

Monitoring & Evaluation (M&E) Plan and Impact Statement Form

Objective of the M&E Plan and Impact Statement:

- The M&E Plan and Impact Statement must be designed based on the Technical Assistance Response Plan and must enable the Implementer to complete the Closure Report at the end of the assistance.

Process for filling in the form:

- The Implementer must identify relevant quantitative and qualitative indicators as specified in the Closure Report. A sub-set of indicators to monitor and assess must be chosen among these.
- The Implementer may also identify other specific, measurable, achievable, relevant, and time-bound indicators suitable to monitor Activities, Outputs and anticipated Outcomes from the technical assistance and add to the M&E Plan and Impact Statement.
- During implementation of the TA or FTA, the Implementer must collect all relevant data as described in the Monitoring & Evaluation Plan. Aggregated data on selected indicators as well as an updated version of the Impact Statement will be presented in the Closure Report at the end of the assistance.

Basic Information	
Title of response plan	Feasibility and viability study of using blockchain technology for a real-time climate risk insurance system in Thailand's agricultural sector
Technical assistance reference number	AF-2022000120 / 2023000006
Country/ countries	Thailand
NDE focal point and organisation	The Office of National Higher Education Science Research and Innovation Policy Council (NXPO) Dr. Surachai SATHITKUNARAT (Vice-President) E-mail: surachai@nxpo.or.th - chanida@nxpo.or.th Address: 319 Chamchuri Square Building 14 th Fl., Phayathai Rd., Patumwan, Bangkok 10330, Thailand
Sector(s) addressed	Agriculture and insurance
Technologies supported	Blockchain technology
Implementation period and total duration	12 months
Total budget for implementation	USD 222,210
Designer of the response plan	CTCN
Implementer of response plan	Blockchain & Climate Institute

(A) Outputs and Activities as described in the Response Plan	(B) Indicator	(C) Expected results	(D) Method and frequency for data collection	(F) Comments
Output 1: Development of implementation planning and communication documents				
Activity 1.1: Formulation of i) Detailed work plan, ii) Monitoring and evaluation plan, iii) CTCN Impact Description, iv) Closure and data collection report and v) Project webinar hosted through the CTCN	<ul style="list-style-type: none"> • number of participants to the webinar (men? women?) • number of webinar training sessions and capacity strengthening activities • number of people who received the training (men? women ?) • % of participants reporting satisfaction • % of participants reporting increased knowledge as a result of the webinar • number of institutions trained during the webinar • number of reporting documents developed 	<ul style="list-style-type: none"> • a detailed work plan • a monitoring and evaluation plan • a CTCN impact description • a closure and data collection report • a project webinar 	<ul style="list-style-type: none"> • the formulation of a detailed work plan, with a comprehensive coverage on project activities, timelines, and responsibilities • definition of a clear baseline measurements and targets for each project indicator, ensuring a reference point for assessing progress and impact • the mapping of activities and outcomes for stakeholders and the gathering of empirical evidence to substantiate effects through a logic model • the featuring of post-implementation review and lessons learnt by the incorporation of data amassed throughout the project, valuable insights, and recommendations 	<ul style="list-style-type: none"> • design of an event understandable by participants
Output 2: Preparatory analysis for blockchain-based parametric crop insurance in Thailand				
Activity 2.1: Analysis of the agricultural sector, crop insurance market and farmer experience in Thailand	<ul style="list-style-type: none"> • number of technical reports produced • number of government policies supported by the assistance • number of farmers interviewed (robustness of the study) • number of crops analyzed to determine the most relevant to Thai's GDP 	<ul style="list-style-type: none"> • one report on the agricultural sector, crop insurance market and farmer survey in Thailand that detail the existing situation and potential opportunities 	<ul style="list-style-type: none"> • an extensive desk review of policy and sectoral literature • farmer interviews • stakeholder consultations 	<ul style="list-style-type: none"> • potential flood preventing data collection
Activity 2.2: Mapping of blockchain-based crop insurance products internationally	<ul style="list-style-type: none"> • number of technical reports developed • number of blockchain-based crop insurance 	<ul style="list-style-type: none"> • one holistic colourful mapping report of blockchain-based 	<ul style="list-style-type: none"> • a comprehensive approach that combines desk research, data collection, and analysis 	

	<ul style="list-style-type: none"> products identified and analysed number of companies engaged 	crop insurance products in the international community	<ul style="list-style-type: none"> stakeholder interviews 	
Output 3: Formation and regular meetings of project working group				
Activity 3.1: Mapping of relevant stakeholders and formation of project working group	<ul style="list-style-type: none"> number of reports produced number of stakeholders in Thai's agricultural sector number of stakeholders engaged 	<ul style="list-style-type: none"> one matrix identifying all relevant stakeholders for engagement purposes 	<ul style="list-style-type: none"> the identification and mapping of key stakeholders who hold significant interest in and potential impact on the feasibility study 	
Activity 3.2: 2-day kick-off and preparation workshop for the technical and economic feasibility of blockchain-based parametric insurance in Thailand	<ul style="list-style-type: none"> number of participants to the webinar (men? women?) number of webinar training sessions and capacity strengthening activities number of people who received the training (men? women?) % of participants reporting satisfaction % of participants reporting increased knowledge as a result of the webinar number of institutions trained during the webinar number of reporting documents developed 	<ul style="list-style-type: none"> one workshop to enhance stakeholder understanding and alignment, clarification of roles and responsibilities, identification of potential challenges, initiation of stakeholder engagement, and informed decision-making, all of which are critical for the success of the feasibility study strengthened capacity stakeholder satisfaction 	<ul style="list-style-type: none"> the gathering of key stakeholders and experts to lay the groundwork for the technical and economic feasibility studies of blockchain-based parametric insurance in Thailand 	<ul style="list-style-type: none"> design of an event understandable by participants
Activity 3.3: Regular meetings of the project working group	<ul style="list-style-type: none"> number of participants activities completed deliverables completed ideas generated next steps 	<ul style="list-style-type: none"> bilingual meeting minutes to summarize the key discussions, decisions, action items for each agenda item 		
Output 4: Technical feasibility study	<ul style="list-style-type: none"> number of reports produced number of policies, strategies and laws supported by the assistance anticipated number of policies, strategies, plans, laws, agreements or regulations proposed, adopted or implemented as a result of the assistance anticipated number of technologies transferred or deployed as a result of the 	<ul style="list-style-type: none"> one report developed on the technical feasibility study 		

	assistance <ul style="list-style-type: none"> • number of South-South collaborations enabled during the assistance • number of countries with strengthened system of innovation as a result of the assistance • anticipated number of cooperative researches 			
Activity 4.1: Assessment of extreme weather events and availability of localized climate data in Thailand	<ul style="list-style-type: none"> • number of technical reports produced • number of stakeholders engaged for data collection • number of data sources accessed and analyzed 	<ul style="list-style-type: none"> • one analysis of historical extreme weather events in Thailand • one evaluation of availability and reliability of localized climate data • collaboration with meteorological agencies and research institutions • statistically robust study • well-documented study 	<ul style="list-style-type: none"> • the historical analysis of data from TMB and WMO to examine the frequency, magnitude, and impact of extreme weather events on farming activities 	
Activity 4.2: Availability of data on theoretical loss exposure, average indemnity costs and aggregation risk	<ul style="list-style-type: none"> • number of stakeholders engaged for data collection • number of data sources accessed and analyzed 	<ul style="list-style-type: none"> • data collection • examination of average indemnity costs in the agricultural sector • assessment of aggregation risk factors • statistically robust study • well-documented study 	<ul style="list-style-type: none"> • the comprehensive analysis of open-source models • the examination of model input data requirements 	
Activity 4.3: Assessment of the optimal level of granularity in location, peril coverage and 'sums insured'				
Activity 4.4: Evaluation of the existing digital infrastructure for disbursing payments	<ul style="list-style-type: none"> • number of technical reports produced • number of existing digital payment platforms evaluated 	<ul style="list-style-type: none"> • one report on digital infrastructure evaluation 	<ul style="list-style-type: none"> • an in-depth examination of the current payment processes in Thailand to identify strengths, weaknesses, and areas for improvement • a rigorous risk assessment is conducted, focusing on security measures, reliability, availability, scalability, compliance, and adherence to financial services regulations to 	

			<p>mitigate potential threats and ensure regulatory compliance</p> <ul style="list-style-type: none"> an evaluation extends to analysing transaction speed and costs, covering both operational and integration expenses, to optimize efficiency while minimizing expenditure 	
<p>Activity 4.5: Assessment of the regulatory and commercial information requirements</p>	<ul style="list-style-type: none"> number of technical reports produced number of stakeholders engaged number of policies and laws analyzed 	<ul style="list-style-type: none"> one report on regulatory and commercial information 	<ul style="list-style-type: none"> a comprehensive review of legal and regulatory frameworks, particularly within insurance, data protection, and competition law domains 	
<p>Activity 4.6: Definition of the product structure and system architecture</p>	<ul style="list-style-type: none"> number of technical reports produced number of climate risks that can be modelled and insured within the blockchain framework number of coverage levels tailored to farmers' risk exposure and affordability accuracy and reliability of parametric triggers integrated with smart contracts for real-time pay outs time from trigger event to payment disbursement through the blockchain system number of automated transactions executed via smart contracts farmer outreach number of blockchain platforms number of customizable parameters % of claims processed automatically without human intervention number of transactions/hour number of security protocols 	<ul style="list-style-type: none"> one comprehensive report detailing the product structure and system architecture 		
<p>Activity 4.7: Assessment of the trade-offs of blockchain design against the existing 'business-as-usual' scenario</p>	<ul style="list-style-type: none"> number of technical reports produced cost of transaction reduction in administrative staff costs time taken for claims to be processed and pay outs disbursed level of data transparency 	<ul style="list-style-type: none"> one comprehensive report chapter on blockchain design evaluation 	<ul style="list-style-type: none"> the utilization of the blockchain selection decision tree to facilitate a systematic evaluation of blockchain technology's suitability for specific use cases 	

	<ul style="list-style-type: none"> • level of fraudulent claims • % of farmers able to access and use the product • product scalability • ease of use • farmer confidence and satisfaction • energy consumption and carbon footprint • improvement in farmer resilience • tangible benefits to farmers • anticipated increased ecosystem resilience (areas with increased resistance to climate-induced disturbances and with improved recovery rates) • anticipated increased economic resilience (e.g. less reliance on vulnerable economic sectors or diversification of livelihood) • anticipated increased health and wellbeing of target group (e.g. improved basic health, water and food security) 			
Activity 4.8: Mapping of technical risks and mitigation actions	<ul style="list-style-type: none"> • number of technical reports produced • risk of unauthorized access • potential for coding errors or loopholes • bottlenecks in data processing or transaction validation • accuracy and real-time availability of climate and weather data • risk of data loss or corruption 	<ul style="list-style-type: none"> • one report chapter on technical risks and mitigation actions 	<ul style="list-style-type: none"> • the analysis of data errors, calculation errors, payment errors, data security and immutability challenges 	
Output 5: Economic feasibility study				
Activity 5.1: Definition of the business model of the blockchain-based parametric crop insurance	<ul style="list-style-type: none"> • number of models produced • revenue generation • operational costs • insurance affordability • tangible benefits to farmers • tangible benefits for insurers • demand for parametric insurance products 	<ul style="list-style-type: none"> • one intermediate business model and a final business model to be presented with a business model canvas 	<ul style="list-style-type: none"> • the gathering from the farmer survey (activity 2.1), qualitative interviews, and focus groups with smallholder farmers, agricultural cooperatives, and agribusiness owners will inform the understanding of specific needs, risk exposure, and insurance 	

	<ul style="list-style-type: none"> • alignment of a blockchain-based insurance product with the needs of farmers and insurers • efficiency of the claims process 		<ul style="list-style-type: none"> • preferences • the leverage of our understanding of market needs and the local landscape, we will quantify the benefits of the proposed system and articulate a value-added proposition for blockchain-based parametric crop insurance in Thailand • the tracking of information dissemination pathways to gain insights into the entire lifecycle of agricultural information, from creation to utilization by end-users 	
Activity 5.2: Economic assessment of potential demand, pricing and revenue	<ul style="list-style-type: none"> • number of reports produced • number of farmers or agricultural enterprises that are likely to adopt the blockchain-based insurance product • % of the target market • insurance affordability • expected revenue • expected profit margins • cost of implementation and maintenance • savings delivered to insurers and farmers 	<ul style="list-style-type: none"> • one comprehensive report on the economic assessment of a blockchain-based climate risk insurance product 	<ul style="list-style-type: none"> • the conduct of on-the-ground market surveys (activity 2.1) with the target customer base, specifically farmers • the analysis and process using an appropriate methodology to estimate willingness-to-pay (WTP) 	
Activity 5.3: Assessment of development, maintenance and running costs	<ul style="list-style-type: none"> • number of models produced • costs associated with developing the blockchain infrastructure • continuous investment in security updates 	<ul style="list-style-type: none"> • one cost calculation model 		
Activity 5.4: Development of a cost-revenue analysis	<ul style="list-style-type: none"> • number of reports produced • initial investment required for the development and launch of the blockchain-based insurance system • recurring operational and maintenance expenses associated with running the blockchain system • level of revenue 	<ul style="list-style-type: none"> • one report on business model with cost-revenue analysis (economic feasibility study report) 	<ul style="list-style-type: none"> • a thorough cost-benefit analysis will be conducted, as outlined in activity 5.2, to provide a projected revenue that can be systematically compared against the costs of the solution 	
Output 6: Implementation roadmap for a blockchain-based	<ul style="list-style-type: none"> • anticipated number of technologies transferred as a result of the assistance 			

parametric crop insurance in Thailand				
<p>Activity 6.1: Development of an implementation roadmap</p>	<ul style="list-style-type: none"> • number of roadmaps • a clear timeline with key phases, activities, and milestones for the development, testing, and deployment of the blockchain-based insurance system • number of all relevant stakeholders engaged • a well-defined budget • continuous performance monitoring • number of South-South collaborations enabled 	<ul style="list-style-type: none"> • one comprehensive roadmap to serve as a guiding framework 	<ul style="list-style-type: none"> • the delineation of key milestones, technology requirements, and financial allocations essential for demonstrating the feasibility and effectiveness of the proposed solution • the crafting of a detailed roadmap and budget for the full-scale product build-out and rollout 	
<p>Activity 6.2: Development of a concept note for implementation of blockchain-based parametric crop insurance product</p>	<ul style="list-style-type: none"> • number of notes produced • anticipated number of laws and policies strengthened as a result of the assistance • anticipated number of technologies transferred as a result of the assistance • number of climate technologies created • anticipated number of cooperative researches • number of countries strengthened • a clear definition of the blockchain-based product • specific issues addressed by the blockchain-based product • improvements in financial resilience and crop productivity for farmers • potential for scaling and long-term sustainability • alignment of a blockchain-based insurance product with the needs of farmers and insurers • number of policies, strategies, plans, laws, agreements or regulations supported by the assistance • number of policies, strategies, plans, laws, agreements or regulations proposed, 	<ul style="list-style-type: none"> • one concept note as a preliminary proposal for the Thai government 	<ul style="list-style-type: none"> • the outlining of essential aspects of the envisioned insurance product, including its objectives, target beneficiaries, key features, and anticipated impact on the agricultural sector 	

	<p>adopted or implemented by the assistance</p> <ul style="list-style-type: none"> • number of technologies transferred or deployed as a result of CTCN support • number of South-South collaborations enabled • number of direct beneficiaries of mitigation/adaptation • number of indirect beneficiaries of mitigation/adaptation • anticipated amount of funding/investment mobilized or leveraged (USD) as a result of the assistance • anticipated amount of public funding mobilized from national sources (USD) • anticipated amount of public funding mobilized from international and regional sources as a result of the assistance • anticipated amount of private investment mobilized (USD) from national sources as a result of the assistance • anticipated amount of private investment mobilized (USD) from international and regional sources as a result of the assistance 			
Output 7: Capacity building on blockchain technology for crop insurance				
Activity 7.1: Capacity building workshop on blockchain technology for crop insurance, and final conference/webinar	<ul style="list-style-type: none"> • number of participants to the webinar (men? women?) • number of webinar training sessions and capacity strengthening activities • number of people who received the training (men? women ?) • % of participants reporting satisfaction • % of participants reporting increased knowledge as a result of the webinar • number of institutions 	<ul style="list-style-type: none"> • a one-day workshop and final webinar to gain a comprehensive understanding of blockchain fundamentals and its practical applications in agriculture 	<ul style="list-style-type: none"> • the UN-approved online learning design framework, ADDIE, ensuring a dynamic and coherent learning design process • BLOOM's Taxonomy to scaffold learners' experiences across cognitive, psychomotor, and affective domains, promoting both lower-order and higher-order thinking skills • MERRILL's First Principles of Instruction, an instructional approach 	<ul style="list-style-type: none"> • design of an event understandable by participants

	trained during the webinar <ul style="list-style-type: none"> number of reporting documents developed 		that fosters learner engagement through problem-solving and critical thinking	
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Note: The Response Plan may contain information useful for the section below. The information in the table below will be used by the CTCN for public communication of the achieved and expected results of the Technical Assistance through the CTCN website www.ctc-n.org and other communication channels. See for example: https://www.ctc-n.org/sites/www.ctc-n.org/files/benin_a_ag_forestry.final_.pdf

Impact Statement	
Challenge	<p>As extreme weather events are expected to be more frequent, Thai farmers' livelihood will become more vulnerable. Existing traditional insurance cannot provide the necessary coverage and farmers suffer from slow payouts and high insurance costs.</p> <p>The implementation of a blockchain-based parametric insurance will reduce transaction costs and automatize transparent indemnity payments, thus making crop insurance more attractive and accessible to Thai farmers whilst remaining economically viable for insurance providers. <u>The resilience of Thai farmers to extreme weather events will therefore be increased.</u></p>
CTCN assistance	<p>The key activities for this technical assistance are:</p> <ul style="list-style-type: none"> an assessment of the Thai agricultural sector with risks it faces a technical and economic feasibility study for a blockchain-based parametric insurance an identification of a profitable business model a concept note for implementing the technology
Anticipated impact	<ul style="list-style-type: none"> transparency on the feasibility and viability of using blockchain technology for a real-time parametric insurance system clarity on the roadmap for implementation of a proof-of-concept of a blockchain-enabled real-time parametric insurance system enhanced access of farmers to transparent and efficient parametric insurance if the blockchain-enabled system will be implemented enhanced institutional capacities of key stakeholders (including NXPO, BAAC, Ministry of Agriculture, etc.) on the relevance of blockchain technology for parametric insurance and agriculture at large, and related considerations for technology implementation
Anticipated co-benefits from the technical assistance	<p>Besides the study whether blockchain technology can effectively the improve crop insurance coverage in Thailand, this technical assistance can:</p> <ul style="list-style-type: none"> make insurance more accessible and reliable, thus improving the overall financial security of smallholder farmers who are most vulnerable to climate risks incentivize farmers to adopt sustainable agricultural techniques that reduce their climate risk exposure decrease Thai farmers' economic vulnerability therefore improving their financial security increase digital inclusion in rural communities
Gender aspects of the technical assistance	<p>BCI is committed to mainstreaming gender considerations in development projects. Throughout this feasibility study in Thailand, we will again integrate gender-responsive and effective stakeholder engagement approaches. By promoting gender-responsive approaches and inclusive stakeholder engagement, we strive to create insurance solutions that empower all farmers, regardless of gender, to effectively manage risks and protect their livelihoods.</p> <p>Throughout the technical assistance, gender mainstreaming will be embedded in the activities in the following way:</p>

	<ul style="list-style-type: none"> Farmer interviews and surveys will pay particular attention on the specific experiences, interest and requirements of female farmers. A representative share of female farmers will be targeted with the surveys and interviews. The working group will have an equal representation of women. The service offers and business model of the planned blockchain-based parametric crop insurance product will integrate a gender perspective. <p>The blockchain-based parametric crop insurance product that is planned to be developed as a result of this technical assistance will increase the accessibility of crop insurance to a larger number of farmers, including female farmers. Particular attention in terms of service offering will be given to female farmers.</p>
<p>Anticipated contribution to NDC</p>	<p>As part of the Paris Agreement, Thailand has committed to various climate action plans through its NDCs, which reflect the country's climate change mitigation and adaptation priorities. This study will provide:</p> <ul style="list-style-type: none"> enhanced climate adaptation capacity: A blockchain-based climate risk insurance system would provide direct contributions to adaptation, which is a core priority in Thailand's NDCs, particularly for the agricultural sector. improvement in Climate Data and Transparency: Blockchain technology can improve data transparency and accuracy, which are critical for disaster risk management and climate adaptation in Thailand. promotion of financial inclusion and social resilience: A blockchain-based insurance system can play a crucial role in promoting financial inclusion for smallholder farmers, who are often the most vulnerable to climate risks. supporting climate finance and international cooperation: Thailand's NDC highlights the importance of climate finance and international cooperation. A feasibility study on blockchain-based climate risk insurance can demonstrate Thailand's readiness to adopt innovative technologies. sustainable agriculture and food security: Given the significant role agriculture plays in Thailand's economy and food security, a blockchain-based insurance system would enhance the sustainability of the agricultural sector. improving technological innovation and readiness: The implementation of a blockchain system for climate risk insurance could showcase Thailand as a leader in technological innovation for climate adaptation
<p>The narrative story</p>	<p>Thailand's agricultural sector is exposed to increasingly frequent climate change-related extreme weather events. The fragility of farmers being exposed to climate risk poses a threat to livelihoods and food security. Besides concrete risk mitigation measures, Thai farmers are in need of financial instruments that reduce their exposure to the economic impact of climate-induced agricultural losses. Existing crop insurance products seem inaccessible to a large number of farmers for multiple reasons (lack of transparency, high transaction costs, slow indemnity payments, etc.).</p> <p>This technical assistance aims to develop a technical and economic feasibility study for using blockchain technology for an improved parametric crop insurance product. Blockchain technology has the potential to reduce transaction costs and automatize transparent indemnity payments, thus making crop insurance more attractive and accessible to farmers whilst remaining economically viable for insurance providers. Beyond the feasibility study, an implementation roadmap will support the national stakeholders in the subsequent steps of developing, testing and implementing such a blockchain-based product.</p>
<p>Contribution to SDGs</p>	<p>Primary SDGs addressed:</p> <ul style="list-style-type: none"> SDG01 (No poverty): A blockchain-based parametric crop insurance product will decrease the fragility of farmers by protecting their livelihood from extreme weather events which often push smallholder farmers into poverty. SDG15 (Life on land): By providing immediate financial relief after extreme weather events, a blockchain-based parametric crop insurance product helps farmers recover quickly without resorting to unsustainable practices like deforestation or

	<p>overuse of land to compensate for lost income.</p> <p>Secondary SDGs addressed:</p> <ul style="list-style-type: none"> • SDG02 (Zero hunger): A blockchain-based parametric crop insurance product will help stabilize food production by reducing the impact of crop losses due to extreme weather. • SDG05 (Gender equality): A blockchain-based parametric crop insurance will ensure that female-headed farming households have equal access to insurance services. • SDG08 (Decent work and economic growth): A blockchain-based parametric crop insurance product will improve Thai farmers' work conditions by reducing the financial risk associated with extreme weather. • SDG09 (Industry, innovation, technology and infrastructure): As part of this technical assistance, national stakeholders will increase their understanding and innovative capacity on blockchain technology which can be applied beyond the agricultural and insurance sector in the future. • SDG10 (Reduced inequality): A blockchain-based parametric crop insurance product will reduce inequalities by providing financial protection to farmers who are often excluded from traditional insurance markets. • SDG11 (Sustainable cities and communities): A blockchain-based parametric crop insurance product will reduce migration pressures to urban areas caused by crop failures and economic losses by helping farmers manage climate risks better. • SDG17 (Partnerships for the goals): A blockchain-based parametric crop insurance product will involve collaboration between government bodies, international organizations, private sector insurers, and tech companies.
Reference to knowledge products	<ul style="list-style-type: none"> • Distributed ledger technology (TEC/2023/27/20) • Joint activities CTCN-TEC • Mapping of emerging climate technologies (TEC/2020/21/5) • Promoting climate technology entrepreneurship through incubators and accelerators • Twelfth report of the Green Climate Fund to the conference of the parties to the United Nations Framework Convention on Climate Change • Transforming climate finance & green investment with blockchains