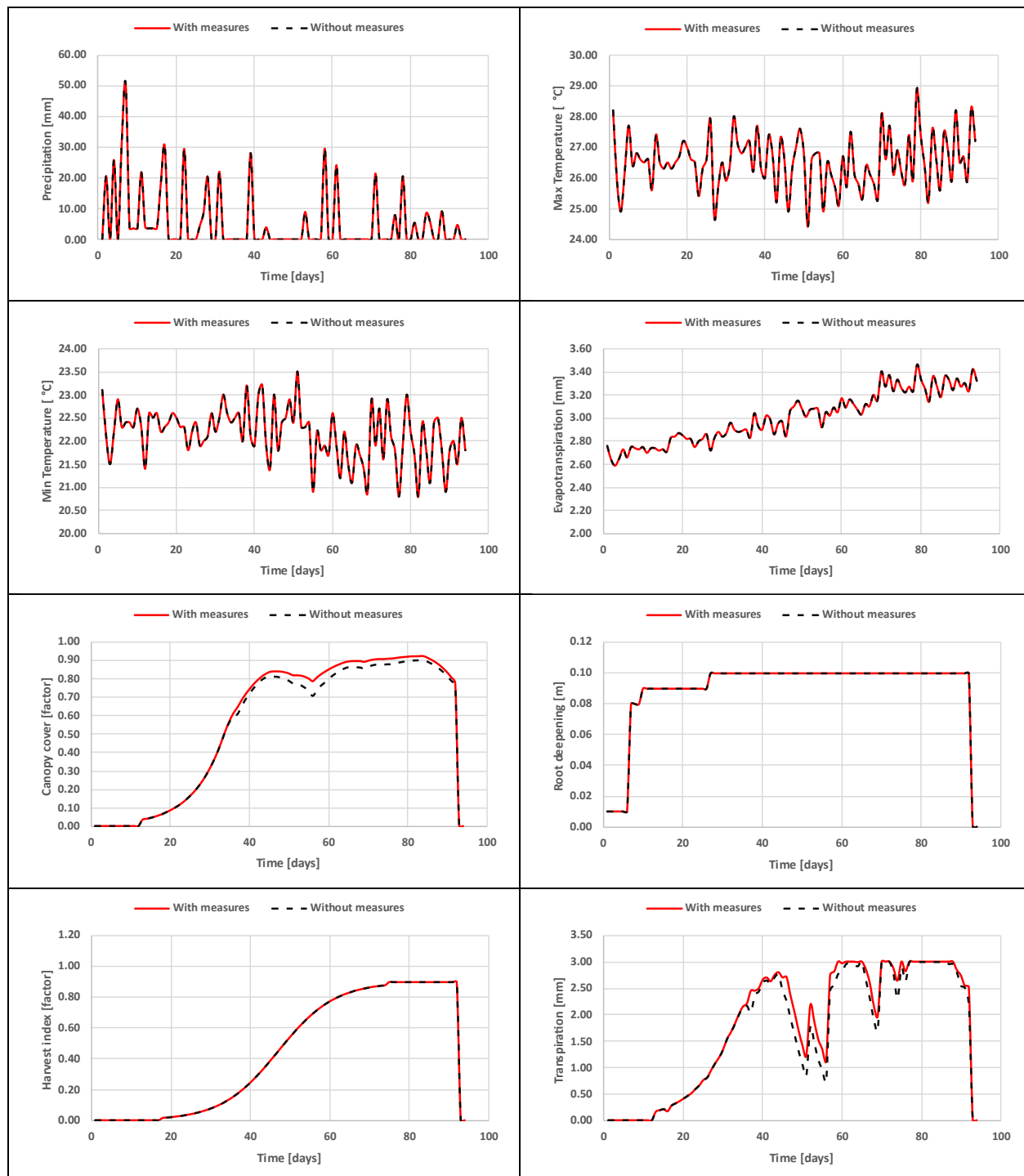
Figure 36. Location of the NAMA farm for livestock.

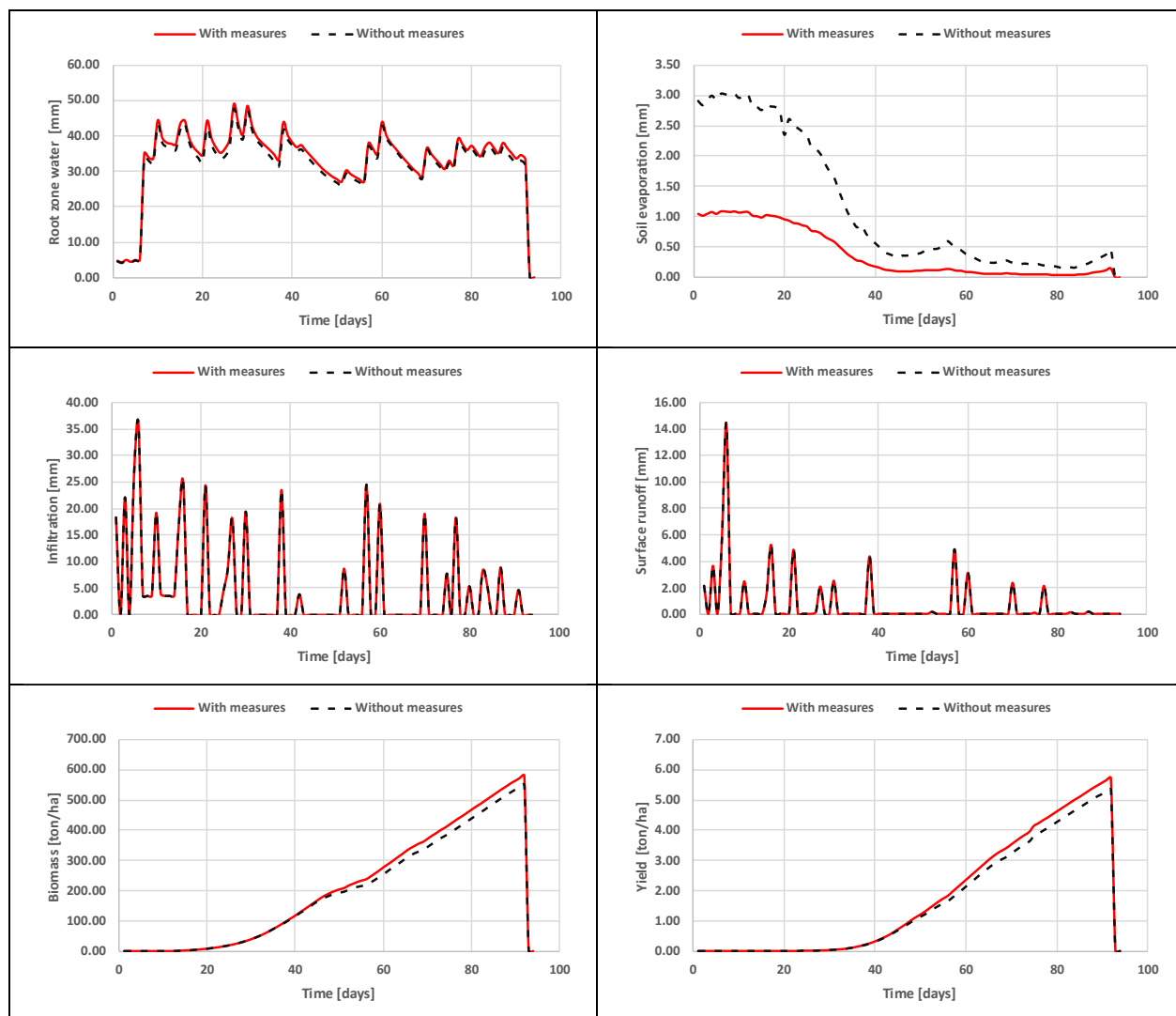


Figure 37. Coverage of the NAMA livestock farm.

The following graphs present the results corresponding to pasture development for extensive livestock production under the same drought scenario and methodological approach described in the previous section. In this case, the analysis focuses on the response of the forage system to the climatic conditions evaluated at the NAMA farm, as well as on the behavior of the main biophysical and hydrological variables that control biomass availability for livestock activity.

As with sugarcane cultivation, the graphs include a comparison between scenarios with and without implementation of NAMA measures, allowing assessment of their effect on soil water balance, transpiration, water availability in the root zone, biomass production, and overall pasture system resilience to extreme drought events.





4.3 NAMA Farm for Coffee Cultivation

Figure 38 presents the location (light blue point) of the NAMA farm for coffee cultivation, and Figure 39 provides a close-up view of that agricultural unit.

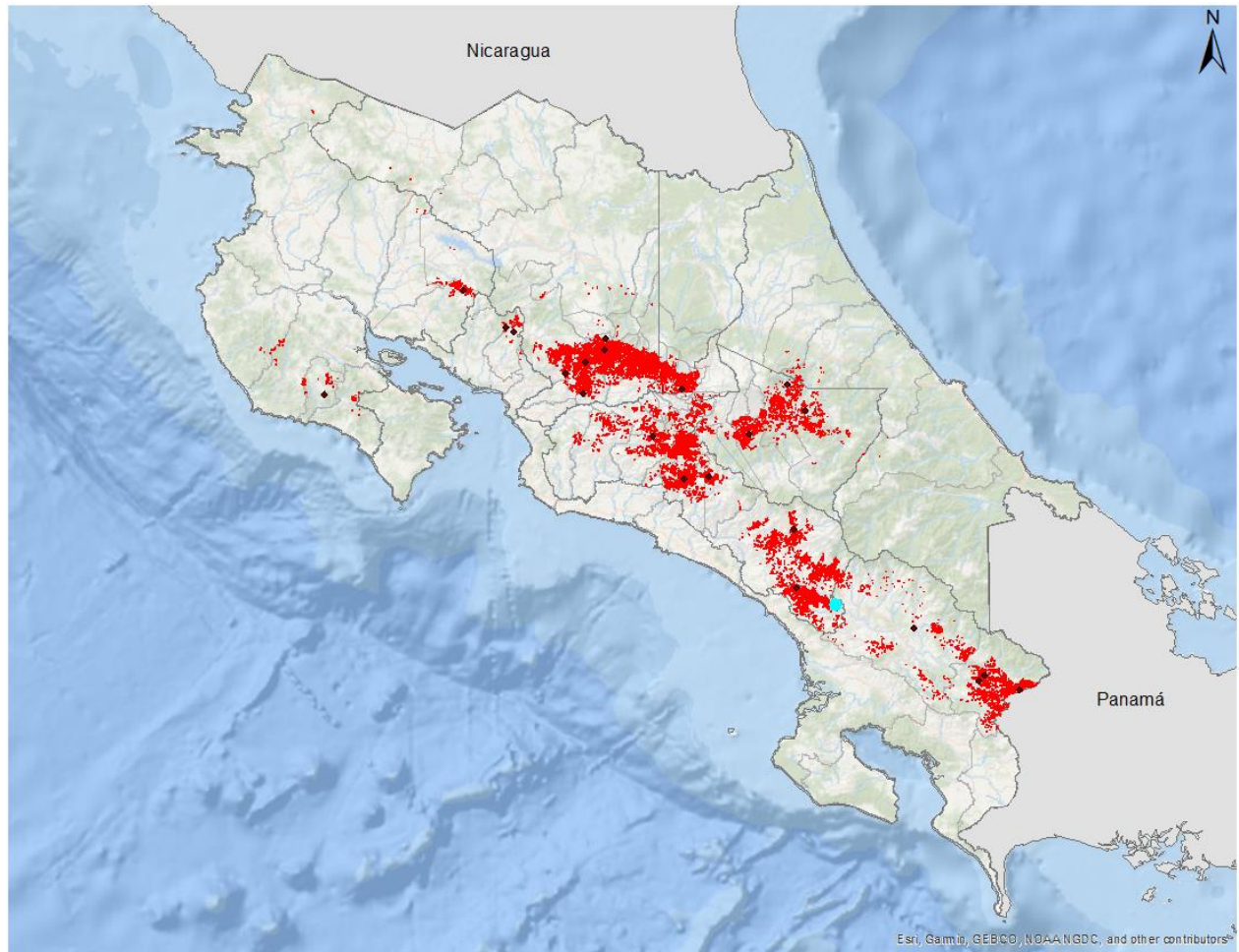


Figure 38. Location of the NAMA farm for coffee cultivation.

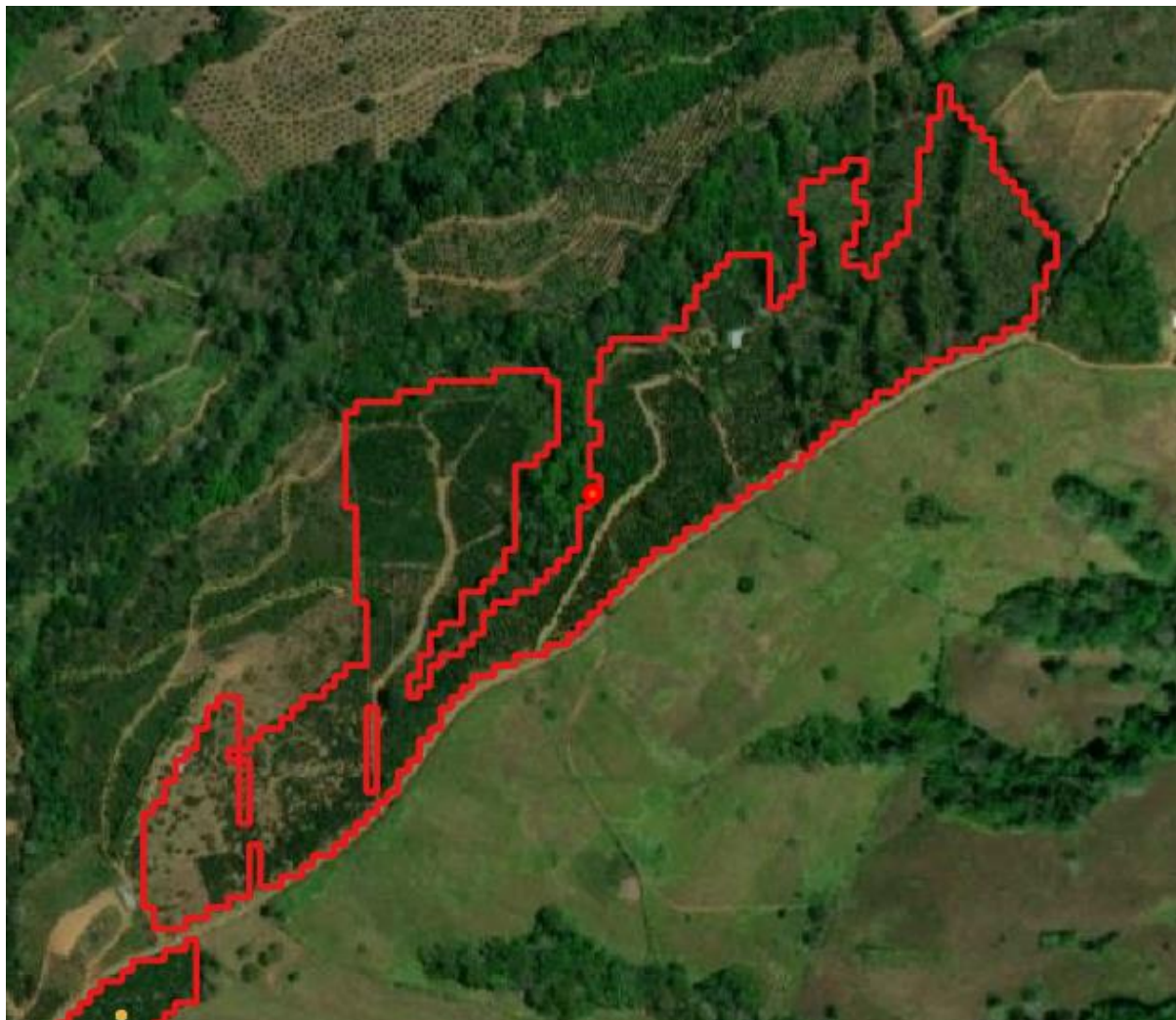
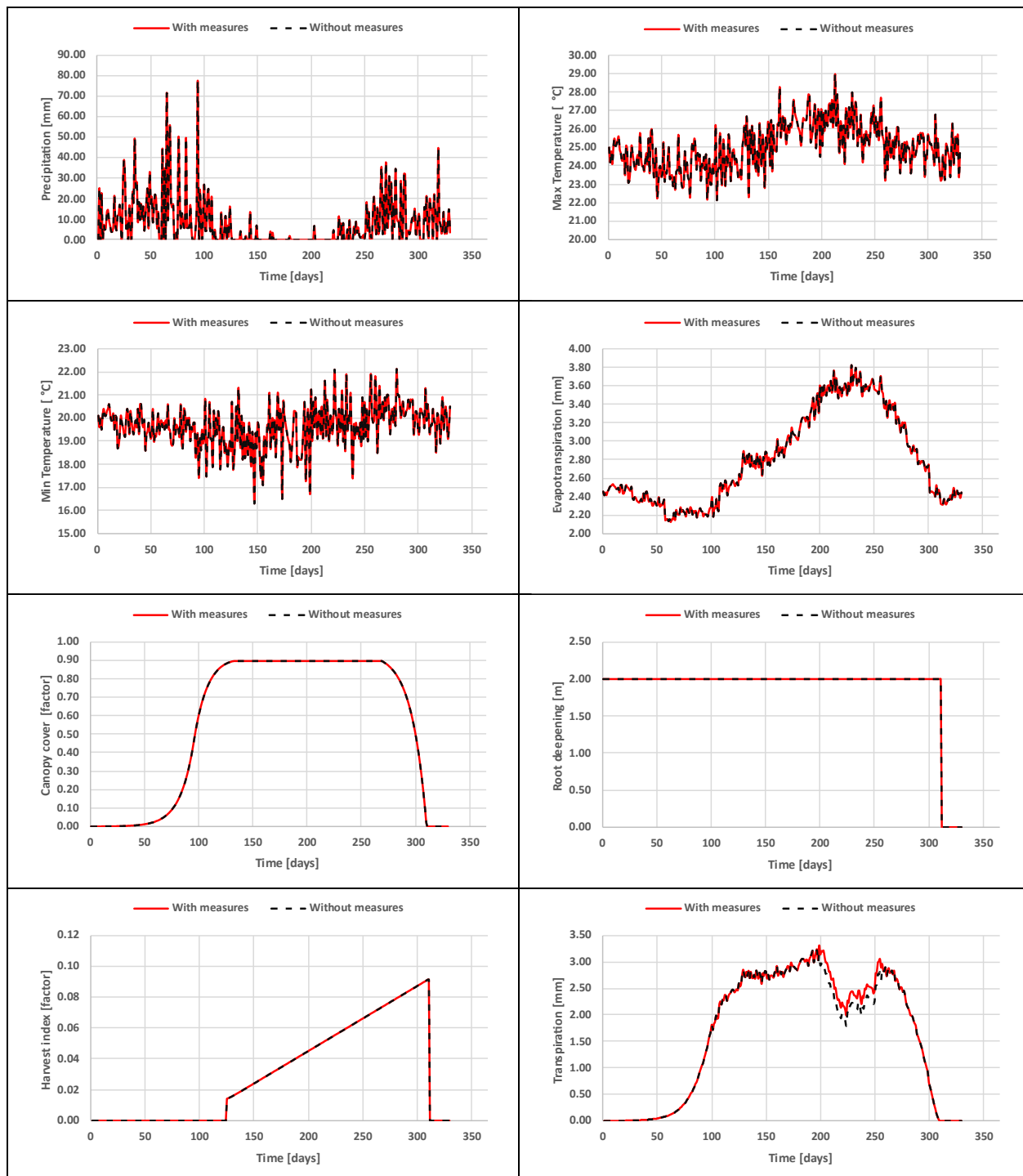
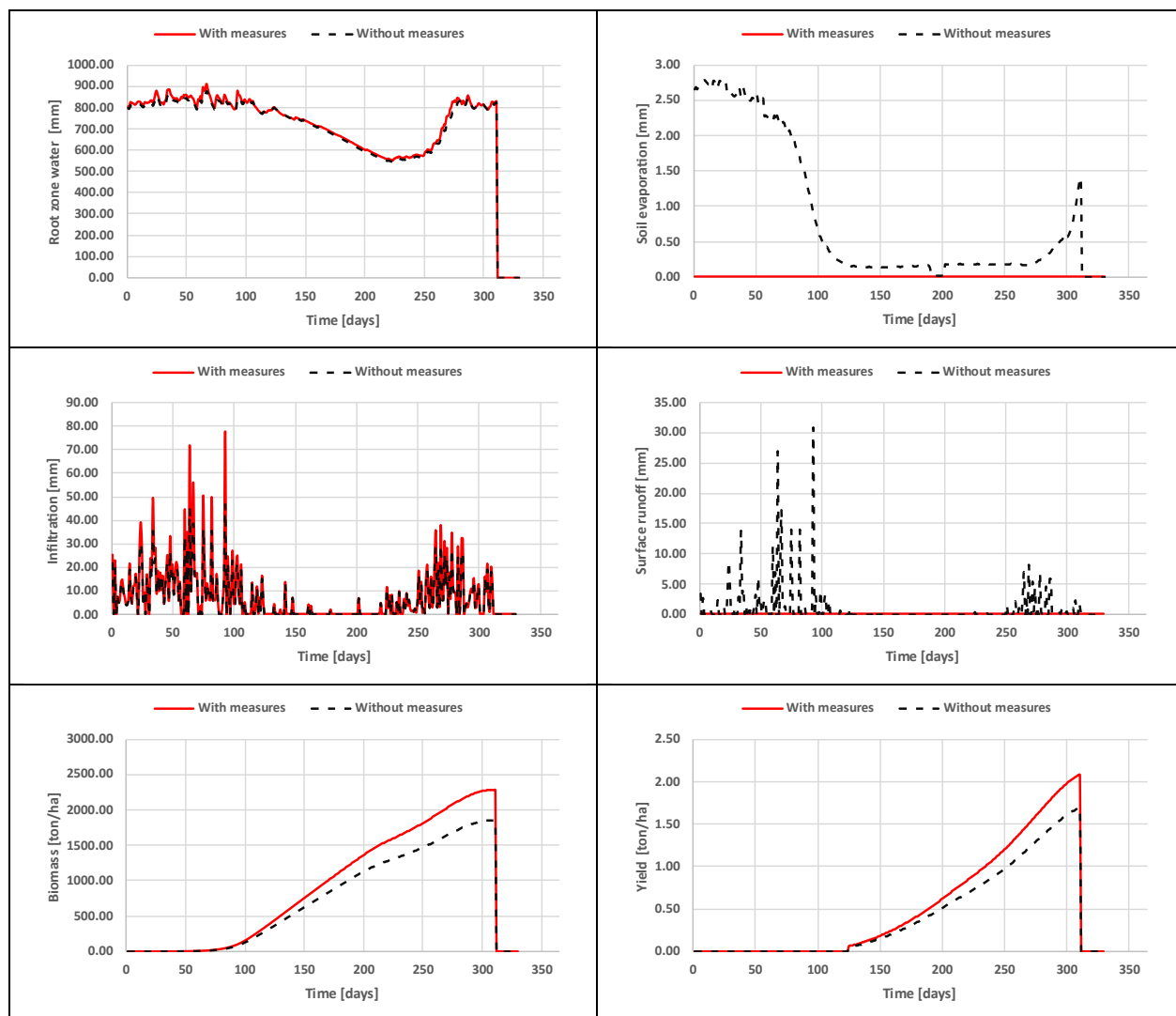


Figure 39. Coverage of the NAMA farm for coffee cultivation.

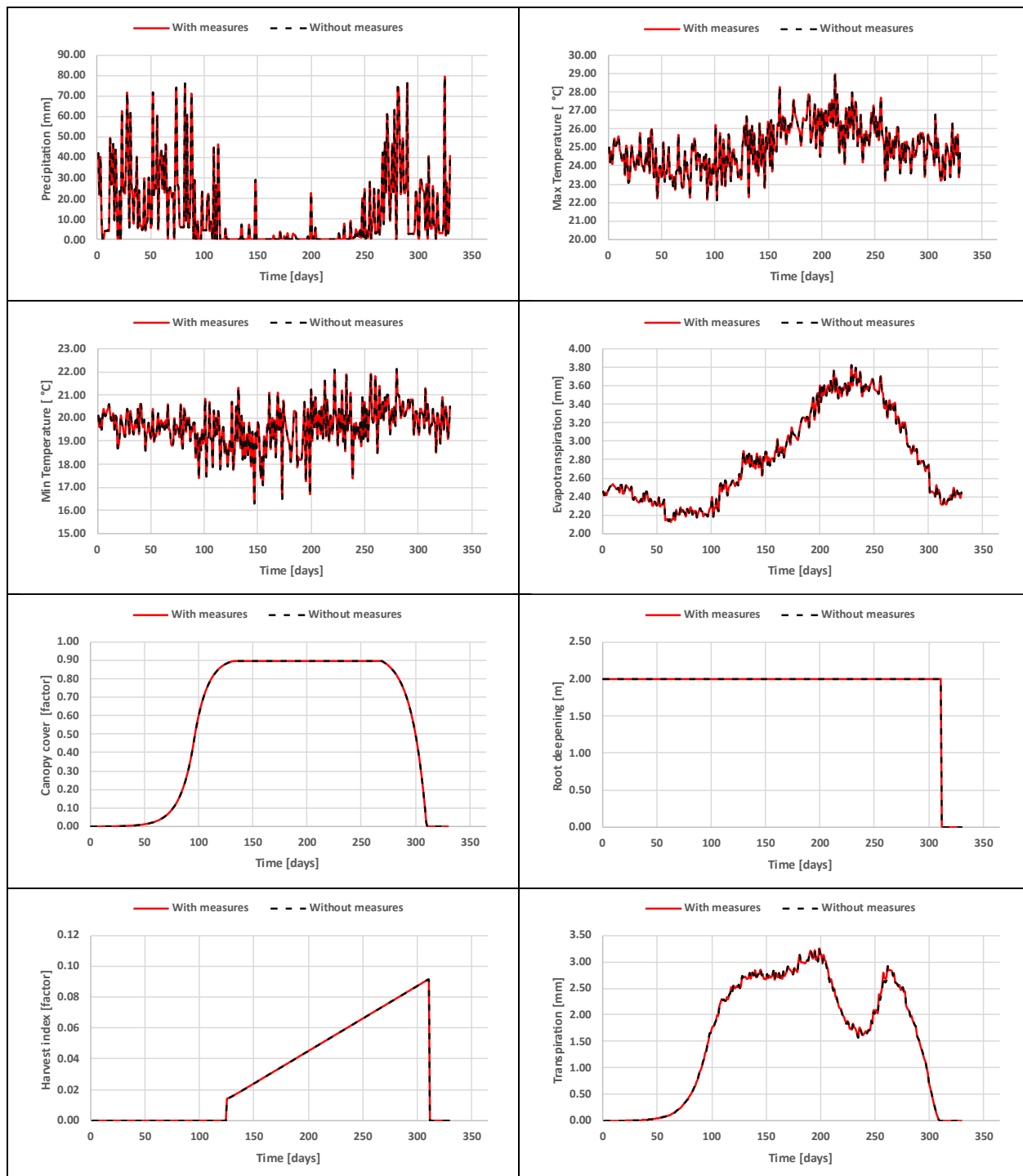
The following graphs correspond to coffee cultivation and present the evolution of the main climatic, physiological, and hydrological variables under the drought scenario evaluated at the NAMA farm, maintaining the same methodological framework and set of variables described in the preceding sections. The analysis makes it possible to characterize the response of the coffee production system to water deficit, considering both crop development and the processes associated with soil water balance.

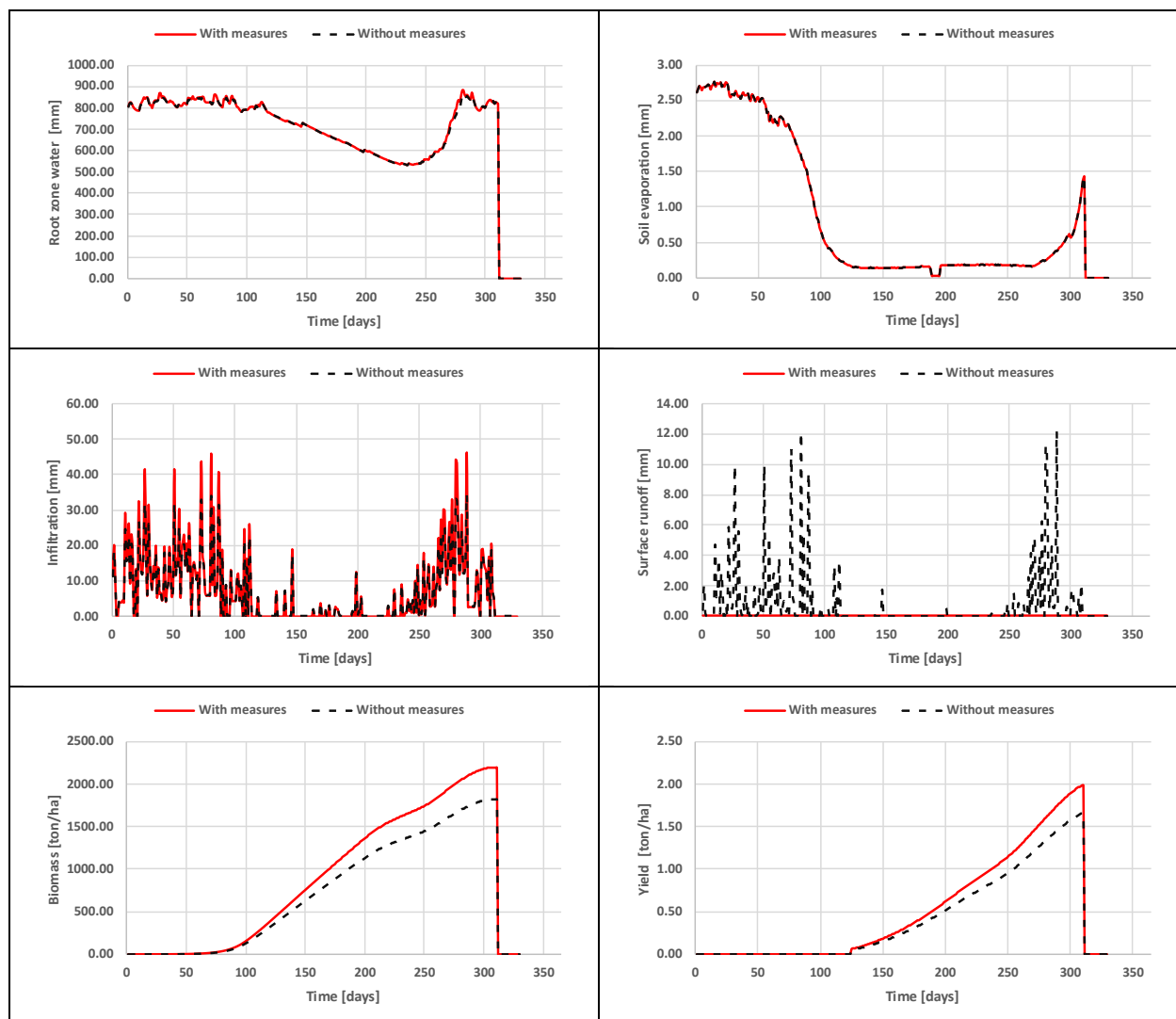
The figures include a comparison between scenarios with and without implementation of NAMA measures, allowing assessment of the effect of these practices on key variables such as canopy cover, root depth, transpiration, water availability in the root zone, biomass accumulation, and yield, as well as their contribution to reducing the vulnerability of coffee cultivation to extreme drought at the farm scale.





As stated previously, in the case of coffee the deterministic heavy rainfall scenario with a 50-year return period ($Tr = 50$) was also analyzed. The following graphs present the results corresponding to coffee crop development under this hazard, evaluated on the same NAMA farm.





Based on the deterministic results presented, it is evident that the implementation of NAMA measures constitutes a highly effective climate adaptation and prospective agricultural risk management strategy, substantially reducing productive vulnerability to extreme events. Under the 50-year return period drought scenario, national portfolios show relevant impacts, particularly for coffee (relative AAL 2.83%), confirming the sensitivity of the coffee system to severe water deficit. However, the farm-scale analysis demonstrates that the adoption of NAMA practices significantly modifies the response of the soil–plant–atmosphere system, cushioning direct economic losses even under extreme climatic conditions.

In the representative farms evaluated, the benefits of NAMA measures are quantitatively consistent across the three production systems. For coffee, relative AAL under drought decreases from 27.27% without measures to 4.55% with NAMA, representing a reduction of more than 80% in expected economic risk. Similar results are observed for sugarcane, where relative AAL declines from 23.33% to 6.67%, and for extensive livestock production, where it decreases from 8.33% to 3.33%. These reductions reflect the structural role of adaptive management measures, such as improved soil moisture retention, microclimatic

regulation, forage diversification, and enhanced pasture management, as direct mechanisms for reducing sensitivity and functional exposure to extreme drought.

Additionally, in the case of coffee, evaluation under an extreme heavy rainfall scenario (Tr50) confirms that NAMA measures not only strengthen resilience to water deficit but also to precipitation excess associated with erosion, disease, and productivity deterioration. In this context, relative AAL decreases from 22.73% without measures to 9.09% with NAMA measures, implying a reduction of nearly 60% in farm-level economic risk.

Taken together, these results support the conclusion that NAMA practices function as comprehensive climate adaptation interventions, capable of reducing losses from both drought and extreme rainfall hazards, thereby strengthening productive sustainability and economic stability in Costa Rica's agricultural sector under more severe future climate scenarios.

5 TRAINING PROGRAM

As part of Operational Project 2 of the Risk Assessment and Capacity Development initiative in Costa Rica, implemented within the framework of the Global Risk Modelling Alliance (GRMA), Ingeniar Risk-Intelligence and CIMNE are carrying out a capacity-building process aimed at supporting the assessment of climate risk from flood and drought faced by micro, small, and medium-sized agricultural producers in Costa Rica.

This project focuses on the development of a methodology and tools for the quantitative estimation of losses associated with fluvial flood, pluvial flood, and agricultural drought, applied to the national portfolio of coffee, sugarcane, and extensive livestock production, primarily in the context of producers implementing sustainable production practices under the framework of Nationally Appropriate Mitigation Actions (NAMA) of the Ministry of Agriculture and Livestock (MAG).

The capacity development component is mainly structured through the Probabilistic Disaster Risk Modeling Course, complemented by institutional coordination spaces, with the objective of strengthening the technical capacity of stakeholders to interpret risk results, manage and update agricultural exposure information, and use these results as inputs for decision-making related to financial protection mechanisms and resilience planning in the agricultural sector.

5.1 Development of Activities

5.1.1 Interpretation of Risk Results and Use in Decision-Making for Financial Protection Mechanisms

One of the central objectives of Operational Project 2 is to strengthen the capacity of technical stakeholders to interpret the results of the quantitative assessment of climate risk from flood and drought, and to use this information as an input for decision-making related to potential financial protection mechanisms.

In this context, the Probabilistic Disaster Risk Modeling Course provides participants with a solid conceptual and methodological foundation for interpreting the results derived from the project. Through Module 1, fundamental metrics such as the Loss Exceedance Curve, Average Annual Loss, and Probable Maximum Loss are introduced, enabling quantification of expected economic losses and evaluation of the probability of exceeding specific impact thresholds.

Additionally, Module 3 of the course explores in greater depth the use of these results in decision-making processes under uncertainty, addressing concepts related to comprehensive risk management, resilience, and the evaluation of adaptation and financial protection options. These contents support understanding of how agricultural climate risk results can inform the design of risk transfer instruments and differentiated financing schemes, in alignment with the objectives of the Development Banking System (SBD) and the regulatory framework of SUGESE.

5.1.2 Management and Updating of the Agricultural Exposure Database

Capacity building under Operational Project 2 includes the development of technical competencies for the management, maintenance, and updating of the agricultural exposure database, in order to ensure the sustainability of risk assessments beyond the duration of the GRMA project.

This component is addressed transversally throughout the course, beginning in Module 1, where principles for constructing inventories of exposed elements and their characterization according to variables relevant to risk modeling are presented. Subsequently, in Module 2, participants acquire technical criteria for integrating crop and livestock exposure databases with fluvial flood, pluvial flood, and agricultural drought hazard models, using the specialized CAPRA-ROBOT platform software.

This approach strengthens the capacity of technical stakeholders to manage crop exposure information autonomously, update it as new data becomes available, and conduct risk analyses independently, ensuring the continuity and replicability of agricultural climate risk assessments beyond the GRMA project.

5.1.3 Institutional Coordination for the Interpretation and Use of Risk Results

The capacity development process also includes strengthening institutional coordination among entities involved in climate risk management and financial resilience of the agricultural sector, particularly the Ministry of Agriculture and Livestock (MAG), the Development Banking System (SBD), and the General Superintendence of Insurance (SUGESE).

Through course content and technical exchange spaces, a shared understanding of the concepts, methodologies, and results of the probabilistic climate risk assessment is promoted. This approach facilitates appropriate interpretation of agricultural risk assessment results by the involved institutions and supports their use as inputs for financial resilience planning, the design of financial instruments, and the integration of climate risk considerations into producer support programs.

5.1.4 Foundations for the Design of Technical Training for Agricultural Producers

In line with the Terms of Reference, Operational Project 2 includes capacity strengthening not only at the technical-institutional level, but also as a foundation for the future design of training programs targeted at agricultural producers.

The contents of the Probabilistic Disaster Risk Modeling Course establish the conceptual and methodological basis for developing a technical course aimed at micro, small, and medium-sized producers, focused on climate risk management through sustainable production practices that promote resilience and adaptability. This approach is consistent with the MAG's NAMA framework and may be implemented through the National Directorate of Agricultural Extension of MAG and other related institutions.

In this sense, the course contributes to creating a common language and shared understanding of climate risk, facilitating the progressive transfer of technical knowledge to producers and supporting the integration of risk management into sustainable rural development strategies.

5.2 Participation Summary

Below is the list of participants who have completed Module 1 of the Probabilistic Disaster Risk Modeling Course to date and who reported being linked to Operational Project 2, along with the institution to which they belong.

It is important to note that individuals who are members of the technical working groups are not necessarily enrolled in the Course.

Participant	Institution
1	Superintendencia General de Seguros
2	Sistema de Banca para el Desarrollo
3	Ministerio de Agricultura y Ganadería
4	Ministerio de Agricultura y Ganadería
5	Ministerio de Agricultura y Ganadería
6	Ministerio de Agricultura y Ganadería
7	Ministerio de Agricultura y Ganadería

Of these participants, Jorge Alfaro Figueroa has completed Module 2 in one of the hazards offered in the course.

5.3 Participants Feedback

Participant feedback and the evaluation of capacity development associated with Operational Project 2 will be conducted through the final capacity development questionnaire of the Probabilistic Disaster Risk Modeling Course, which will be administered upon completion of the last module of the course.

The objective of this questionnaire is to assess the level of understanding and appropriation of the fundamental concepts of probabilistic climate risk assessment, comprehension of the results associated with flooding and drought, and the perceived usefulness of the tools presented for application in decision-making related to resilience and financial protection in the agricultural sector.

The questions included in the final capacity development questionnaire, used as a participant feedback instrument, are presented and documented in Project Product 9 “Capacity building report” and are therefore not reproduced in this report.

The results of the questionnaire will allow documentation of the impact of the training process, as well as identification of opportunities for improvement and additional capacity-building needs, in line with the project’s objective of supporting national institutions in the interpretation, maintenance, and application of agricultural climate risk assessments and in the design of financial resilience strategies for micro, small, and medium-sized producers.

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A.1 DATA FOR GENERATING THE EMPIRICAL RISK CURVES

The characteristics of the events presented herein are taken directly from the data source, and therefore, the names, categories, and other properties are presented in Spanish.

Historical losses in coffee and sugarcane crops at the national level.
Source: Ministerio de Planificación Nacional y Política Económica

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	501 Liberia	4,546,949.88
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	502 Nicoya	41,190,017.04
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	502 Nicoya	4,546,949.88
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	503 Santa Cruz	41,190,017.04
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	503 Santa Cruz	4,546,949.88
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	504 Bagaces	4,546,949.88
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	505 Carrillo	4,546,949.88
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	506 Cañas	4,546,949.88
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	508 Tilarán	41,190,017.04
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	508 Tilarán	4,546,949.88
1988	Hidrometeorológico	LLUVIAS INTENSAS		HURACÁN JUANA	604 Montes de Oro	299,563,760.27
1993	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GERT	119 Perez Zeledón	8,190,008.19
1996	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	HURACÁN CESAR	119 Perez Zeledón	464,215,219.68
1996	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	HURACÁN CESAR	119 Perez Zeledón	1,628,174.94
1997	Hidrometeorológico	SEQUIA			104 Puriscal	34,836,824.16
1997	Hidrometeorológico	SEQUIA			112 Acosta	1,828,933,268.39
1997	Hidrometeorológico	SEQUIA			201 Alajuela	34,836,824.16
1997	Hidrometeorológico	SEQUIA			201 Alajuela	49,900,552.04
1997	Hidrometeorológico	SEQUIA			202 San Ramón	34,836,824.16
1997	Hidrometeorológico	SEQUIA			202 San Ramón	668,233,479.46
1997	Hidrometeorológico	SEQUIA			203 Grecia	34,836,824.16

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
1997	Hidrometeorológico	SEQUIA			203 Grecia	49,900,552.04
1997	Hidrometeorológico	SEQUIA			204 San Mateo	146,127,618.12
1997	Hidrometeorológico	SEQUIA			205 Atenas	49,900,552.04
1997	Hidrometeorológico	SEQUIA			206 Naranjo	34,836,824.16
1997	Hidrometeorológico	SEQUIA			206 Naranjo	49,900,552.04
1997	Hidrometeorológico	SEQUIA			207 Palmares	34,836,824.16
1997	Hidrometeorológico	SEQUIA			208 Poás	34,836,824.16
1997	Hidrometeorológico	SEQUIA			211 Alfaro Ruiz	34,836,824.16
1997	Hidrometeorológico	SEQUIA			212 Sarchí	34,836,824.16
1997	Hidrometeorológico	SEQUIA			401 Heredia	34,836,824.16
1997	Hidrometeorológico	SEQUIA			503 Santa Cruz	94,881,474.27
1997	Hidrometeorológico	SEQUIA			503 Santa Cruz	1,712,128,592.30
1997	Hidrometeorológico	SEQUIA			505 Carrillo	183,511,933.76
1997	Hidrometeorológico	SEQUIA			506 Cañas	8,118,201.01
1997	Hidrometeorológico	SEQUIA			509 Nandayure	32,472,804.03
1997	Hidrometeorológico	SEQUIA			509 Nandayure	3,247,280.40
1997	Hidrometeorológico	SEQUIA			510 La Cruz	811,820.10
1997	Hidrometeorológico	SEQUIA			602 Esparza	146,127,618.12
1997	Hidrometeorológico	SEQUIA			604 Montes de Oro	146,127,618.12
1997	Hidrometeorológico	SEQUIA			608 Coto Brus	2,240,623,477.84
1997	Hidrometeorológico	SEQUIA			612 Monteverde	146,127,618.12
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	104 Puriscal	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	105 Tarrazú	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	106 Aserri	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	109 Santa Ana	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	112 Acosta	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	116 Turrubares	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	117 Dota	134,060,180.46

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	119 Perez Zeledón	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	120 León Cortés	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	201 Alajuela	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	201 Alajuela	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	202 San Ramón	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	202 San Ramón	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	203 Grecia	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	203 Grecia	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	206 Naranjo	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	206 Naranjo	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	207 Palmares	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	207 Palmares	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	212 Sarchí	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	212 Sarchí	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	308 El Guarco	236,736,723.13
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	308 El Guarco	236,736,723.13
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	502 Nicoya	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	503 Santa Cruz	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	504 Bagaces	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	505 Carrillo	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	506 Cañas	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	509 Nandayure	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	510 La Cruz	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	511 Hojancha	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	603 Buenos Aires	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	605 Osa	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	607 Golfito	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	608 Coto Brus	141,511,205.01

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACÁN MITCH	610 Corredores	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR PARA LA ATENCION, REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR LLUVIAS INTENSAS EN CACHI Y OTRAS COMUNIDADES DE PARAISO DE LA PROVINCIA DE CARTAGO EL 26 DE JULIO DE 2000	302 Paraíso	295,751,323.44
1999	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA RECONSTRUCCION DE LOS DANOS CAUSADOS POR FENOMENOS HIDROMETEOROLOGICOS PRESENTADOS ENTRE EL 12 DE AGOSTO AL 5 DE OCTUBRE DE 2001	103 Desamparados	38,339,087.14
1999	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA RECONSTRUCCION DE LOS DANOS CAUSADOS POR FENOMENOS HIDROMETEOROLOGICOS PRESENTADOS ENTRE EL 12 DE AGOSTO AL 5 DE OCTUBRE DE 2010	501 Liberia	392,754,795.92
1999	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA RECONSTRUCCION DE LOS DANOS CAUSADOS POR FENOMENOS HIDROMETEOROLOGICOS PRESENTADOS ENTRE EL 12 DE AGOSTO AL 5 DE OCTUBRE DE 2013	502 Nicoya	15,238,462.05
1999	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA RECONSTRUCCION DE LOS DANOS CAUSADOS POR FENOMENOS HIDROMETEOROLOGICOS PRESENTADOS ENTRE EL 12 DE AGOSTO AL 5 DE OCTUBRE DE 2021	503 Santa Cruz	15,238,462.05
1999	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA RECONSTRUCCION DE LOS DANOS CAUSADOS POR FENOMENOS HIDROMETEOROLOGICOS PRESENTADOS ENTRE EL 12 DE AGOSTO AL 5 DE OCTUBRE DE 2022	503 Santa Cruz	52,367,306.12
1999	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA RECONSTRUCCION DE LOS DANOS CAUSADOS POR FENOMENOS HIDROMETEOROLOGICOS PRESENTADOS ENTRE EL 12 DE AGOSTO AL 5 DE OCTUBRE DE 2028	505 Carrillo	1,309,182,653.06
1999	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA RECONSTRUCCION DE LOS DANOS CAUSADOS POR FENOMENOS HIDROMETEOROLOGICOS PRESENTADOS ENTRE EL 12 DE AGOSTO AL 5 DE OCTUBRE DE 2038	509 Nandayure	15,238,462.05
1999	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA RECONSTRUCCION DE LOS DANOS CAUSADOS POR FENOMENOS HIDROMETEOROLOGICOS PRESENTADOS ENTRE EL 12 DE AGOSTO AL 5 DE OCTUBRE DE 2050	511 Hojanca	15,238,462.05
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACÁN MICHELLE	503 Santa Cruz	46,744,541.95
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACÁN MICHELLE	505 Carrillo	9,081,277.43
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACÁN MICHELLE	509 Nandayure	213,808,396.47
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACÁN MICHELLE	509 Nandayure	71,393.69
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACÁN MICHELLE	511 Hojanca	16,232,069.47
2002	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN REGULADOR PARA LA ATENCION DE LA EMERGENCIA POR INUNDACIONES VERTIENTE ATLANTICA	703 Siquirres	386,321.14
2005	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES EN LA VERTIENTE DEL PACÍFICO Y ZONA NORTE (ONDA TROPICAL E INFLUENCIA INDIRECTA HURACÁN RITA Y VILMA)	612 Monteverde	156,624,663.91
2006	Hidrometeorológico	LLUVIAS INTENSAS			106 Aserri	2,713,499.28
2006	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	LLUVIAS INTENSAS ASOCIADAS A UN SISTEMA DE BAJA PRESION	202 San Ramón	30,956,631.53
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	103 Desamparados	13,457,878.24
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	104 Puriscal	10,463,364.00
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	106 Aserri	10,463,364.00
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	107 Mora	10,463,364.00
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	109 Santa Ana	10,463,364.00

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Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	508 Tilarán	21,358,753.44
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	508 Tilarán	21,358,753.44
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	509 Nandayure	21,358,753.44
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	509 Nandayure	21,358,753.44
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	510 La Cruz	21,358,753.44
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	510 La Cruz	21,358,753.44
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	511 Hojanca	21,358,753.44
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	511 Hojanca	21,358,753.44
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	601 Puntarenas	122,014,620.98
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	602 Esparza	30,503,655.24
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	603 Buenos Aires	5,270,489.73
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	604 Montes de Oro	61,007,310.49
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	605 Osa	5,270,489.73
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	606 Aguirre	30,503,655.24
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	607 Golfito	5,270,489.73
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	608 Coto Brus	5,270,489.73
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	609 Parrita	30,503,655.24
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	610 Corredores	5,270,489.73
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	611 Garabito	10,463,364.00
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	612 Monteverde	30,503,655.24
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2030	501 Liberia	1,524,679,253.89
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2034	502 Nicoya	24,858,900.88
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2039	503 Santa Cruz	4,786,167.05
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2040	503 Santa Cruz	78,063,577.80
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2053	505 Carrillo	487,897,361.24
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2058	506 Cañas	1,015,043,015.84
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2068	507 Abangares	310,736,260.98
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2069	507 Abangares	232,727,041.31

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2080	509 Nandayure	23,201,640.82
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2091	511 Hojancha	19,887,120.70
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2095	601 Puntarenas	6,629,040.23
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL Nº16 OCTUBRE 2099	604 Montes de Oro	2,916,777.70
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	502 Nicoya	25,116,641.68
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	503 Santa Cruz	4,835,790.75
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	503 Santa Cruz	78,872,952.66
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	507 Abangares	313,958,021.05
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	507 Abangares	235,139,990.11
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	509 Nandayure	23,442,198.91
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	511 Hojancha	20,093,313.35
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	601 Puntarenas	5,358,216.89
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	604 Montes de Oro	2,947,019.29
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	501 Liberia	1,540,487,356.62
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	504 Bagaces	212,189,809.48
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	505 Carrillo	492,955,954.12
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	506 Cañas	813,377,324.29
2009	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES POR INFLUENCIA DE FRENTE FRIO	201 Alajuela	5,217,838.22
2009	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES POR INFLUENCIA DE FRENTE FRIO	203 Grecia	72,580,129.69
2009	Hidrometeorológico	SEQUIA		EL NINO 2009-2020	503 Santa Cruz	169,005,665.37
2009	Hidrometeorológico	SEQUIA		EL NINO 2009-2033	505 Carrillo	889,503,501.91
2009	Hidrometeorológico	SEQUIA		EL NINO 2009-2039	507 Abangares	49,883,356.39
2010	Hidrometeorológico	LLUVIAS INTENSAS		TEMPORAL POR LOS EFECTOS INDIRECTOS DEL PASO DEL HURACÁN TOMAS	612 Monteverde	18,141,983,514.83
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	501 Liberia	366,032,403.26
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	502 Nicoya	51,909,298.91
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	502 Nicoya	34,170,617.77
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	503 Santa Cruz	14,599,490.32
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	503 Santa Cruz	337,556,888.45

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	504 Bagaces	12,529,226.52
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	505 Carrillo	1,525,474,007.80
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	506 Cañas	256,279,633.31
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	507 Abangares	68,347,243.57
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	507 Abangares	794,930,607.36
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	508 Tilarán	136,694,487.14
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	509 Nandayure	64,886,623.64
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	509 Nandayure	7,118,878.70
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	511 Hojancha	97,329,935.46
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	511 Hojancha	1,220,379.21
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	601 Puntarenas	222,296,766.18
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	601 Puntarenas	7,472,521.72
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	604 Montes de Oro	27,036,093.18
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	612 Monteverde	33,669,949.38
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	305 Turrialba	222,981,660.00
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	305 Turrialba	312,120,000.00
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	701 Limón	24,000.00
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	703 Siquirres	24,000.00
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACÁN OTTO POR TERRITORIO COSTARRICENSE	210 San Carlos	1,180,093,922.10
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACÁN OTTO POR TERRITORIO COSTARRICENSE	213 Upala	2,766,701.48
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACÁN OTTO POR TERRITORIO COSTARRICENSE	213 Upala	3,637,672.17
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACÁN OTTO POR TERRITORIO COSTARRICENSE	214 Los Chiles	3,514,570,038.01
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACÁN OTTO POR TERRITORIO COSTARRICENSE	702 Pococí	251,289.87
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	104 Puriscal	35,608,687.54
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR LA TORMENTA TROPICAL NATE	104 Puriscal	3,536,311.04
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	120 León Cortés	17,926,150.04
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	202 San Ramón	28,978,104.34

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	205 Atenas	1,688,588.52
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	502 Nicoya	235,754.07
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	503 Santa Cruz	343,808.02
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	506 Cañas	2,062,848.11
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	507 Abangares	150,944,612.53
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	507 Abangares	1,358,706,422.33
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	508 Tilarán	15,677,645.60
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	509 Nandayure	13,322,069.53
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	511 Hojancha	2,889,814.44
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	601 Puntarenas	147,088,437.25
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	604 Montes de Oro	785,846.90
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	103 Desamparados	16,503,271.39
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	105 Tarrazú	130,652,934.20
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	106 Aserri	162,424,239.45
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	106 Aserri	1,768,155.52
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	112 Acosta	211,640,848.32
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	112 Acosta	736,731.47
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	116 Turrubares	3,177,768.39
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	117 Dota	26,325,871.06
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	120 León Cortés	223,008,398.74
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	203 Grecia	245,577.16
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	301 Cartago	65,301,953.18
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	308 El Guarco	8,518,465.44
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	507 Abangares	50,784,373.43
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	604 Montes de Oro	26,890,698.52
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	609 Parrita	49,331,538.98
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	612 Monteverde	29,907,415.45
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	119 Perez Zeledón	227,023,310.18

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	119 Perez Zeledón	37,489,808.55
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	201 Alajuela	987,220.16
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	602 Esparza	5,911,271.99
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	603 Buenos Aires	42,320,311.20
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	603 Buenos Aires	1,080,539.48
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	605 Osa	122,788.58
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	605 Osa	1,399,789.79
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	608 Coto Brus	196,461.72

Historical losses in the agricultural sector (cattle) at the national level.

Source: Ministerio de Planificación Nacional y Política Económica

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
1993	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR PARA LA RECONSTRUCCION DE LAS ZONAS AFECTADAS POR LA TORMENTA TROPICAL GERT	119 Perez Zeledón	73,677,313.68
1993	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR PARA LA RECONSTRUCCION DE LAS ZONAS AFECTADAS POR LA TORMENTA TROPICAL GERT	605 Osa	77,149,877.15
1993	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR PARA LA RECONSTRUCCION DE LAS ZONAS AFECTADAS POR LA TORMENTA TROPICAL GERT	606 Aguirre	16,380,016.38
1996	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	HURACAN CESAR	510 La Cruz	703,872,551.48
1997	Hidrometeorológico	SEQUIA			407 Belén	13,395,031.66
1997	Hidrometeorológico	SEQUIA			116 Turrubares	66,272,933.92
1997	Hidrometeorológico	SEQUIA			204 San Mateo	54,672,024.68
1997	Hidrometeorológico	SEQUIA			209 Orotina	103,352,817.02
1997	Hidrometeorológico	SEQUIA			210 San Carlos	172,511,771.39
1997	Hidrometeorológico	SEQUIA			213 Upala	172,511,771.39
1997	Hidrometeorológico	SEQUIA			214 Los Chiles	172,511,771.39
1997	Hidrometeorológico	SEQUIA			215 Guatuso	172,511,771.39
1997	Hidrometeorológico	SEQUIA			501 Liberia	193,217,359.03
1997	Hidrometeorológico	SEQUIA			502 Nicoya	193,217,359.03
1997	Hidrometeorológico	SEQUIA			503 Santa Cruz	193,217,359.03
1997	Hidrometeorológico	SEQUIA			504 Bagaces	193,217,359.03
1997	Hidrometeorológico	SEQUIA			505 Carrillo	193,217,359.03
1997	Hidrometeorológico	SEQUIA			506 Cañas	193,217,359.03
1997	Hidrometeorológico	SEQUIA			509 Nandayure	193,217,359.03
1997	Hidrometeorológico	SEQUIA			601 Puntarenas	703,222,925.80
1997	Hidrometeorológico	SEQUIA			602 Esparza	90,493,586.62
1997	Hidrometeorológico	SEQUIA			604 Montes de Oro	143,970,206.20
1997	Hidrometeorológico	SEQUIA			605 Osa	38,277,317.75
1997	Hidrometeorológico	SEQUIA			610 Corredores	38,277,317.75
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	104 Puriscal	134,060,180.46

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	105 Tarrazú	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	106 Aserri	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	109 Santa Ana	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	112 Acosta	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	116 Turrubares	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	117 Dota	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	119 Perez Zeledón	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	120 León Cortés	134,060,180.46
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	201 Alajuela	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	202 San Ramón	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	203 Grecia	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	206 Naranjo	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	207 Palmares	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	212 Sarchí	265,958,204.34
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	308 El Guarco	236,736,723.13
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	502 Nicoya	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	503 Santa Cruz	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	504 Bagaces	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	505 Carrillo	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	506 Cañas	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	509 Nandayure	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	510 La Cruz	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	511 Hojancha	137,934,583.76
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	601 Puntarenas	62,620,542.38
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	602 Esparza	62,620,542.38
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	603 Buenos Aires	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	604 Montes de Oro	62,620,542.38
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	605 Osa	141,511,205.01

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	606 Aguirre	62,620,542.38
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	607 Gofito	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	608 Coto Brus	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	609 Parrita	62,620,542.38
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	610 Corredores	141,511,205.01
1998	Hidrometeorológico	LLUVIAS INTENSAS		PLAN REGULADOR HURACAN MITCH	611 Garabito	62,620,542.38
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACAN MICHELLE	502 Nicoya	17,577,126.60
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACAN MICHELLE	503 Santa Cruz	428,362.14
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACAN MICHELLE	505 Carrillo	3,512,569.57
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACAN MICHELLE	509 Nandayure	22,617,521.15
2001	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN REGULADOR GENERAL PARA LA REHABILITACION Y RECONSTRUCCION DE LOS DANOS CAUSADOS POR EL EFECTO INDIRECTO DEL HURACAN MICHELLE	511 Hojancha	68,836,082.94
2005	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES EN LA VERTIENTE DEL PACÍFICO Y ZONA NORTE (ONDA TROPICAL E INFLUENCIA INDIRECTA HURACÁN RITA Y VILMA)	612 Monteverde	34,960,862.48
2006	Hidrometeorológico	LLUVIAS INTENSAS			106 Aserri	2,713,499.28
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	203 Grecia	158,844,871.90
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	205 Atenas	158,844,871.90
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	206 Naranjo	158,844,871.90
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	401 Heredia	158,844,871.90
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	402 Barva	158,844,871.90
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	404 Santa Bárbara	158,844,871.90
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	408 Flores	158,844,871.90
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	501 Liberia	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	502 Nicoya	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	503 Santa Cruz	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	504 Bagaces	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	505 Carrillo	62,599,210.87

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	506 Cañas	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	507 Abangares	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	508 Tilarán	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	509 Nandayure	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	510 La Cruz	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	511 Hojancha	62,599,210.87
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	601 Puntarenas	122,014,620.98
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	602 Esparza	30,503,655.24
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	604 Montes de Oro	61,007,310.49
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	606 Aguirre	30,503,655.24
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	609 Parrita	30,503,655.24
2007	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas	PLAN GENERAL DE LA EMERGENCIA POR TEMPORAL Y PASO DE UNA ONDA TROPICAL EN EL PACIFICO CENTRAL, NORTE, SUR Y CORDILLERA DE GUANACASTE, DECRETO 34045-MP	612 Monteverde	30,503,655.24
2007	Hidrometeorológico	SEQUIA	Niña	PLAN GENERAL DE LA EMERGENCIA POR SITUACION GENERADA POR LA SEQUIA EN GUATUSO, LOS CHILES, UPALA Y SAN CARLOS	210 San Carlos	59,353,716.21
2007	Hidrometeorológico	SEQUIA	Niña	PLAN GENERAL DE LA EMERGENCIA POR SITUACION GENERADA POR LA SEQUIA EN GUATUSO, LOS CHILES, UPALA Y SAN CARLOS	213 Upala	120,827,208.01
2007	Hidrometeorológico	SEQUIA	Niña	PLAN GENERAL DE LA EMERGENCIA POR SITUACION GENERADA POR LA SEQUIA EN GUATUSO, LOS CHILES, UPALA Y SAN CARLOS	214 Los Chiles	56,628,290.47
2007	Hidrometeorológico	SEQUIA	Niña	PLAN GENERAL DE LA EMERGENCIA POR SITUACION GENERADA POR LA SEQUIA EN GUATUSO, LOS CHILES, UPALA Y SAN CARLOS	215 Guatuso	82,974,072.67
2008	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS ASOCIADOS AL PASO DE LA TORMENTA TROPICAL ALMA	609 Parrita	427,669.66
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2024	211 Alfaro Ruiz	19,887,120.70
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2032	501 Liberia	22,538,736.80
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2042	503 Santa Cruz	124,294,504.39
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2050	504 Bagaces	28,637,453.81
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2056	505 Carrillo	86,177,523.05
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2064	506 Cañas	236,988,188.38
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2074	507 Abangares	92,806,563.28
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2078	508 Tilarán	109,379,163.87

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2084	509 Nandayure	117,377,763.81
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2090	510 La Cruz	37,122,625.31
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2094	511 Hojancha	92,806,563.28
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2096	601 Puntarenas	44,414,569.57
2008	Hidrometeorológico	LLUVIAS INTENSAS		PLAN GENERAL DE LA EMERGENCIA POR INFLUENCIA DE LA DERPRESION TROPICAL N°16 OCTUBRE 2101	604 Montes de Oro	2,651,616.09
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	501 Liberia	22,772,421.79
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	503 Santa Cruz	125,583,208.42
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	505 Carrillo	87,071,024.50
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	508 Tilarán	110,513,223.41
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	509 Nandayure	118,594,754.04
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	510 La Cruz	37,507,518.25
2008	Hidrometeorológico	LLUVIAS INTENSAS		TORMENTA TROPICAL GUSTAV Y HANNA	511 Hojancha	93,768,795.62
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA POR INUNDACIONES EN LA VERTIENTE CARIBE POR LA INTERACCION DE UN BAJA Y UNA ALTA PRESION DECRETOS 34906 Y 34975	305 Turrialba	4,779,060,637.82
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA POR INUNDACIONES EN LA VERTIENTE CARIBE POR LA INTERACCION DE UN BAJA Y UNA ALTA PRESION DECRETOS 34906 Y 34977	410 Sarapiquí	53,553,086.86
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	502 Nicoya	145,676,521.77
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	504 Bagaces	28,934,371.22
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	506 Cañas	93,768,795.62
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	507 Abangares	93,768,795.62
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	601 Puntarenas	22,772,421.79
2008	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	TORMENTA TROPICAL GUSTAV Y HANNA	604 Montes de Oro	2,679,108.45
2008	Hidrometeorológico	LLUVIAS INTENSAS	Movimiento de Masas		601 Puntarenas	22,102,644.68
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	204 San Mateo	196,101,795.90
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	209 Orotina	171,589,071.41
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	501 Liberia	42,852,207.70
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	501 Liberia	40,683,913.02
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	501 Liberia	1,802,406.21
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	502 Nicoya	941,775,269.99
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	502 Nicoya	891,023,115.86

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	503 Santa Cruz	510,928,089.00
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	503 Santa Cruz	539,640,419.96
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	503 Santa Cruz	4,506,015.53
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	504 Bagaces	675,902,329.61
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	504 Bagaces	6,488,662.36
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	504 Bagaces	2,403,208.28
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	505 Carrillo	167,894,138.68
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	505 Carrillo	45,420,636.55
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	505 Carrillo	9,012,031.06
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	506 Cañas	1,238,793,789.71
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	506 Cañas	47,583,524.00
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	507 Abangares	40,554,139.78
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	507 Abangares	4,152,743.91
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	508 Tilarán	27,171,273.65
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	509 Nandayure	340,519,593.66
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	509 Nandayure	41,094,861.64
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	509 Nandayure	7,209,624.85
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	510 La Cruz	243,324,838.66
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	510 La Cruz	28,117,536.91
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	511 Hojancha	213,558,100.06
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	511 Hojancha	21,628,874.55
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	601 Puntarenas	283,979,112.11
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	601 Puntarenas	513,541,578.01
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	604 Montes de Oro	95,126,994.54
2014	Hidrometeorológico	SEQUIA	Niño	PLAN GENERAL DE LA EMERGENCIA POR SEQUIA	611 Garabito	306,409,056.09
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	305 Turrialba	328,774,320.00
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	305 Turrialba	2,931,634,524.80

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	410 Sarapiquí	35,520,000.00
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	701 Limón	3,155,169.60
2015	Hidrometeorológico	LLUVIAS INTENSAS		INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	706 Guácimo	780,000.00
2015	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	INUNDACIONES Y DESLIZAMIENTOS PROVOCADOS POR TEMPORAL Y PASO DE UN SISTEMA DE BAJA PRESION. PROVINCIA DE LIMON Y CANTONES DE SARAPIQUI Y TURRIALBA	702 Pococí	2,340,000.00
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	210 San Carlos	2,647,590.08
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	213 Upala	4,020,637.93
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	213 Upala	1,005,159.48
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	213 Upala	349,851,789.23
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	214 Los Chiles	52,527,624.30
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	215 Guatuso	20,268,035.83
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	216 Río Cuarto	564,899.63
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	410 Sarapiquí	25,508,937.38
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	504 Bagaces	321,690,959.70
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	510 La Cruz	143,269,150.55
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	605 Osa	6,783,801.25
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	607 Golfito	4,953,425.94
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	610 Corredores	8,146,134.11
2016	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACIÓN PROVOCADA POR EL PASO DEL HURACAN OTTO POR TERRITORIO COSTARRICENSE	702 Pococí	14,186,457.08
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	104 Puriscal	6,704,256.34
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	112 Acosta	1,493,109.11
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	116 Turrubares	17,435,978.04
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	119 Perez Zeledón	55,097,690.59
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	202 San Ramón	1,620,809.23
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	305 Turrialba	55,488,895.00
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	306 Alvarado	7,583,422.56
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	401 Heredia	2,234,752.11
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	501 Liberia	8,554,483.75

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	503 Santa Cruz	1,915,501.81
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	504 Bagaces	184,068,624.08
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	507 Abangares	2,535,338.55
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	508 Tilarán	178,563,586.80
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	509 Nandayure	31,407,550.02
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	510 La Cruz	18,467,402.09
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	511 Hojancha	40,268,941.37
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	601 Puntarenas	182,196,045.23
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	603 Buenos Aires	163,480,712.37
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	604 Montes de Oro	392,923.45
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	605 Osa	169,060,225.34
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	104 Puriscal	115,765,071.07
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	106 Aserri	1,010,795.57
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	107 Mora	13,752,320.70
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	112 Acosta	15,363,306.84
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	203 Grecia	14,734,629.33
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	601 Puntarenas	57,397,275.08
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	604 Montes de Oro	48,149,679.28
2017	Hidrometeorológico	LLUVIAS INTENSAS	Deslizamiento	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	612 Monteverde	46,362,521.00
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	104 Puriscal	7,416,430.09
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	112 Acosta	10,628,579.29
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	116 Turrubares	28,879,873.48
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE		1,797,624.78
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	119 Perez Zeledón	1,915,501.81
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	209 Orotina	26,718,794.51
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	501 Liberia	12,694,374.32
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	502 Nicoya	1,964,617.24
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	506 Cañas	4,709,187.53

Year	Type of Event	Category	Subcategory	Event	Canton	Constant Value in Colones
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	509 Nandayure	392,923.45
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	606 Aguirre	51,792,224.04
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	609 Parrita	111,920,806.28
2017	Hidrometeorológico	LLUVIAS INTENSAS	Inundación	PLAN GENERAL DE LA EMERGENCIA ANTE LA SITUACION PROVOCADA POR LA TORMENTA TROPICAL NATE	611 Garabito	100,833,980.02

A. 2 RISK ASSESSMENT DATASET FOR AGRICULTURE

As part of the products included in this deliverable, a web repository (Drive) was established to host the risk results for the agriculture project. This repository compiles deliverables 7a, 7b, 7c, 7d, 7e.

Below is a list of the files that comprise this dataset.

The link to access the dataset is:

<https://onedrive.live.com/?redeem=aHR0cHM6Ly8xZm1zL2YvYy85ZjZmNTQ4ZGFkMDc1MzQzL0VvTWNDRlFZV3psTmdaZ0k2YTk5eWdNQIBINERfYThVTFV4QnN3Y2RFZi1ta3c%5FZT1qQ2RlZzU&id=9F6F548DAD075343%21se2eb577372c44e01913b79a2829aaeaf&cid=9F6F548DAD075343&sb=name&sd=1>

Coffee

Flood

This directory contains the risk results for fluvial and pluvial flooding at the canton and province levels.

File	Format
Cafe_Canton_Fluvial_CR-SIRGAS	.shp
Cafe_Canton_Fluvial_WGS84	.shp
Cafe_Canton_Pluvial_CR-SIRGAS	.shp
Cafe_Canton_Pluvial_WGS84	.shp
Cafe_Fluvial_CR-SIRGAS	.shp
Cafe_Fluvial_WGS84	.shp
Cafe_Pluvial_CR-SIRGAS	.shp
Cafe_Pluvial_WGS84	.shp
Cafe_Provincia_Fluvial_CR-SIRGAS	.shp
Cafe_Provincia_Fluvial_WGS84	.shp
Cafe_Provincia_Pluvial_CR-SIRGAS	.shp
Cafe_Provincia_Pluvial_WGS84	.shp

The *.shp files used in this project are available in vector format and require a Geographic Information System (GIS) for visualization.

Intense Rainfall

This directory contains the risk results for intense rainfall hazard at the canton and province levels.

File	Format
Cafe_Canton_LluviasIntensas_CR-SIRGAS	.shp
Cafe_Canton_LluviasIntensas_WGS84	.shp
Cafe_LluviasIntensas_CR-SIRGAS	.shp
Cafe_LluviasIntensas_WGS84	.shp
Cafe_Provincia_LluviasIntensas_CR-SIRGAS	.shp
Cafe_Provincia_LluviasIntensas_WGS84	.shp

Drought

This directory contains the risk results for drought hazard at the canton and province levels.

File	Format
Cafe_Canton_Sequia_CR-SIRGAS	.shp
Cafe_Canton_Sequia_WGS84	.shp
Cafe_Sequia_CR-SIRGAS	.shp
Cafe_Sequia_WGS84	.shp
Cafe_Provincia_Sequia_CR-SIRGAS	.shp
Cafe_Provincia_Sequia_WGS84	.shp

Sugarcane

Flood

This directory contains the risk results for fluvial and pluvial flooding at the canton and province levels.

File	Format
Cana_Canton_Fluvial_CR-SIRGAS	.shp
Cana_Canton_Fluvial_WGS84	.shp
Cana_Canton_Pluvial_CR-SIRGAS	.shp
Cana_Canton_Pluvial_WGS84	.shp
Cana_Fluvial_CR-SIRGAS	.shp
Cana_Fluvial_WGS84	.shp
Cana_Pluvial_CR-SIRGAS	.shp
Cana_Pluvial_WGS84	.shp
Cana_Provincia_Fluvial_CR-SIRGAS	.shp
Cana_Provincia_Fluvial_WGS84	.shp
Cana_Provincia_Pluvial_CR-SIRGAS	.shp
Cana_Provincia_Pluvial_WGS84	.shp

Drought

This directory contains the risk results for drought hazard at the canton and province levels.

File	Format
Cana_Canton_Sequia_CR-SIRGAS	.shp
Cana_Canton_Sequia_WGS84	.shp
Cana_Sequia_CR-SIRGAS	.shp
Cana_Sequia_WGS84	.shp
Cana_Provincia_Sequia_CR-SIRGAS	.shp
Cana_Provincia_Sequia_WGS84	.shp

Livestock

Flood

This directory contains the risk results for fluvial and pluvial flooding at the canton and province levels.

File	Format
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Ganaderia_Canton_Fluvial_CR-SIRGAS	.shp
Ganaderia_Canton_Fluvial_WGS84	.shp
Ganaderia_Canton_Pluvial_CR-SIRGAS	.shp
Ganaderia_Canton_Pluvial_WGS84	.shp
Ganaderia_Fluvial_CR-SIRGAS	.shp
Ganaderia_Fluvial_WGS84	.shp
Ganaderia_Pluvial_CR-SIRGAS	.shp
Ganaderia_Pluvial_WGS84	.shp
Ganaderia_Provincia_Fluvial_CR-SIRGAS	.shp
Ganaderia_Provincia_Fluvial_WGS84	.shp
Ganaderia_Provincia_Pluvial_CR-SIRGAS	.shp
Ganaderia_Provincia_Pluvial_WGS84	.shp

Drought

This directory contains the risk results for drought hazard at the canton and province levels.

File	Format
Ganaderia_Canton_Sequia_CR-SIRGAS	.shp
Ganaderia_Canton_Sequia_WGS84	.shp
Ganaderia_Sequia_CR-SIRGAS	.shp
Ganaderia_Sequia_WGS84	.shp
Ganaderia_Provincia_Sequia_CR-SIRGAS	.shp
Ganaderia_Provincia_Sequia_WGS84	.shp

RDLS Metadata

This directory contains the metadata following the Risk Data Library Standard, providing structured information to describe, organize, and ensure the consistency of the datasets used in the project.

File	Format
Loss_Agriculture	.json

The *.json file may contain information related to hazard, exposure, vulnerability, or loss, depending on the type of data being represented within the project.