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**RESEARCH THE SCIENTIFIC BASE IN ASSESSING
THE ADAPTATION SOLUTIONS – APPLY FOR
QUANG NGAI PROVINCE**

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LIST OF ARTICLES BY AUTHOR RELATING TO THIS DISSERTATION

- 1. Chu Th Thanh H ng**, Hu nh Th Lan H ng, Tr n Th c (2015), *Ph ng pháp ánh giá tính hi u qu các ho t ng thích ng v i bi n i khí h u*. T p chí Tài nguyên và Môi tr ng, s 8-2015, 61-64.
- 2. Chu Th Thanh H ng**, Hu nh Th Lan H ng, Tr n Th c (2016), *o c, báo cáo, th m nh ho t ng thích ng v i bi n i khí h u*. T p chí Môi tr ng, Chuyên II - 2016, 52-55.
- 3. Chu Thi Thanh Huong**, Huynh Thi Lan Huong, Tran Thuc (2017), *Developing the Indicators for Monitoring the Adaptation Actions for Quang Ngai Province, Viet Nam using the Delphi Technique*, International Journal of Sciences 06: 80-86 DOI: 10.18483/ijSci.1341.
- 4. Tr n Th c**, Hu nh Th Lan H ng, Tr n Thanh Thu , **Chu Th Thanh H ng**, Nguy n Xuân Hi n (2017), *Thích ng v i bi n i khí h u trong m i liên h v i gi m nh r i ro thiên tai*. T p chí Khoa h c bi n i khí h u, s 1, 16-22.
- 5. Chu Th Thanh H ng**, Hu nh Th Lan H ng, Tr n Th c (2017), *Nghiên c u xây d ng quy trình ánh giá hi u qu thích ng v i bi n i khí h u*, T p chí Môi tr ng, Chuyên II - 2017, 93-96.
- 6. Chu Thi Thanh Huong**, Huynh Thi Lan Huong, Tran Thuc (2017), *Result on effectiveness assessment of the adaptation actions in Quang Ngai, Viet Nam*, International Journal of Scientific & Technology Research, October 2017 edition.

INTRODUCTION

1. Necessity

Climate change is affecting many fields, sectors and regions around the world. To effectively respond to climate change, methods and tools are needed to assist managers in policy making. The Paris Agreement on Climate Change, begin in 2015, encouraged countries to develop a National Communication on Adaptation, which includes a transparency framework for actions taken and support received for these actions. Decision No. 2053 / QD-TTg of the Prime Minister dated 28 October 2016 approving the Plan to implement the Paris Agreement on Climate Change required the development of Framework for Measurement, Reporting and Verification (MRV) for climate change adaptation.

Quang Ngai, a coastal province in Central Vietnam, is affected by climate change. Quang Ngai has implemented several adaptation activities, but the effectiveness of these activities has not been adequately assessed. It is needed to develop effective assessment procedures for adaptation activities and piloted in Quang Ngai province, then propose the MRV framework for adaptation activities.

2. Research scope

The thesis focuses on developing the effective assessment procedures for adaptation activities based on the pilot in Quang Ngai province, proposing MRV frameworks for climate change adaptation. The issue of greenhouse gas emission mitigation and assessment of economic efficiency has not been considered within the framework of the thesis.

The effective assessment for adaptation activities only evaluates base on 03 indicators: strengthening the adaptation capacity, adaptation implementation and sustainable development. Assessment

of economic efficiency will not be considered within the framework of the thesis.

3. Research purposes

- Identify methods and procedures for assessing the effectiveness of the climate change adaptation activities;

- Assess the effectiveness of climate change adaptation activities in Quang Ngai;

- Propose the Measurement - Reporting - Verification Framework (MRV) for CC adaptation.

4. Scientific and practical significance

4.1. Scientific significance

- Propose the procedure for assessing the effectiveness of climate change adaptation activities base on the combination of the RBM method and the Delphi method follow the KAMET rule. The evaluation process includes specific steps that are clear, easy to use and appropriate to Vietnamese conditions;

- The thesis has proposed scientific foundation for development of MRV framework for adaptation actions, which uses the effective assessment for adaptation activities tool.

4.2. Practical significance

- The results of the thesis support local managements assessing the effectiveness of adaptation actions. Based on the evaluation results, managers can determine which activities should be prioritized in the coming period;

- The process proposed in the thesis can be applied to adaptation actions in other localities. In addition, it can be applied at a higher level such as the ministerial level, national level to serve the state management on climate change.

- Proposed MRV framework for evaluating the effectiveness of the adaptation activities.

5. The novelty of the Thesis:

- The thesis analyzed the selection and developed method to assess the effectiveness of the climate change adaptation activities based on a combination of RBM method and the Delphi method follow the KAMET rule; suitable for the Vietnamese context.

- The thesis has assessed the effectiveness of adaptation actions in Quang Ngai province. Evaluation of the adaptation actions by effectiveness in enhancing adaptability and sustainable development will support the implementation of adaptation actions and develop future plans.

- The thesis proposed the MRV framework for adaptation actions in Vietnam. So far, there have been some studies on the MRV framework for climate change mitigation. However, this is the first time MRV framework for adaptation actions is researched and proposed. The conclusions of the thesis can be further researched to develop the MRV system at provincial and national level.

6. The structure of the thesis

Beside the Introduction, Conclusion and Recommendations, the thesis is divided into 3 chapters, including:

Chapter 1. Overview of studies evaluating the effectiveness of adaptation activities.

Chapter 2. Scientific basis for selecting methods and proposing assessment procedures for adaptation actions.

Chapter 3. Assessing the effectiveness of climate change adaptation actions for Quang Ngai and proposing the framework for measuring, reporting and evaluating climate change adaptation.

CHAPTER 1. OVERVIEW OF STUDIES EVALUATING THE EFFECTIVENESS OF ADAPTATION ACTIVITIES

In the world as well as in Vietnam, there have been studies on the impacts of climate change, development and implementation of solutions to adapt to climate change. Research on effectiveness assessment of adaptation actions aims to answer the following questions: (i) the effectiveness of the adaptation actions in lowering the vulnerable level, (ii) policies that should be developed and implemented to effectively adapt to climate change.

A number of studies carried out by agencies that have introduced monitoring systems such as the African Climate Change Respond Association (ACCRA), the United Nations Development Program (UNDP), the German Organization for Cooperation and Development Agency (GIZ), Adaptation actions monitoring method (TRAC3), the Adaptation Monitoring and Measurement Framework (TAMD) ... have proposed monitoring and evaluation systems that use different set of Indicators. UNEP's methodology provides report on the shortfall in adaptation action. WRI developed result based management (RBM) to track the effectiveness of adaptation actions based on 3 groups of indicators: (i) Enhancing adaptive capacity; (ii) Implementating the adaptation actions; and (iii) Sustainable development. In addition, the Delphi method is often used to reach the consensus. The Delphi method is also used in the development of a set of sustainable development indicators, consultations in the field of climate change.

In Vietnam, there have been some initial researches on the impacts of climate change and CC adaptation solutions, such as the prioritied investment selection toolkit for climate change adaptation, led by the Ministry of Planning and Investment in coordination with line

ministries, localities and the World Bank in 2013; The monitoring and evaluation system for NTP-RCC implementation in 2012-2015; Impact assessment of SP-RCC; Criteria for selection of adaptation models of NGOs; Criteria for selection of investment projects under the SP-RCC Program. However, studies on the effectiveness of adaptation solutions remain limited in terms of measuring and quantifying the effects of those solutions. Therefore, it is necessary to select and combine appropriate methods to develop the process of assessing the effectiveness of climate change adaptation actions.

The Paris Agreement on Climate Change regulates MRV for actions including mitigation of GHG and climate change adaptation, financing give and receipt. Current there is no official guidance on MRV for adaptation actions. A systematic focus on the development of result-based indicators is needed to monitor the effectiveness of climate change adaptation actions; develop a reporting format that focuses on the effectiveness of adaptation actions and set of questionnaire for evaluation of received information.

Quang Ngai is a province in Central Vietnam, which is one of the most vulnerable to climate change. It can be said that climate change impacts on all aspects of socio-economic life of Quang Ngai province. To cope with climate change, Quang Ngai province has approved the plan to respond to climate change in 2011. In the recent time, the province has implemented several adaptation actions. However, these projects have not been systematically assessed. Hence it is needed to research and select methodology to assess the effectiveness of adaptation actions for Quang Ngai province, from which develop the MRV framework for climate change adaptation.

CHAPTER 2. SCIENTIFIC BASIS FOR SELECTING METHODS AND PROPOSING ASSESSMENT PROCEDURES FOR ADAPTATION ACTIONS

2.1. Scientific basis for the selecting methods for assessing the effectiveness of climate change adaptation activities

The selection of appropriate methods to assess the effects of the adaptation actions base on: (i) The evaluation purpose: In order to develop the process to assess the effectiveness of adaptation actions. (ii) Scope of assessment methods: project level. (iii) the evaluation object: Effectiveness of adaptation actions at the project level after implemented. In order to select the suitable method, the thesis uses the strengths, weaknesses, opportunities and challenges (SWOT) analysis method to select the appropriate method. Results-Based Management (RBM) and Delphi Methods are selected. RBM is a key tool for monitoring and evaluating adaptation actions, helping to assess the quality of the actions. The effectiveness of adaptation actions should be assessed based on the implementation results. Delphi methodology is applied in many areas, which are used to evaluate adaptation actions of local communities in coastal areas, to develop a set of sustainable development indicators focusing on environmental aspects. Applying Delphi to consult with experts to determine questions and indicators suitable for research purposes.

2.2. Propose a process to assess the effectiveness of climate change adaptation activities

2.2.1. Process of evaluating the effectiveness of climate change adaptation activities

- *Step 1. Development of M&E indicators:* The process of selection of Delphi indicators has been specified in eight small steps: (i) Selection of a group of experts involved in the consultation process; (ii) Develop adaptation action effectiveness monitoring criteria based on RBM; (iii) Questions are developed based on performance results of the project ; (iv) Apply the Delphi method round 1; (v) Round 1 data analysis; (vi) Applying the Delphi method round 2; (vii) Round 2 data analysis; and (viii) Analysis and synthesis of results. The suitability of the indicator set is determined by the KAMET rule.

Table 2.1. KAMET rule analyse reviews from experts using the Delphi method

Round t	Round $t + 1$	Round $t + 2$
Mean value (q_i) ≥ 3.5	If (q_i) ≥ 3.5 , Q ≤ 0.5 and (%) $< 15\%$, q_i is accepted	
Mean value (q_i) < 3.5	If (q_i) < 3.5 , Q ≤ 0.5 and (%) $\geq 15\%$ then q_i is eliminated	If (q_i) ≥ 3.5 , Q ≤ 0.5 and (%) $\geq 15\%$ q_i is accepted
<i>Note:</i>	<i>Mean value (q_i): the mean of the questions for q_i; Variance (%): the percentage of experts who change the opinion of q_i and Q is the quartile deviation.</i>	

- *Step 2. Developing the questionnaire to examine the process / results of adaptation actions:* The development of appropriate questionnaires is an important step in the process of assessing the effectiveness of adaptation actions. The questionnaire should be easy to understand and stick to the RBM indicators.

- *Step 3. Carry out surveys, surveys on the process / performance of adaptation actions:* Based on the questions to be built in Step 2, survey locally to learn about outcomes of adaptation actions.

- *Step 4. Data analysis:* The questionnaires collected after the interview process were analyzed and compiled by each group of indicators. The results are converted into units of calculation determined by each indicator. For quantifiable indicators, threshold levels are referenced from the literature on disaster damage assessment and experts' opinion.

- *Step 5. Develop a baseline for adaptation action:* The baseline is the level of vulnerability and adaptive capacity on which the change can be measured once adaptation actions are implemented.

- *Step 6. Comparison of results of adaptation action implementation to the baseline:* The comparison of results after implementation (or at the time of the interview) compared to baseline (prior to build up staff adaptation activities) will give us the efficiency of adaptation action.

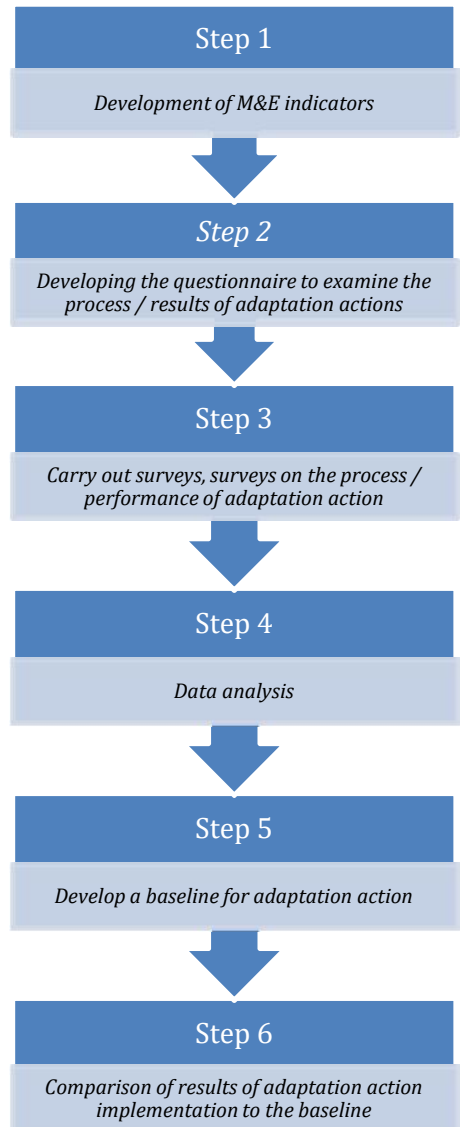


Fig. 2.4. The process of effectiveness assessment of adaptation actions

2.2.2. The selection criteria for evaluation indicators of adaptation actions:

SMART rule (Specific, Measurable, Attainable, Relevant, Timebound) are applied to select the initial set of evaluation and monitoring indicators for adaptation actions to consult on suitability in the following steps:

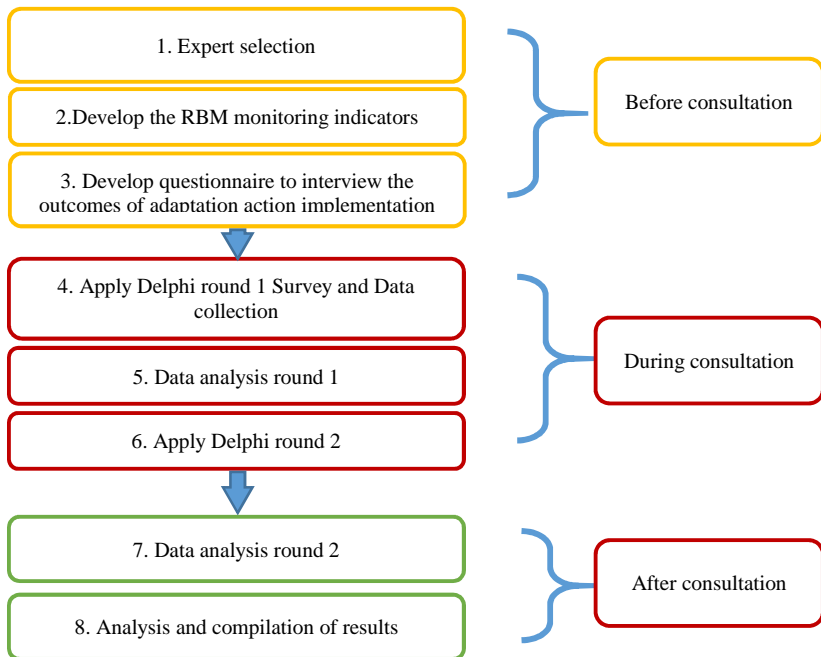


Fig. 2.5. The process of selecting monitoring indicators for adaptation actions

2.2.3. Baseline on adaptation to climate change

Baseline is the level of vulnerability and adaptive capacity that can be used to assess changes after the implementation of adaptation actions. In order to build a standard baseline it is necessary to have adequate information and data. Source of data can be obtained from

the project documentation; on the website, past / present data, interview data.

2.2.4. Compare the implementation results with the baseline:

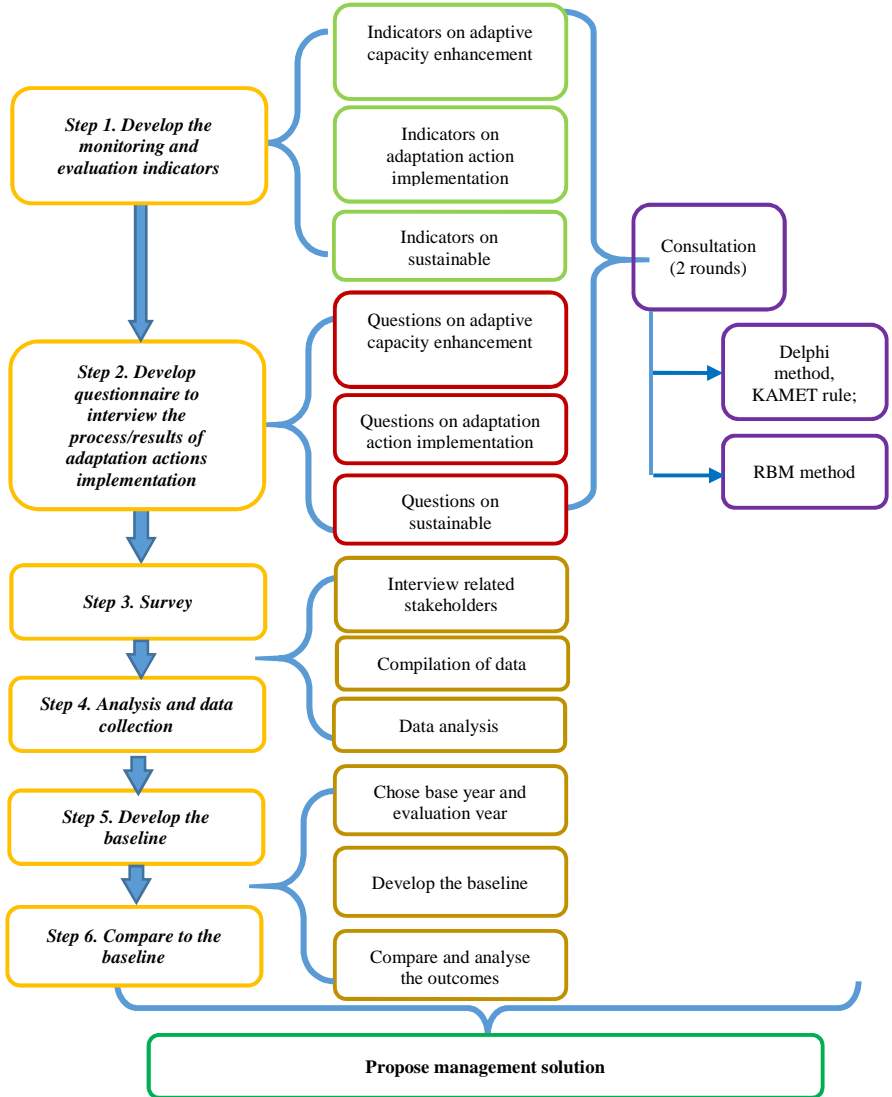


Fig. 2.6. Methodology to apply the evaluation of adaptation actions

**CHAPTER 3. ASSESSING THE EFFECTIVENESS OF
CLIMATE CHANGE ADAPTATION ACTIONS FOR QUANG
NGAI AND PROPOSING THE FRAMEWORK FOR
MEASURING, REPORTING AND EVALUATING CLIMATE
CHANGE ADAPTATION**

3.1. Evaluate the effectiveness of planting mangrove on the coastal area of Quang Ngai

3.1.1. Develop a set of monitoring and evaluation indicators

Based on the results of the project implementation and reference to the SMART rule, the monitoring indicators was developed and presented in Table 3.1.

Table 3.1. Indicators for monitoring and evaluating the effectiveness of mangrove forest planting projects

Indicators on Adaptive Capacity - AC	AC1. The ratio of mangrove forests to the total area of natural land;
	AC2. Salinity;
	AC3. Percentage of salinity intrusion area;
	AC4. Extent of damage;
	AC5. Proportion of households protected against target (850 households)
Indicators on Adaptation Actions - AAs	AAs1. The proportion of newly planted mangroves compared with the target (100 ha);
	AAs2. The proportion of mangrove forests restored to the target (30 ha)
Indicators on Sustained Development - SD	SD1. Proportion of local population directly benefiting from the project;
	SD2. To enhance the coastal ecosystems' bio-diversity;
	SD3. Minimize the process of coastal landslide, wave break, sand barrier.

Experts were asked to assess the level of consensus of the proposed indicators. Consensus levels are from 1 to 5 as follows: (1) very unrelated; (2) not relevant; (3) somewhat related; (4) related; (5) very relevant. According to experts, the AC2 and AC3 indicators are not closely related to the outputs of the project and the effectiveness of the adaptation actions is not clear and should not be taken into account in the next steps. Figure 3.1 on the suitability of M&E indicators shows that the mean value of AC2 and AC3 is below the green line; The variance of the index is on the purple line. Thus, AC2 and AC3 were rejected and not used in the next step of the process of assessing the effectiveness of adaptation actions.

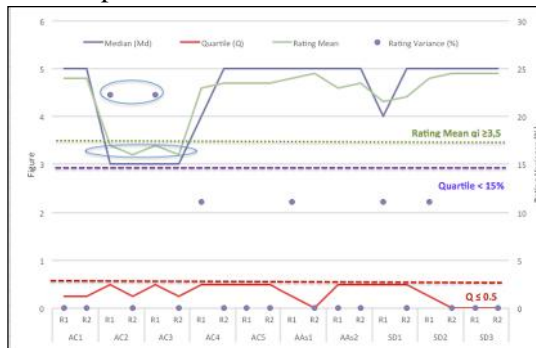


Fig. 3.1. Suitability of M&E indicators of forest planning project

3.1.2. Develop questionnaire to evaluate the project results

Sixteen questions were developed for comments from experts. Based on the evaluation results from the first round, questionnaires continue to be edited for consultations round 2 and in accordance with requirements of the KAMET rule should the question be applied for interview at the next step of the thesis.

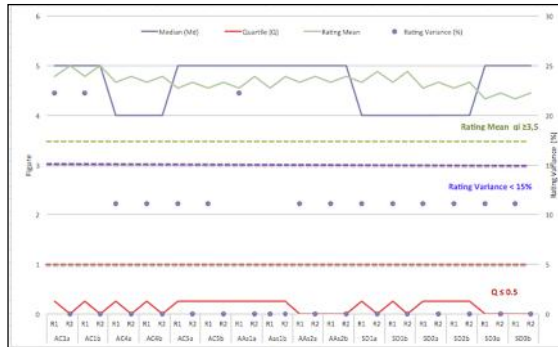


Fig. 3.2. Suitability of M&E indicators of forest planning project

3.1.3. Assess the adaptation effects of the afforestation project

The thesis interviewed 60 people from related departments and local people living near the project area. To see the effect before and after implementation, the baseline was developed in 2013 before project implementation. Results showed:

- The AC indicators: (i) The AC 1 : Forest area in 2013 only accounts for about 0.9% and reaches about 7% in 2016. Based on the thresholds, this indicator is given 1 point in 2013 and 2 points in 2016; AC4 indicator: the level of physical damage in 2013 was higher than 2016. Therefore, the value of this index is for 2 and 3 points in 2013 and 2016 respectively; (iii) AC5 indicator: in 2013, although the project has not been implemented, Quang Ngai had developed plans and program on flood protection. Hence the percentage of households protected from floods and storms compared to the target is given 1 point. In 2016, the damage rate is less so it is given 4 points.

- The AAs indicators: (i) in 2013, although the project has not been implemented, part of the mangroves already exists in the province. Therefore, the AAs1 score is 0.5. The AAs2 indicator is set to zero. In 2016, the project has completed its planting goals of 100 hectare new

and restored 30 hectares of mangroves. Therefore, AAs1 and AAs2 are given 3 points.

- The SD indicators: (i) SD1 and SD3: During implementation, the project manager hired households engaged in planting and managing mangroves forests to help them increase income, and households are also partially protected from floods and saline intrusion. However, not all households benefited directly from the project. Therefore SD1 and SD3 are given 0 and 1 point for 2013 and 2016; (ii) SD2: There were some migratory birds in the area in 2013, so this indicator was given 0.5 points. In the process of survey, people commented that after the implementation of the project there are more bird species that come here to reside, so this indicator is given a point.

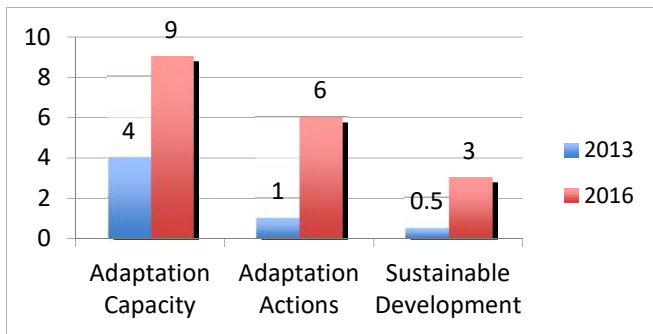


Fig. 3.3. Adaptation effectiveness of afforestation project

From the above results, it can be seen that in 2016 after the end of the project, the indicators are higher than in 2013 and basically achieved the target. Specifically, in 2013, the AC, AAs and SD indicators are 4, 1, and 0.5 respectively. The result of this assessment in 2016 is 9, 6, and 3 respectively. The adaptation effect of the project is presented in Figure 3.3.

3.2. Assess the effectiveness of integrated coastal zone management in Quang Ngai

3.2.1. Develop a set of monitoring and evaluation indicators

Similar to the mangrove afforestation project, to assess the effectiveness of the ICZM project, the thesis has consulted experts to develop the monitoring and evaluation indicators.

Table 3.7. Indicators for ICZM project effectiveness assessment

AC Indicators	AC1. The ICZM office is built and operated;
	AC2. The Steering Committee and inter-sector group of experts are established;
	AC3. Project monitoring and evaluation program is developed;
Aas Indicators	AAs1. Number of staff participating in the integrated coastal area management training program compared to the target;
	AAs2. The number of integrated communication programs against the target;
	AAs3. IIMS and GIS databases - training and transfer are developed, maintained and implemented;
	AAs4. The Quang Ngai Provincial ICZM Plan was developed
SD Indicators	SD1. Environmental risk assessment of Quang Ngai coastal zone was conducted;
	SD2. Survey on the status of waste discharge, pollution and environmental protection work in the coastal zone is carried out;
	SD3. Investigation and assessment of the status and use of wetlands in coastal and island areas is carried out;
	SD4. Strengthening coastal ecosystem diversification;
	SD5. Coastal erosion survey and assessment was conducted and remedies are proposed;
	SD6. Surveys and assessments of mangrove forests and coastal protection forests of the province are carried out;
	SD7. The investigation, assessment and recommendation for sustainable development of Ly Son Island is carry out.

Results of development of the monitoring indicators for ICZM project are as follows: Round 1: 13/14 indicators met the evaluation criteria of experts except SD4 is not suitable because the project mainly focus on policy development, communication programs. In order to see the effect of the adaptation actions, longer implementation time is required. Round 2 results indicate that the indicators met the KAMET rule, so there is no need for further consultation. The suitability of the indicators is shown in Figure 3.4.

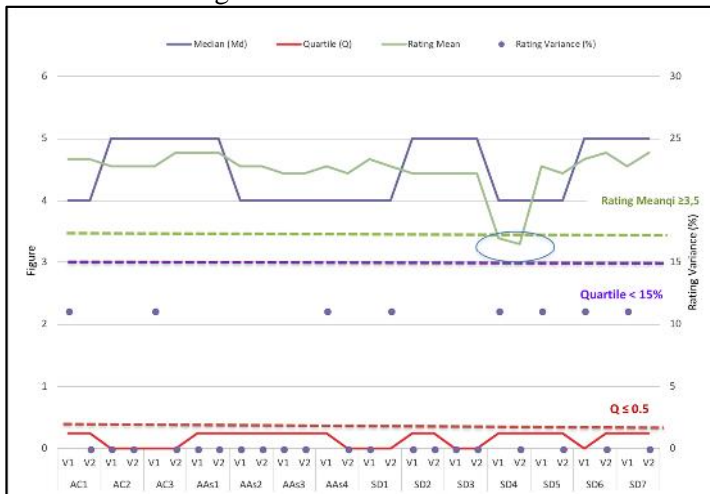


Fig. 3.4. Suitability of the indicators for ICZM project

3.2.2. Develop questionnaires to evaluate the results of the project

Questions were developed to evaluate the implementation results of adaptation actions. The results of consultation on the suitability of questionnaires for ICZM project in Quang Ngai are presented in Figure 3.5.

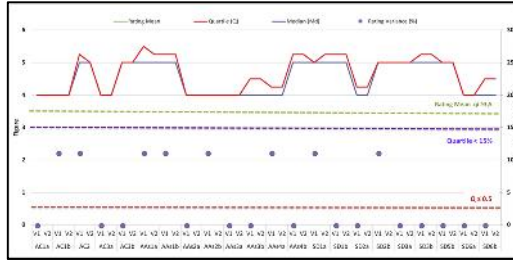


Fig. 3.5. Suitability of questionnaires for ICZM project

3.2.3. Assess the adaptation effect of the ICZM project

In order to see the effect before and after the implementation of the adaptation actions, the baseline was developed in 2013 when the project was not implemented.

- AC indicators: In 2013, because the project has not been implemented, all AC indicators are given 0 point. AC1, AC2, AC3 have been completed in 2015. Therefore, they are given 1 point each;

- AAs indicators: In 2013 the AAs were rated 0 point because the project was not implemented. By 2015, AAs1 and AAs2 met the target and should be given 3 points; AAs3 IIMS and GIS databases - training and transferring are developed, maintained and implemented by 2015, so this indicator is given for 1 point, AAs4 was completed and given 1 point.

- SD indicators: In 2013, the SD indicators were not implemented so these indicators are given 0 point. By 2015, these reports are made so that these indicators are given 1 point.

Overall assessment: In 2015 after the end of phase 1 of the project, the indicators were higher than in 2013 and basically achieved its objectives. Specifically, the AC, AAs and SD indexes are 0, 0, 0 in 2013 and 1, 8, 5 in 2016 respectively (Figure 3.6)

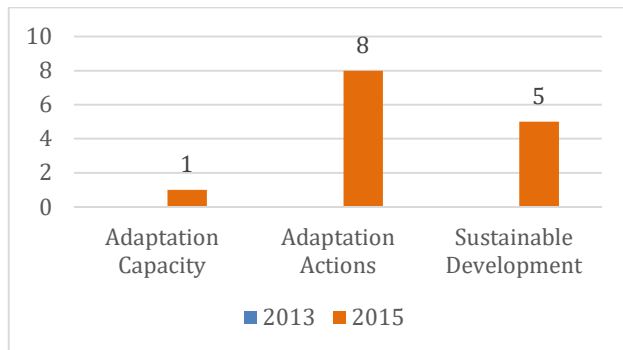


Fig. 3.6. Adaptive effectiveness of the ICZM project

Thus, the project has contributed to enhance the adaptive capacity of Quang Ngai. However, MRV should be continued to ensure sustainability in phase 2 of the project.

3.3. Proposed Framework for Measuring, Reporting and Assessing Adaptation to Climate Change

3.3.1. Assessment of constraints and factors needed to implement Measurement, Reporting and Assessment of Adaptation to Climate Change

- Difficulties in implementing MRV adaptation actions:

+ About the indicators following RBM: Currently, the projects and programs have developed a set of indicators to evaluate the process and results. However, these indicators have not been developed in accordance with RBM and made it difficult for MRV later.

+ Current reporting systems are usually in the form of letters and it is only mandatory to report on socio-economic performance against the objectives of the project, which does not cover effectiveness reporting under RBM. Hence, it is difficult to synthesize the adaptation actions effectiveness. The report on adaptation actions has not been sent to the State management agency on climate change for compilation (except projects Investment under SP-RCC's Scheme).

+ On resources and implementation data: MRV for adaptation to climate change may be more costly than conventional reporting (resources needed for local surveys). Even with good resources, data limitations can reduce the effectiveness of MRV for adaptation to climate change.

+ Other challenges: The short term and long term time frame: MRV system for adaptation actions will need to monitor the effectiveness of adaptation actions in the short term (<5 years), medium term (5-20 years) and long term (>20 years). On the other hand, projects often last for several years; it makes it difficult to report later. The development of baselines or the quantification of RBM indicators is a major challenge due to the lack of data.

- Difficulties in implementing national MRV for adaptation to climate change: (i) there is insufficient data and leads to lack of representation of indicators for each sector. Base on the outputs of a set of adaptation actions of a field, it is needed to compile and develop a common set of indicators for that field; (ii) the adaptation actions are developed not only for the adaptation purpose but also for other purposes and have to follow different reporting forms. Therefore, it is necessary to have a pilot phase, supplement the contents of the adaptation into the report. To establish national MRV system, these factors should be taken into consideration: context, content and system operation.

3.3.2. Proposed Framework for Measurement, Reporting and Assessment of Adaptation to Climate Change

1) Develop a set of indicators for monitoring adaptation actions (Measurement - M)

Based on the steps to develop the MRV system for climate change adaptation, the indicators for monitoring, reporting and evaluating adaptation actions are developed in accordance with the RBM. The selection process of indicators to monitor the adaptation actions (step M) is done via 08 specific steps described in Chapter 2.

2) *Develop a framework for reporting adaptation activities (R)*

In order to synthesize information on the results of the implementation of the adaptation actions, it is necessary to develop a RBM monitoring indicator at the time actions were developed. Project management units should report to the provincial CC focal point, the national focal point for climate change for synthesizing and reporting to the UNFCCC on adaptation efforts undertaken in Vietnam through periodic national communications.

Table 3.1. MRV framework for adaptation actions

Criteria	Sign	M&E indicators	Unit	Base year	Progress
Strengthening adaptive capacity	AC1				
	...				
	ACn				
Adaptation action implementation	AAs1				
	...				
	AAsn				
Sustainable Development	SD1				
	...				
	SDn				

3) *Develop questionnaire to assess the performance of CC adaptation activities (Verification – V)*

Before the indicators and reports on effectiveness of adaptation actions were recognized by the local and national CC focal points, these indicators and reports should be assessed by a qualified third party. The 3rd party could be research institutes, universities or organizations, groups of experts who have the professional capacity to assess the effectiveness of adaptation actions.

The MRV framework for adaptation at project level is presented in Figure 3.7.

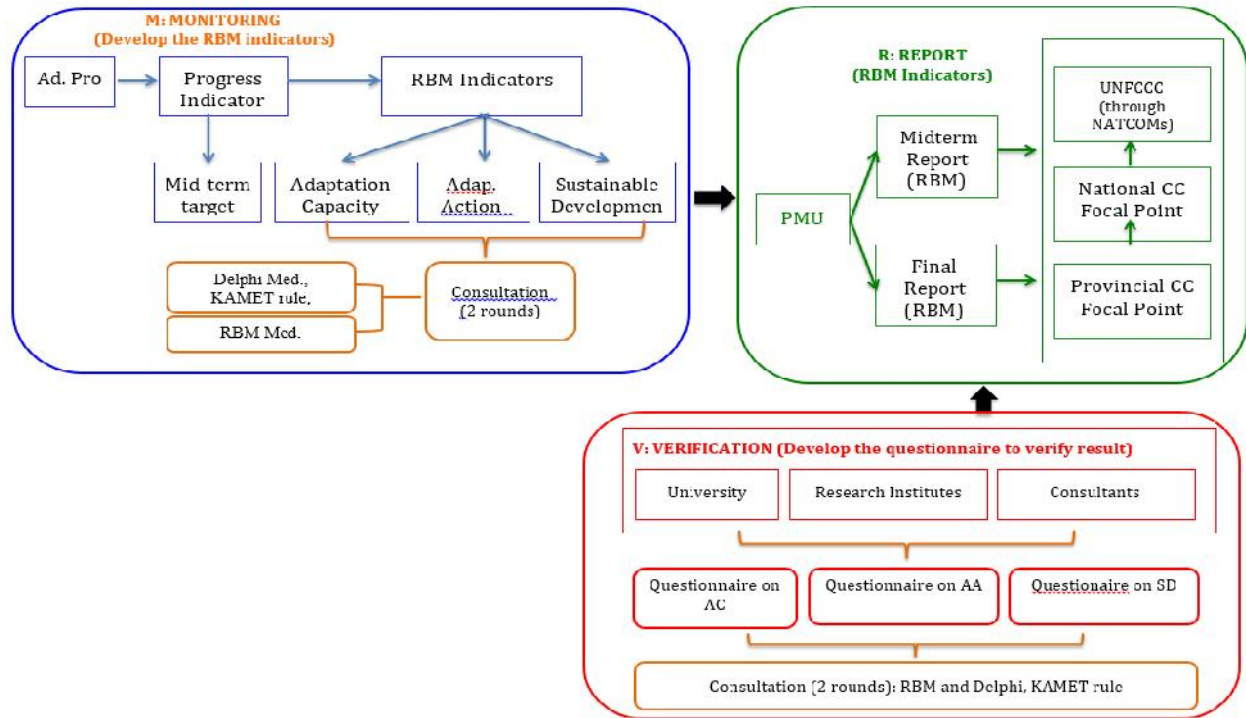


Fig. 3.7. MRV framework for climate change adaptation at the project level

4) National MRV system for adaptation actions:

Factors to consider when developing a national MRV system: context; objective; scale; focuses; data; organizational structure and resources; synthetic; results and reports. The national MRV for adaptation actions map is shown in Figure 3.8.

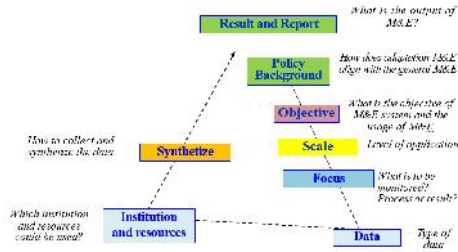


Fig. 3.8. MRV mapping for adaptation actions at national level

Indicators for the national MRV could be: (i) AC Indicators: Number of agencies to be strengthened ; Number of people reduced risk; Number of people rose awareness; Behavior modification; Developed areas with climate risk response services; Physical infrastructure is enhanced to withstand climate risks; (ii) AAs Indicators: Identification of risks; Integrating climate change in development policy and strategy; (iii) SD Indicators: Number of ecosystems and ecosystem services created; maintained and improved to withstand climate risks; percentage of households and communities that have access to ecosystems to ensure livelihoods; percentage of population having a livelihoods against climate.

CONCLUSION AND RECOMMENDATIONS

A. Conclusion

1) On the basis of the effectiveness assessment of adaptation to climate change methods, based on the criteria for choosing a suitable method, RBM and Delphi methods was selected to support provinces to measure the effectiveness of adaptation actions by 06 specific steps. It is necessary to build a BAU on the current situation of climate change adaptation to see the adaptation effect.

2) Process to assess the effectiveness of adaptation actions is applied to assess 02 specific operations in Quang Ngai province. The assessment results of 02 projects: planting and restoration of mangroves and ICZM showed that in 2015 after the end of the project, the group of indicators evaluated were higher compare to 2013 and basically achieved the objectives set out, contributing to the province's capacity of adaptation and sustainably in the context of climate change. The assessment outcomes can be the basis for Quang Ngai to continue to mobilize resources to support the implementation of adaptation actions and withdraw experience in the implementation of adaptation actions in the previous period, as a prerequisite for the implementation of the plan to respond to climate change in the coming period.

3) In Vietnam, despite the implementation of a number of monitoring and evaluation policies and programs, there is a lack of an MRV system that focuses on developing: (i) result-based indicators for monitoring the results of adaptation activities; (ii) performance-focused reports, and (iii) questionnaire for the assessment of reported information. Therefore the application of effective assessment process will be the basis to develop MRV framework for adaptation actions.

Base on the assessment results of the 2 adaptation actions in Quang Ngai, the thesis proposed MRV framework for adaptation activities. In order to implement the MRV for adaptation actions, it is necessary to apply the suitable methodology for each stage of M, R and V. To develop national MRV system, it is necessary to define the following factors: context, scale, purpose, focus, data and organizational structure.

B. Recommendations

1) The thesis has developed methodologies and frameworks for assessment of adaptation actions' effectiveness. However, the limited conditions are not enough to benefit both in terms of adaptation to climate change and mitigation of GHGs in response to climate change. Therefore, further research is needed on the co-benefits as well as tradeoffs while considering both the benefits of adaptation and mitigation of GHG.

2) In a pilot study of effectiveness assessment of adaptation action in Quang Ngai, due to the data limitation, the thesis only consider those indicators that data could be obtained. In further studies, consideration should be given to indicators contributing to the reduction of vulnerability of the community.

3) On the basis of the proposed MRV framework for climate change adaptation projects, and initial proposals for a national MRV, it is needed to further research to develop the details of MRV at the national level as required in the Paris Agreement on Climate Change.

4) The thesis only proposed that there should be a third party to carry out the Appraisal (V) but not yet specified. Further research needed to offer specific policy provisions on third party involved in the process of evaluating the implementation of adaptation actions ./.