

Development of indicators to assess the effectiveness of climate change adaptation measures: Case study in Can Tho city

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Abstract

Adaptation is the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects which moderate harm or exploit beneficial opportunities. At present, there are many activities in Vietnam aimed at adapting to climate change; therefore, it is important to assess the effectiveness of those adaptive activities in order to see which activities are effective for continuation and replication. These indicators are built on the basis of the SMART principle but must also meet the requirements of the ADAPT rule. In addition, the set of indicators was developed based on the Adaptation Monitoring and Assessment Tool (AMAT), which were divided into three sets of indicators: reducing vulnerability to negative impacts of climate change, increasing likelihood responding to the impacts of climate change and promoting the transfer and application of adaptive technologies.

In this study, Can Tho City, Viet Nam was chosen as the pilot city to apply the indicator to assess the effectiveness of adaptation measures. The result shows that the set of indicators can provide a visual result on adaptation effectiveness and should be applied in other cities/provinces or at regional level.

Keywords: Climate Change, Adaptation Indicators, Vietnam.

Introduction

Measuring Effective Climate Change Adaptation:

Climate change adaptation can be defined as the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects which moderate harm or exploit beneficial opportunities.¹⁷ According to the Global Environment Facility,¹³ effective adaptation is the fulfillment of four elements: relevance, effectiveness, efficiency, results and sustainability.

The effectiveness of adaptation measures depends on the extent to which those measures reach the long-term adaptation objectives, which include three key areas: (i) Reducing the development deficit; (ii) Addressing current climate variability and (iii) Addressing future climate risks¹⁶. Unlike mitigation activities, the effectiveness of which can be measured by the amount of greenhouse gases

reduced, there is currently no uniform set of indicators around the world to assess the effectiveness of adaptation measures.¹⁸

In 2007, the Intergovernmental Panel on Climate Change (IPCC) called for research on "effective approaches to identify and evaluate adaptation strategies and strategies that are and will be implemented".¹⁰ These evaluations are important tools not only for policy makers but also for investors.¹¹ In the past decades, there have been an increasing number of studies of different metrics to assess adaptation measures, focusing on the process of adaptation or the outcomes. Harley et al¹⁵ provided a framework for the development of adaptive indicators, suggesting two types: process-based and outcome-based indicators.

Process-based indicators play an important role in short-term evaluations whereas outcome-based indicators are more relevant to long-term evaluations. Haddad¹⁴ has pointed out that different development and growth objectives across countries will lead to different sets of indicators for adaptation.¹⁴ At a national level, the ability to adapt to climate change in different sectors and groups of people differs from nation to nation.

Bours et al² developed the AdaptME tool for assessing and monitoring climate change adaptation measures. AdaptME does not have specific indicators but only as a guide to help users to orient and design the factors to assess their own adaptation measures. The toolkit asks users to answer relevant questions such as type of assessment, purpose of assessment, barriers etc. from which users will design an appropriate evaluation framework. The OECD¹⁹ has provided five indicators for assessing the effectiveness of adaptation activities including: Reducing the risk of climate change; Policy and administrative management for climate change; Education, training and awareness raising on climate change; Developing climate change scenarios and assessing the impacts of climate change; and Coordinating measures to adapt to climate change and activities of other related agencies.

Also in 2011, in response to the management and monitoring of adaptation activities, the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF) under UNFCCC and managed by the GEF Secretariat has developed an assessment framework for monitoring the effectiveness of adaptation activities. It is worth noting that most other evaluation frameworks focus only on estimating the final outcomes while effective adaptation requires a long

process. Therefore, other frameworks mainly use the method which is not comprehensive and leads to certain shortcomings, especially in the long term.

The LDCF/SCCF Adaptation Monitoring and Assessment Tool (AMAT) developed a set of indicators for evaluating the effectiveness of adaptation activities to assess the process of achieving the results and effectiveness of adaptation activities. The tool has several advantages such as simplicity and ease of use and is capable of adding and removing indicators and is flexible for many project types and adaptive activities in various areas.

GIZ has compared M and E systems for climate change adaptation at national, local and project levels. The study notes that there is no common approach for adaptation monitoring and evaluation, which must be based on the level of application, the purpose of the M and E system and the capacity and resources of the M and E agency. Stadelmann et al¹⁸ proposed two generic adaptation effectiveness metrics including: (i) wealth saved from climate impacts and (ii) disability-adjusted life years saved. In addition, adaptation projects should also cause no harm to the environment and culture at the project area.

Brooks et al³ has proposed the Tracking Adaptation and Measuring Development (TAMD) in a series of climate change studies for the International Institute of Environment and Development (IIED). This framework assesses and compares the effectiveness of direct or indirect interventions to help people adapt to climate change. TAMD differs from other evaluation frameworks when emphasizing the need to assess development activities in consideration to climate change risks. In other words, TAMD assesses the impact of climate risk management measures on development and adaptation.

TAMD can assess the short-term and long-term results of adaptation measures at the national to the local levels; therefore, it can detect how adaptation measures can contribute to climate risk management systems. TAMD also uses indicators to assess vulnerability, quality of climate risk management and community benefits when applying risk management measures.

In 2014, McGill University (Canada) and Wageningen University (Netherlands) introduced a method of monitoring adaptation activities (TRAC3). The research aims monitoring the implementation of adaptation plans at global, national and municipal levels. The study focused on monitoring on-going adaptation activities, not on unfinished adaptation activities. At the national level, the authors primarily focused on national communications submitted to UNFCCC from countries, conducted survey to identify whether or not countries implemented according to their proposed plans and developed a global map for implementation of adaptation plans. In Vietnam, there is a lack of studies evaluating the effectiveness of climate change

adaptation measures. At present, localities are developing and implementing activities to adapt to climate change in order to ensure sustainable socio-economic development, improve the ability to adapt to climate change and minimize damage caused by natural disasters. The assessment of priority options for adaptation activities has been specifically guided by Decision 1485 / QD-BKHDT in 2013 entitled Framework for Guidelines for Climate Change Adaptation Prioritization in the Socio-Economic Development Planning Assembly. However, these prioritized activities in the planning and implementation process need to be assessed to discover whether they really have the desired adaptive effect on climate change.

It is noteworthy that the majority of the above-mentioned M and E frameworks focus solely on the evaluation of results while adaptation is a long-term process. Therefore, frameworks which mainly focus on evaluating the result are not very practical. Use of result-oriented adaptation measures has many shortcomings, especially in the long-term. This study, therefore, proposed a set of indicators to assess the effectiveness of adaptation activities based on the AMAT tracking tool, which assesses the achievement of adaptation activities and applied for a pilot city in Vietnam, which is highly vulnerable to climate change and sea level rise. This tool has a number of advantages, such as simplicity, ease of use, an open set of tools that can be used to add indices and flexibility for different types of projects and activities in a variety of areas.

The Site of the Study

Located in the Mekong Delta region, Can Tho is Vietnam's fourth largest city with a population estimated at 1.4 million. The rapidly growing urban metropolis is divided into nine districts: Ninh Kieu, O Mon, Binh Thuy, Cai Rang, Thot Not, Vinh Thanh, Co Do, Phong Dien and Thoi Lai (Figure 1). As the city has developed, its sustainability has been threatened by climate change-induced effects.

According to Can Tho Climate Change Coordination Office, natural disasters such as tropical storms, drought, salt intrusion, climate extremes etc. have occurred with increasing frequency and unpredictability over the last two decades. According to the updated climate change scenarios released by the Vietnam Ministry of Natural Resources and Environment, if the sea level rises one meter, 20% of the city area will be underwater.

Until 2014, there were 9 climate change-related projects and tasks that have been implemented in Can Tho city, particularly:

- The project "Establishment of Can Tho Climate Change Office" aimed at establishing and implementing a sustainable and effective mechanism for planning, decision-making and implementation of local government policies;



Figure 1: Geographical Location of Can Tho city

- The project "Improving the Resilience of Can Tho City to Respond to Salinity Intrusion Due to Climate Change" was implemented in order to apply the "saline adaptation" model to mitigate the effects of saline intrusion on Can Tho City;
- The project "Improving Resistance of Can Tho City to Dengue Fever in The Context of Climate Change" aimed at strengthening the capacity of the health system in Can Tho City;
- The project "Community-based Flood and Landslide Management In Can Tho City" aimed at strengthening resilience to climate change of vulnerable households living in suburban areas of Can Tho city;
- The project "Model of Communication on Climate Change And Adaptation Risks In Coastal And Delta Communities In Vietnam" was implemented in order to help increasing the climate resilience of vulnerable people. Officials and organizations are working on communication on climate change risks;
- The project "Can Tho Youth Initiative to Adapt to Climate Change" aimed at increasing youth participation through simple, community-based initiatives in climate change adaptation in Can Tho City;
- The project "Research on Use of Integrated Water Resources Management" aimed at proposing projects to manage sustainable and efficient use of water resources in Can Tho City;
- The project "Development of A Comprehensive Response Plan For Integrated Flood Risk Management In Can Tho City" aimed at developing a risk management plan as well as flood response in Can Tho City;
- The project "Capacity Building For Responding To Climate Change (CBCC)" aimed at strengthening capacity to cope with climate change in Can Tho City to mitigate impacts and control greenhouse gas emissions.

The assessment of effectiveness of adaptation measures was implemented for the Can Tho city based on two approaches. The first one is general assessment of effectiveness of all adaptation measures which have been implemented. The second approach is to assess the effectiveness of a typical project. In this study, the project "Improving The Resilience Of Can Tho City To Respond To Salinity Intrusion Due to Climate Change" was selected.

Methodology

Criteria for Indicator Development: These indicators were developed based on the SMART criteria and meet the requirements of DFID's ADAPT standard rule. 5 SMART criteria are those adaptation indicators which must be included: Specific (S), Measurable (M); Achievable (A), Relevant (R) and Time-phased (T). ADAPT rules mean that an adaptation measure must be based to include: adaptive learning and dynamic monitoring and must be active, participatory and thorough.²⁰

This ADAPT standard rule does not guarantee that following the standard it will increase the quality of indicators to assess the effectiveness of adaptation measures; however, it is a suggestion for the criteria on which the set of indicators should be based on. The most important lesson from the ADAPT rule is that the identification of adaptive indicators should be flexible and should include need of the

involvement of relevant stakeholders, so that the set of indicators can cover most aspects of adaptation.

Framework of Indicators to assess the Effectiveness of Adaptation Measures: Based on the definition and importance of adaptation to climate change, the AMAT tool assesses adaptation effectiveness based on three main objectives:

- (i) Reducing vulnerability to the adverse impacts of climate change;
- (ii) Increasing adaptive capacity to respond to the impacts of climate change, including variability at local level and
- (iii) Promoting transfer and adoption of adaptation technology.

Based on the AMAT tool, the most appropriate indicators were selected for Vietnam, which are summarized in table 1.

Results and Discussion

The assessment of effectiveness of adaptation measures was implemented for the Can Tho City based on two approaches. The first one is general assessment of effectiveness of all adaptation measures which have been implemented. The second approach is to assess the effectiveness of a typical project. In this study, the project "Improving The Resilience Of Can Tho City To Respond To Salinity Intrusion Due to Climate Change" was selected.

❖ **General assessment of effectiveness of all adaptation measures:** The process of calculating and collecting data for assessing the effectiveness of adaptation activities in Can Tho City is based on information from reports from departments including Climate Change Office of Can Tho city. Not all data can be collected for the calculation of indicators.

Regarding Indicator 1.3, Indicator 2.2, Indicator 2.3, Indicator 3.1 and Indicator 3.2, the research team has no information to calculate and hence those indicators are assumed unavailable and not calculated. In the future, the local authorities should consider the framework for monitoring and evaluation in the most adequate way.

Reducing Vulnerability to the Adverse Impacts of Climate Change including Variability to Local Level

Outcome indicator 1.1- Adaptation issue mainstreamed in broader development frameworks at country level and in targeted vulnerable areas: Based on the assessment result, climate change is yet to be integrated in any environmental protection strategies and plans in Can Tho city.

However, climate change has been incorporated into the master plan for Socio-Economic Development in Can Tho to 2020 with a vision to 2030 in decision no. 1533 / QD-TTg dated 30 August 2013. Therefore, it can be seen that the level of integrating climate change into strategies, planning and

plans on socio-economic development and environmental protection in Can Tho city is still very inadequate and more guidance on climate change integration is needed.

According to the climate change adaptation plan of Can Tho City by 2020, about 33 adaptation activities will be carried out. Main sources for those activities include the state budget, the fund for natural disaster risk management and foreign aid. During 2013, the province has implemented 9 adaptation activities with financial sources from the State Budget and a small part from foreign aid. The above-mentioned activities have been implemented effectively.

However, in Can Tho city, there are no institutional and financial initiatives to manage the risks due to climate change. This issue has not yet been set up as a specific goal in the adaptation process. Therefore, when updating the action plan to cope with climate change, the province can evaluate and add specific targets for that activity to facilitate the implementation, monitoring and evaluation.

Outcome indicator 1.2- Reducing the vulnerability of socio-economic sectors to the negative impacts of climate change:

Most of the objectives related to the reduction of the vulnerability of the economic, social and environmental sectors for the years between 2010 and 2013 have been achieved. Some indicators have met the targets, particularly: Increase in the agricultural output; Increase in the agricultural productivity; Change in real per capita food production; Change in forest area; Change in the value of forestry production; Change in aquaculture production; Change in the value of fishery production; Change in the value of industrial production; and Change in GDP per capita.

The proportion of the population suffering from diseases related to climate change also reduced. Only the result of indicator on change in the value of forest products reduced because the forest area in Can Tho city only accounts for a small percentage of the total area of the city. In addition, the city has yet to have an orientation for investment into forestry.

Increasing Adaptive Capacity to Respond to the Impacts of Climate Change including Variability at Local Level

Outcome indicator 2.1- Knowledge and understanding of climate variability and change increasing at local level in targeted vulnerable areas. The objectives set out in the provincial action plan for responding to climate change on propagation and dissemination of risk information to stakeholders have been achieved. Information on climate change and risks from natural disasters are constantly updated and propagated on the mass media such as loudspeakers, radio and television.

The objective of updating risks and vulnerability assessment set out in the adaptation plan have not been prioritized at this stage.

Table 1
Framework of Indicators to Assess the Effectiveness of Adaptation Measures

Expected Outcome	Outcome Indicator
Objective 1: Reducing vulnerability to the adverse impacts of climate change, including variability at local level	
Outcome 1.1. Adaptation issue is mainstreamed in broader development frameworks at country level and in targeted vulnerable areas	1.1.1. Adaptation actions implemented in national/sub-regional development frameworks (no. and type)
	1.1.2. For each action listed under Indicator 1.1, indicate which ones include adaptation budget allocation and targets (yes/no)
	1.1.3. For each action listed under Indicator 1.1, indicate to what extent targets set out in plans have been met (%)
Outcome 1.2. Reducing vulnerability in development sectors	1.2.1. Infection rates of population to climate –sensitive diseases as compared with past population infected per year under similar climatic conditions (% change)
	1.2.2. Rate of increase in agricultural output (grain crops)
	1.2.3. Rate of increase in agricultural productivity (major crops)
	1.2.4. Percentage of change in food production per capita
	1.2.5. Percentage of change in agricultural output value (according to 2010 prices)
	1.2.6. Percentage of change in forest area
	1.2.7. Percentage of change in forestry production value
	1.2.8. Percentage of change in fishery outputs
	1.2.9. Percentage of change in fishery production value
	1.2.10. Percentage of change of industrial production value
	1.2.11. Percentage of change in GDP per capita
Outcome 1.3. Livelihoods and sources of income for vulnerable people are diversified and strengthened in targeted areas	1.3.1. % of targeted households that have adopted resilient livelihoods under existing and projected climate change
	1.3.2. % increase per capita income of farm households due to adaptation measures applied
	1.3.3. % of increase per capita income of households outside of climate change vulnerable sectors due to adaptation measures applied
Objective 2: Increasing adaptive capacity to respond to the impacts of climate change, including variability at local level	
Outcome 2.1. Knowledge and understanding of climate variability and change induced risks is increased at local level and in targeted vulnerable areas.	2.1.1. Relevant risk information disseminated to stakeholders (Yes/No)
Outcome 2.2. Adaptive capacity to reduce risks to climate-induced economic losses is strengthened.	2.2.1. Number and type of targeted institutions with increased adaptive capacity to minimize exposure to climate variability (number and type)
	2.2.2. Number of staff trained on technical adaptation themes
	2.2.3 % of population covered by climate change risk reduction measures
Outcome 2.3. Awareness and ownership of adaptation and climate risk reduction processes is strengthened at local level	2.3.1. % of targeted population awareness of predicted adverse impacts of climate change and appropriate responses
	2.3.2. % of population affirming ownership of adaptation processes
Objective 3: Promoting transfer and adoption of adaptation technology	
Outcome 3.1 Successful demonstration, deployment and transfer of relevant adaptation technology in targeted areas	3.1.1. % of targeted groups adopting adaptation technologies by technology type (disaggregated by gender)
Outcome 3.2. Favourable environment to support adaptation-related technology transfer is enhanced.	3.2.1. Policy environment and regulatory framework for adaptation-related technology transfer established or strengthened (Score 1-5)
	3.2.2. Strengthened capacity to transfer appropriate adaptation technologies

Source: Adapted from GEF¹²

Table 2
Assessment result of effectiveness of all adaptation measures in 2014 in Can Tho City

Expected Outcome	Outcome Indicator	Unit	Result in 2014
Objective 1: Reducing vulnerability to the adverse impacts of climate change, including variability at local level			
Outcome 1.1. Adaptation issue is mainstreamed in broader development frameworks at country level and in targeted vulnerable areas	1.1.1. Adaptation actions implemented in national/sub-regional development frameworks	No. and type of project	9 projects
	1.1.2. For each action listed under Indicator 1.1, indicate which ones include adaptation budget allocation and targets	Yes = Y No = N	Y
	1.1.3. For each action listed under Indicator 1.1, indicate to what extent targets set out in plans have been met	1 = Some results is achieved however the overall target has yet to be reached; 2= The overall target is achieved 3= The achievement goes beyond the target	1
Outcome 1.2. Reducing vulnerability in development sectors	1.2.1. Infection rates of population to climate –sensitive diseases as compared with past population infected per year under similar climatic conditions	% change	0.6
	1.2.2. Rate of increase in agricultural output (grain crops)	%	13
	1.2.3. Rate of increase in agricultural productivity (major crops)	%	1.7
	1.2.4. Percentage of change in food production per capita	% change in tons of food production/year	11.5%
	1.2.5. Percentage of change in agricultural output value (according to 2010 prices)	%	13.2%
	1.2.6. Percentage of change in forest area	%	0.0%
	1.2.7. Percentage of change in forestry production value (according to 2010 prices)	%	-30.0%
	1.2.8. Percentage of change in fishery outputs	%	5.4%
	1.2.9. Percentage of change in fishery production value	%	19.0%
	1.2.10. Percentage of change of industrial production value	%	57.3%
	1.2.11. Percentage of change in GDP per capita	% change in average income (US\$)	57.3%
Objective 2: Increasing adaptive capacity to respond to the impacts of climate change, including variability at local level			

Outcome 2.1. Knowledge and understanding of climate variability and change induced risks is increased at local level and in targeted vulnerable areas.	2.1.1. Relevant risk information disseminated to stakeholders (Yes/No)	Yes = 1 No – 0	1
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Another target of application of risk monitoring and warning systems is also outlined in the plan. However, as of 2013, Can Tho city has not yet implemented any adaptation of the warning and risk monitoring system. Other indicators of adaptive capacity building have not been fully evaluated due to limited data availability.

Promoting Transfer and Adoption of Adaptation Technology: Can Tho city has set some targets for technology transfer in the project "Improving the Resilience of Can Tho City to respond to salinity intrusion due to climate change"; however, as of 2013 the city is yet to implement this component. In addition, Can Tho has not implemented any other adaptation measures related to technology transfer. As a result, in this study the indicators of promoting the transfer and adoption of adaptation technologies are yet to be considered.

❖ **Assessment of the effectiveness of the project "Improving the Resilience of Can Tho City to respond to Salinity Intrusion due to Climate Change":** By 2014, eight automatic salinity measuring devices have been installed by the project ensuring timely warning for people when saline intrusion along the main rivers into the city. The location of each station is as follows:

- Station No. 1: installed at Cai Cui port, Ninh Kieu district, Can Tho City;
- Station No. 2: installed at Vam Can Tho, Ninh Kieu District, Can Tho City; in combination with the existing hydrographic station.
- Station No. 3: installed at Can Tho port, Binh Thuy district, Can Tho City.
- Station No. 4: installed in O Mon district, Can Tho City; combined with existing automatic water level measuring station.
- Station No. 5: installed in Thanh An town, Vinh Thanh district, Can Tho City.
- Station No.6: installed in Tan Hiep district, Kien Giang province.
- Station No. 7: installed in Mot Ngan town, Chau Thanh A district, Hau Giang province.
- Station No. 8: Installed in Phong Dien district, Can Tho City.

In addition, a website showing instant salinity data has been developed and provided with extensive information. The website shows the locations of 8 automatic salinity measuring devices on the administrative-river map of the city which is linked with Google map. The salinity data from each station is displayed right on the main interface and

regularly updated when receiving data from the sending stations.

Another project goal that has been completed at this stage is the SMS Alert System. Besides, a warning threshold for saline intrusion has also been set. The value of indicators to assess the effectiveness of the project "Improving the Resilience of Can Tho City To Respond To Salinity Intrusion Due to Climate Change" was illustrated in table 2. The implementation of the project has brought back the following benefits:

- The city's observation system was upgraded from no automatic station to eight installed and operated automatic salinity measuring stations;
- People have access to status of saline water easily and quickly. In particular, the number of indirect beneficiaries is the number of people in the districts where automatic monitoring stations are located, which is about 750,000 people: Ninh Kieu district (244,065), Cai Rang district (86,328), O Mon district (130,274), Thoi Lai district (121,321), Phong Dien district (99,667) and Vinh Thanh district (112,888). These targets are estimated at 100% when automatic salinity measuring stations are installed and operated.
- Community levels participating in the alert system have been raised. Specifically, the number of direct beneficiaries are those with internet, mobile phone and television, estimated at 30,000 people. Besides, 300,000 people are the number who will indirectly benefit from the project. They are the information recipients from the aforementioned direct beneficiaries.
- The awareness of people on saline intrusion and response is improved. The project has implemented propaganda and training for about 750 people. Besides, the number of indirect beneficiaries is about 300,000 to 400,000, thanks to the propaganda during and after the project's completion, the local officials have been directly trained.
- Water storage models were applied by people and authorities to mitigate the impact of saline intrusion on their health. The project achieved results of 150 pilot households and about 2,000 people in the two pilot communes. The number of indirect beneficiaries is about 300,000 to 400,000 people who do not access the city's water supply system.

Conclusion

Climate change has exerted significant impacts on the ecosystem and socio-economic activities in Can Tho City, especially in the areas of agriculture, water resources and energy.

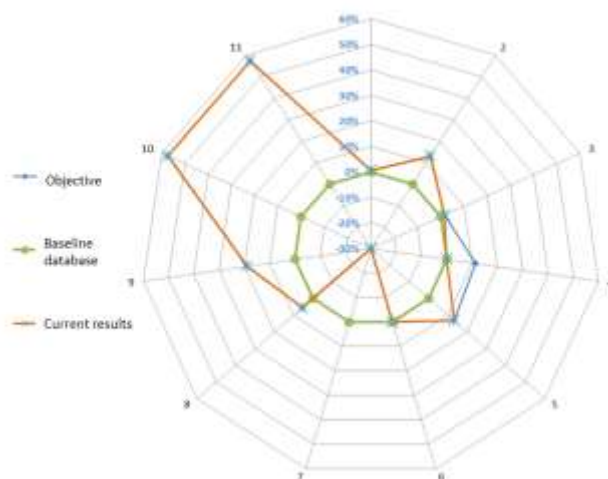


Figure 2: Assessment of Outcome 1.2

Source: Huynh, 2019

Table 3
Effectiveness of the project "Improving the Resilience of Can Tho City to respond to Salinity Intrusion due to Climate Change"

Indicator	Result
1. Percentage of the population benefits indirectly from the installation of a salinity monitoring system in Ninh Kieu, Cai Rang, O Mon, Thoi Lai and Phong Dien districts.	100%
2. Percentage of the population benefits directly from the data management and disclosure system	100%
3. Percentage of the population benefits indirectly from the data management and disclosure system	100%
4. Percentage of the population indirectly benefits from the establishment of saline intrusion threshold and response action	53.3%
5. Percentage of people who were trained on saline intrusion and climate change	0%
6. Percentage of people who indirectly benefit from propaganda from staff trained in saline intrusion and climate change	53.3%
7. Percentage of people following instructions for using water storage model	0%
8. Percentage of people indirectly benefiting from the water storage model	53.3%

From that perspective, by 2014, Can Tho City has been implementing activities to adapt to climate change. Adaptation activities have been carried out with positive results.

However, the number of adaptation activities implemented in the period 2010 - 2013 is limited, not covering all economic, social and environmental areas. The evaluation of the total scheme of activities is limited due to unavailability of data for many heads. Therefore, in the coming period, localities should continue to invest and prioritize resources for adaptation activities to reduce vulnerability and to increase adaptability. In addition, appropriate adaptation technologies should be considered. In addition, climate change should be integrated into comprehensive urban planning with the vision up to 2030. Cities should also focus on measures to promote awareness of climate change.

The project "Improving the Resilience of Can Tho City to Respond to Salinity Intrusion due to Climate Change" has achieved a number of important goals, contributing to

improving the adaptability and reducing the vulnerability to saline intrusion due to climate change in Can Tho City. In general, this project can be evaluated as effectively contributing to improving the ability of coping with saline intrusion due to climate change of the City. However, some indicators have not been calculated due to lack of data

In summary, the pilot results show that the set of indicators provides a visual result, facilitating easy identification of areas with low adaptive effectiveness, which should be prioritized during the investment process. Indicators are also highly feasible because most of the inputs are collected from annual statistical yearbooks and so can be evaluated periodically. In addition, spreadsheets can be automatically updated when the data inputs change and are easily transferred to other cities/provinces in Vietnam.

Therefore, this set of indicators should be applied in other provinces and at the regional level so that the indicators can be adjusted and improved.

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