World Agroforestry Centre

Value Chain and Effectiveness of Locally Appropriate Mitigation Actions (VAE-LAMA)

Photo: World Agroforestry Centre/M. Sofiyuddin

Background

Indonesia has committed to reduce greenhouse gas emissions by 26% below projections for 2020 independently and up to 41% with multilateral support. However, the emission reduction policy should maintain 7% economic growth. This commitment has been translated into the National Action Plan for Greenhouse Gas Emission Reduction (RAN-GRK). RAN GRK was legalized through the issuance of Presidential Regulation No.61 of 2011 which is a working document that contains measures to reduce greenhouse gas emissions in Indonesia. The Regulation has been followed by the issuance of Presidential Regulation No. 71 of 2011 on the Implementation of Inventory of National Greenhouse Gas (GHG).

Furthermore RAN GRK mandates the provincial governments to develop a plan of action for provincial emission reduction, hereinafter referred to as the Regional Action Plan for Reducing Greenhouse Gas Emissions (RAD-GRK). The substance of the RAN GRK is the basis for every province in developing RAD-GRK emissions as well as the ability of each of its links to development policy in each province. The process of developing an action plan and implementation of reduction emission lead to costs and they need to be calculated. The processes will form the value chain and need to be looked into in terms of their the effectiveness and efficiency.

> VAE-LAMA (Value Chain and Effectiveness of LAMA) is a method to assess the value chain and cost effectiveness of locally appropriate mitigation actions (LAMA). Mitigation actions need to be cost effective in the use of funds and fair in terms of balancing rights, responsibilities, and incentives. The VAE-LAMA is use for comparing the reduction emission effectiveness based on preparation, implementation, monitoring and evaluation cost from avoiding emissions (IDR/ton-CO_2)

Steps in the VAE-LAMA method

The data for VAE-LAMA is developed based on discussion with local goverment and different stakeholder group. In addition to assisting the process of developing a mitigation action, as mandated in Perpes 61/2011, the VAE-LAMA can be used to compare any mitigation actions The following steps constitute the VAE-LAMA method:

Step 1: Overview of mitigation actions in Indonesia

Presentation of a basic explanation of climate change, international initiative on mitigation actions, and the commitment by Indonesia to reduce emissions under NAMA (National appropriate mitigation action) and LAMA (Locally appropriate mitigation action). Specific topics are: Indonesia's position as the biggest emitter of land use change and peat land, Indonesia's commitment to reduce emissions in 2020, ratification of Paris Agrement, international mechanism to respond to climate change and economic rationale of carbon market, what is REDD+, the difference between REDD+ and CDM, and what is RAN/RAD-GRK.

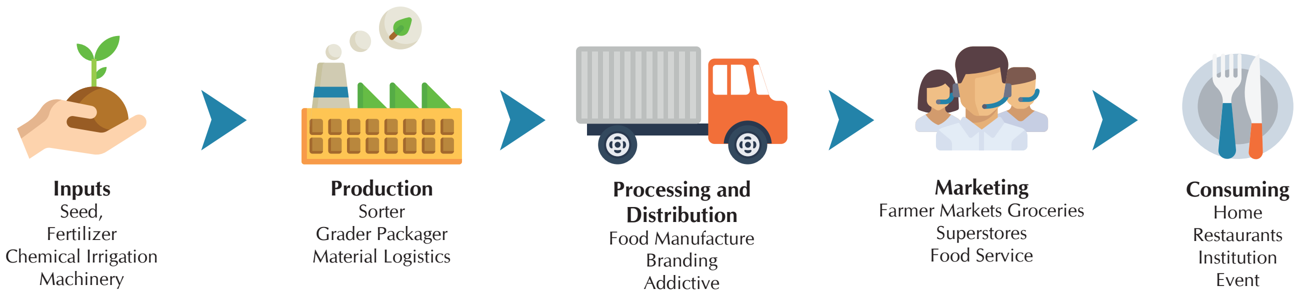


Figure 1. Value chain concepts using sample value chains of food agricultural products

Step 2: Value chain concept introduction

The concept of value chain is introduced here. Value chain is defined as "the whole series of activities that create and build value at every step. The total value delivered by the company is the sum total of the value built up all throughout the company." (http://economictimes.indiatimes.com/definition/value-chain). Using a local agricultural commodity (e.g., coffee, rubber or timber) and discussion of how well or poorly farm gate, processed, and end-user prices reward efforts along the chain.

Step 3: Application of value chain concept to climate change mitigation actions

There are at least nine steps to achieve emission reductions from climate change mitigation action (Table 1). Steps 1 to 7 are preparation steps, and all costs that arise from these steps are called "Transaction Costs". Step 8 is the implementation of mitigation and Step 9 involves measurement, reporting, and verification – costs arise in these steps are called "Implementation Costs". We divided the participants into several groups and asked them to discuss activities, institutions involved, and the role of those institutions in every step. We also asked them to estimate the cost of climate change mitigation actions by step.

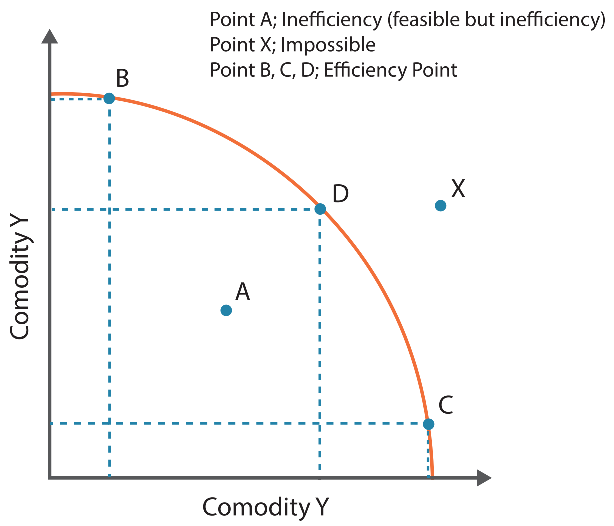
Step 4: Introduction of economic efficiency and cost effectiveness concept

Economic efficiency describes how well a system generates desired output with a given set of inputs and available technology. Efficiency improves if more output is generated without changing inputs, or in other words, the amount of "waste" is reduced. We can distinguish two types of efficiency; production efficiency and economic efficiency (or cost-efficiency). An increase in production efficiency means achieving more output for a given input, while an increase in cost efficiency means reducing the costs of inputs for a given output.

The cost effectiveness is a method to measure the relative efficiency of a program by comparing the costs with impact, using specific indicators. One goal of the study is to identify the cost-effectiveness of program strategies and operational models to achieve the greatest impact for the same cost. Cost-effectiveness is measured from the ratio of output/costs of inputs; it minimizes the ratio of costs/output. To calculate the Cost Effectiveness Ratio (CER) of RAN/RAD-GRK, the total cost of mitigation actions is divided by total emission reduction. From the example of figure 2, mitigation action for the activity Y is the most effective because the decrease of cost per ton CO_2 is the lowest.

Table 1. Value chain of climate change mitigation actions

No	Step	Type of Cost	Activity	Institution involvement	Role of institution	Cost (IDR)
1	Awareness	Transaction Cost				
2	Establishment of working group					
3	Training					
4	Baseline development					
5	Development of Mitigation Scenario					
6	Planning of Mitigation Action					
7	Setting up conducive regulatory framework for multi scale governance					
8.	Implementation of Mitigation Action.	Implementation Cost				
9.	Measurement, Reporting and Verification					



Activity	Cost (IDR)	Emission Reduction (Ton CO_2)	Cost Effectiveness
X	150000	28500	5.3
Y	100000	32000	3.1
Z	120000	13500	8.9

Figure 2. Economic efficiency curve and cost effectiveness

Step 5: Calculation of cost effectiveness of RAD-GRK mitigation actions

Groups of participants discussed the mitigation actions and estimated the cost effectiveness using Table 2.

Step 6: Grup presentation, discussion and debate on the results of cost effectiveness

The following table shows the results of workshop discussion in Jayapura District, Papua. The activity was used as an exercise gathered from the working group while the cost information data was taken from the Ministry of Forestry.

Example of VAE-LAMA Result in Papua Province

The following photos show example of VAE-LAMA assessment in Papua Province as discussed by participants during the training.

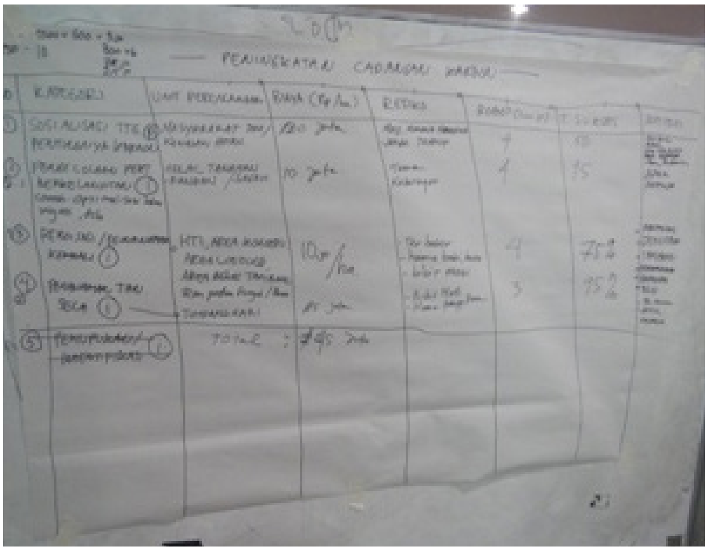


Figure 3. VAE-LAMA assessment in Papua Province

In relation to value chain, training participants explored each step of RAD-GRK mitigation actions. Table 3 lists each step and activities associated to it. The participants also highlighted institutions involved in mitigation actions and their roles. The challenge came when identifying estimated cost for the individual step; participants experienced some difficulties to collect related cost information.

Table 2. Cost effectiveness of mitigation actions

Activity	Location	Area (ha)	Land Cover (Carbon, tC/ha)		Carbon		Cost (IDR/ha)			Cost Effectiveness	
			Base	Target	tC/ha	tCO_2-eq	Est.	Maintenance	Total	IDR/tC/ha	$/tC/ha

Table 3. Value chain at RAD-GRK mitigation actions (Jayapura District)

No	Steps	Activities	Institution involvement	Role of institution	Cost (IDR)
1	Awareness	Socializations of emission reduction	Bappeda, working group (WG)	Leading sector	241.3 million
2	Establishment of working group	Meetings, workshop	Bappeda, related SKPD, community	Bappeda: facilitation	352.9 million
3	Training	Training on tools (GIS), LED	WG, Bappeda	Bappeda: facilitation	710 million
4	Baseline development	Workshops, data collection	WG	Conduct baseline study	100 million
5	Development Mitigation Scenario	Data collection, workshops	WG, forestry service/ environmental service	Create mitigation scenario	35 million
6	Planning of Mitigation Action	Meetings, workshops, Public consultation	WG, forestry service/ environmental service	Develop & socialize planning documents	540 million
7	Setting up conducive regulatory framework for multi scale governance	Preparing for Perda (local law), socializations	WG, Law Dept (Bagian Hukum)	WG: preparing draft of Perda	640 million
8.	Implementation of Mitigation Action.	8 Action Plan (Forest fire prevention, extensions, rehabilitations, alternative technology application)	WG,Related SKPD (forest service), community	Forest service: implementation	28667 million
9.	Measurement, Reporting and Verification	Assessment, meetings etc	WG, Bappeda	Leading sector	

Table 4 shows example of discussion result during VAE-LAMA training in Jayapura. It shows that calculating implementation cost for each mitigation action could be done. Using this table, participants discussed and reviewed cost effectiveness of all mitigation actions. From the analysis of reduction emission of Jayapura District, rehabilitation action is the most effective action because of the cheapest cost in reduction 1 ton CO_2/Ha.

Table 4. Workshop participant's presentation on estimate the cost effectiveness

Activity	Location	Area (ha)	Land Cover (Carbon, tC/ha)		Carbon		Cost (IDR/ha)			Cost Effectiveness	
			Base	Target	tC/ha	tCO_2-eq/ha	Est.	Maintenance	Total	(IDR/tCO_2-eq)/ha	($/$tCO_2$-eq)/ha
Sago forest planting	Sentani Lake area	650	Shurb (20)	Sago forest (47)	27	99	7,514,000	4,749,500	12,263,500	123,305	11.2
Rehabilitation	Cyclop Conservation Area	800	Cleared land (3)	Secondary forest (89)	86	314	7,514,000	4,749,500	12,263,500	39,014	3.5
Rehabilitation at production forest	Unurum Guay	1069	Cleared land (3)	Secondary forest (89)	86	314	7,514,000	4,749,500	12,263,500	39,014	3.5
Tree planting	Sentani, Waibu, West Sentani, Depapre, Raveni Rara	2589	Shurb (20)	Secondary forest (89)	69	253	7,514,000	4,749,500	12,263,500	48,428	4.4
Agroforestry	Nimborang, Nimbokrang	12217	Shurb (20)	agroforestry (60)	40	147	13,009,000	4,564,000	17,573,000	119,707	10.9

Authors

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