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DISASTER RISK FINANCING OPTIONS FOR DEVELOPING COUNTRY: A CASE STUDY OF VIETNAM

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ABSTRACT

Natural catastrophes such as floods, droughts, earthquakes, typhoons, and tsunamis are common in Vietnam. Floods and hurricanes, on the other hand, are the most lethal natural disasters. The Vietnamese Government is doing all possible to put disaster risk reduction (DRR) at its top priority list. The Government has developed a number of important legislative documents, regulations, and plans to assess its risk and response to disasters, and it has prioritized partnerships with neighboring nations. Natural disaster-related economic losses, on the other hand, continue to grow in Vietnam. Natural catastrophes pose a substantial financial risk and cause severe budget instability. Disaster Risk Finance is a growing area that deals with natural catastrophes' fiscal and economic repercussions (e.g., cyclones, droughts, earthquakes, floods). This article examines the existing position, difficulties, and solutions for Vietnam's financial system responding to natural catastrophes.

Motivation of study:

Each year, Vietnam is affected by natural disasters and climate change in the Asia Pacific region. However, disaster risk financial management is still in its infancy. Although Viet Nam has been proactive in building its own unique disaster risk management system and has considered developing Disaster Risk Finance instruments at the national level, financing for disaster risk management has been limited. Disaster management is still lacking, mainly focusing on relief efforts, not on prevention. Especially, when natural disasters occur, the reconstruction is not satisfactory, bringing great losses to the people. I, Dr. Dinh Duc Truong, witnessing years of major natural disasters, produce this study to examine disaster financial resources, analyze financial gaps and institutional challenges to mobilize and effectively use

financial resources for disaster management. I believe that this study will be a premise for policy makers, financial managers, and local agencies to tackle these challenges. If they choose to implement these financial tools and solutions that I have suggested, localities will quickly improve their financial management capacity for disaster risks. Natural disasters are inevitable, especially in the context of increasing climate change. Finding and proposing solutions to combat it is more necessary than ever.

INTRODUCTION

Vietnam has achieved significant economic and infrastructure progress during the previous 30 years. Vietnam introduced and implemented new economic and political reform programs known as Doi Moi in 1986. The improvements accelerated economic growth, converting Vietnam from a low-income nation to a lower-middle-income country (Hallegatte et al., 2016).

The Government of Vietnam is actively improving the region's infrastructure, although it is still lacking. Inadequate roads, communications, and utilities make it difficult for international investors to do business in the country (Koks et al., 2019). As part of its goal for progress, the Government directs roughly 9-10% of its GDP into infrastructure development. The state budget for transportation infrastructure development is expected to grow by 15% each year. Government bonds and official development aid are also used as primary funding sources for infrastructure development (U.N. and Government of Vietnam., 2016.)

Vietnam is prone to various natural disasters, including floods, droughts, earthquakes, typhoons, and tsunamis. Floods and storms, on the other hand, are the most devastating natural catastrophes. During the seasonal flood period from late October to November, Central Vietnam is the most impacted by flooding. Much of Vietnam's population lives along the coast, where low-lying river deltas make the people more vulnerable to floods (Pant et al., 2019).

The Vietnamese Government is working hard to keep disaster risk reduction (DRR) top of its priority list. The Government has created several important legal papers, policies, and plans to analyze its risk and reaction to disasters, and it has emphasized relationships with neighboring countries. As an ASEAN member, Vietnam enjoys the backing of its neighbors to strategize recovery and aid in the event of a disaster. The participation of Vietnam in the National Strategy for Disaster Prevention, Response, and Mitigation to 2020 and the Action Plan National Strategy for Natural Disaster Prevention, Response, and Mitigation to 2020 has been critical in mobilizing resources to implement disaster prevention response and mitigation effectively. Furthermore, Vietnam has emphasized reducing loss of life and property, harm to natural resources and cultural heritage, and environmental degradation (Van Ledden et al., 2020).

However, the economic losses caused by natural disasters continue to rise in Vietnam. Natural disasters generate significant financial risk and create major budget volatility. Even Vietnam, with fairly robust disaster risk management programs, is still be highly exposed to the economic and fiscal shocks caused

by major disasters (Pant et al., 2019).Disaster Risk Finance is a developing field covering natural disasters' fiscal and economic consequences (e.g., cyclones, droughts, earthquakes, floods). Based on World Bank and Asian Development Bank studies, it assists nations in increasing their financial resilience to natural catastrophes (Bangalore, M, Smith, A, and Veldkamp, T., 2017).

A Disaster Risk Financing mechanism can help countries ensure that their populations are financially protected in a disaster. Appropriate financing sources will assist nations in developing and implementing policies and solutions that enhance the ability of national and local governments, households, companies, agricultural producers, and low-income communities to adapt to disasters more promptly and resiliently (Rentschler, J E., 2013)

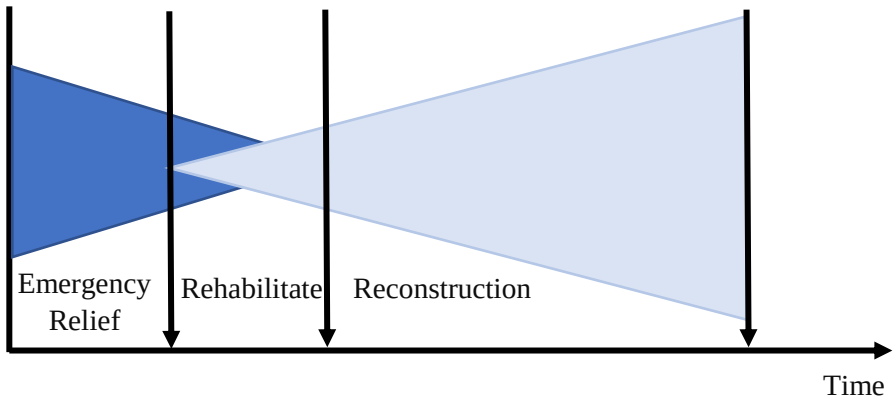
This study analyzes the current situation, challenges, and solutions for the financial system to respond to natural disasters in Vietnam. First, the study presents an overview of disaster risk and economic losses due to natural disasters in Vietnam, then analyzes the financial sources for disaster risk management and the financial shortfall for disaster risk management. Inadequacies in capital sources and financial institutions are also considered to make recommendations to improve the financial system and options for disaster risk management in Vietnam.

METHODOLOGY

Model of Disaster Financial Gap Assessment

Frequent natural disasters force state management agencies to continuously use budget capital and mobilize other resources to address financial needs, according to World Bank in 2019 (Hallegatte et al., 2019). Disaster financing shortfall here is defined as the difference between the total annual loss of the entire economy due to a disaster and the financial resources available to compensate for that loss (Pant et al., 2019).

Figure 1. Post-disaster stages and financial need



Source: Original figure of this study, compiled from data from WorldBank (2019)

Immediately after a disaster occurs, it is necessary to mobilize resources quickly for emergency relief, meeting the minimum needs in people's lives (Devries et al., 2013). Next, extensive financial resources are needed to spend in the recovery period and especially reconstruction. The most important thing is no longer the quick mobilization but the much larger than the relief phase (Braese, J, Rentschler, J, and de Vries Robbe, S., 2020)

The recovery phase is the period following the emergency relief phase, which limits secondary damage and ensures that the rebuilding of damaged structures can begin as soon as possible. The task of this second phase is to restore and enhance people's material wealth and livelihoods, for example: renovating and reopening schools, restoring productive activities business, etc. At the same time, it is necessary to quickly repair and re-supply services needed for life such as electricity, water, and main traffic routes, clean up rubble, and provide inputs to quickly reproduce agricultural products (seeds, fertilizers, pesticides, etc.). Also, it is necessary to design infrastructure works that will have to be rebuilt in the future in the recovery phase (World Bank Group, 2018).

The reconstruction phase focuses on restoring or replacing structures damaged by natural disasters. Duties include repairing and rebuilding homes, industries, infrastructure, and other facilities that serve society and the community. Funding for this phase is usually from the state budget as central and local governments may be responsible for rebuilding private properties. For example, the State often has to provide financial support to poor households who have lost their homes to build new houses because this is beyond their ability (Narloch, U and Bangalore, M., 2018).

Thus, theoretically, the financial resources to meet the needs of emergency relief and recovery and reconstruction after disasters are different, as illustrated in Figure 1. However, it is difficult to analyze and compare actual state budget expenditure with damage caused by natural disasters in Vietnam. There is no exact data on how much the local and central budgets spend on natural disasters. Meanwhile, the post-disaster periods depicted in Figure 1 can overlap. It is often difficult to distinguish between government spending on emergency relief and recovery activities and reconstruction costs for the instant installation of critical infrastructure (World Bank DRFI Program, 2019).

To assess the financial resources for disasters in Vietnam, several assumptions need to be used. The study uses the assumptions of the World Bank in 2019 in the disaster financial assessment report (World Bank DRFI Program, 2019). The specific assumptions are as follows:

- First, not all state budget reserves are used for disaster assistance. According to the regulations, in addition to spending on natural disaster prevention and control, the state budget reserve also serves important national defense and security tasks and other necessary tasks. It is also for supporting lower-level budgets to perform the tasks mentioned above if the lower-level budgets have been used but not yet met the goal. The state budget reserve also supports other localities to overcome the consequences of natural disasters and severe disasters. It is assumed that an average of 40% of the central budget

reserve and 20% of the local budget reserve is for natural disasters. In addition, other government resources, such as the Financial Reserve fund, can be used for natural disasters with a value equivalent to 10% of the total budget reserve.

- Second, it is assumed that government spending on recovery is equivalent to 25% of total disaster damage, while reconstruction spending is equivalent to 35% of total disaster damage. World Bank made this estimate in 2019 based on interviews with experts in public finance and statistical reports on some previous storms (World Bank DRFI Program, 2019).
- Third, it is assumed that if the total disaster budget after spending on recovery is left over, it will be spent on reconstruction.

Data Collection

It is not easy to find robust data on the financial sources and institutions for natural disaster risk management in Vietnam. Currently, there is no systemized methodology, a single tool applied, or software for analyzing disaster data in Viet Nam. Government agencies collect disaster damage data via a parallel data collection and collation system run by the Central Committee for Flood and Storm Control (CCFSC) of the Ministry of Agriculture and Rural Development (MARD) and the General Statistics Office (GSO) of the Ministry of Planning and Investment (MPI) (MARD, 2015). The information gathered by the CCFSC system is known as the Damage and Needs Assessment system or DANA. Currently, data is gathered under DANA using a single template including more than 150 indicators. This information is collected and compiled from the commune to the central level (Deltares et al., 2017)

The CCFSC stores it at the central level in a central DANA database. However, the existing program lacks appropriate data processing facilities for further investigation. As a result, it was determined that for this study, DesInventar software would be used to import the disaster data contained in the DANA database and conduct data mining and restructure. Consequently, a historical disaster database including provincially disaggregated data on indicators for 63 provinces and cities from 1989 to 2010 was produced, allowing for geographic and chronological analysis of catastrophe data (Kulp, S A, and Strauss, B H, 2019).

Thus, the methodology used in this study consists of reviewing existing documents and data, coupled with information collected from different interviews with public officers and experts. In the first step, analysis reports from experts having worked on the issue were studied. These reports come from the World Bank (2017), GIZ (2016), Vietnam Government (2017), Ministry of Finance (MOH) (2019), Institute of Policy and Strategy for Finance (2016), and MONRE (2020) (World Bank, 2020; Rentschler et al., 2019).

Finally, critical reviews were done by comparing the result of desk studies with information collected from field interviews, which are carried out in parallel. The authors have met with stakeholders and public officers in these fields and discussed disaster financial options and challenges.

RESEARCH RESULTS

Overview about Disaster Risks and Damages in Vietnam

Vietnam is one of the world's most disaster-prone countries. With a coastline stretching 3 440 km and diverse and complex topography, Viet Nam suffers from many different natural hazards. These are hydro-meteorological (e.g., typhoons, floods, heavy rainfalls, and droughts) and geophysical (e.g., landslides). Flooding, with 64 occurrences (48% of catastrophes reported), and storm, with 61 occurrences, are the two most common disaster categories (46%). Flooding and storms are also the most lethal disasters in Vietnam. It is estimated that roughly 70% of the Vietnamese population lives in coastal areas and low-lying deltas, making them vulnerable to floods. Between 2000 and 2018, floods killed 2798 individuals (59% of all deaths reported), while storms killed 1804. (38%) (World Bank., 2018). The deadliest catastrophic occurrence within this period was a flood in 2000, which killed 460 people. With an estimated five million victims, this flood was also the catastrophe event that affected the most people in Vietnam. Flooding and storms are the disasters that affect the most people in Vietnam, with 17 566 168 (46% of persons affected) and 16 777 007 (44%) affected individuals, respectively.

Table 1. Disaster Severity Assessment in Different Geographic Areas and Coastal Economic Zone in Vietnam

Disaster	**Geographic Areas and Economics Zones**							
	Northeast and Northwest	**Red River Delta**	**North Central Coast**	**South Central Coast**	**Central highlands**	**North East South**	**Mekong River Delta**	**Coastal Economic Zone**
Storm	+++	++++	++++	++++	++	+++	+++	++++
Flood	-	++++	++++	+++	+++	+++	+++++	++++
Flashflood	+++	-	+++	+++	+++	+++	+	+++
Whirlwind	++	++	++	++	+	++	++	++
Drought	+++	+	++	+++	++	+++	+	+++
Desertification	-	-	+	++	++	++	+	++
Saline intrusion	-	+	++	++	+	++	+++	++
Inundation	-	+++	++	++	-	++	+++	+++
Landslide	++	++	++	++	+	++	+++	++
Storm surge	-	++	++	++	++	++	+++	++
Fire	++	+	++	+++	-	+++	+++	+++
Industrial and environmental hazard	-	++	++	++	+++	+++	++	+++

Source: Original table of this study, compiled from data from World Bank (2018*)*

Figure 2. Location of Flood Disaster in Vietnam

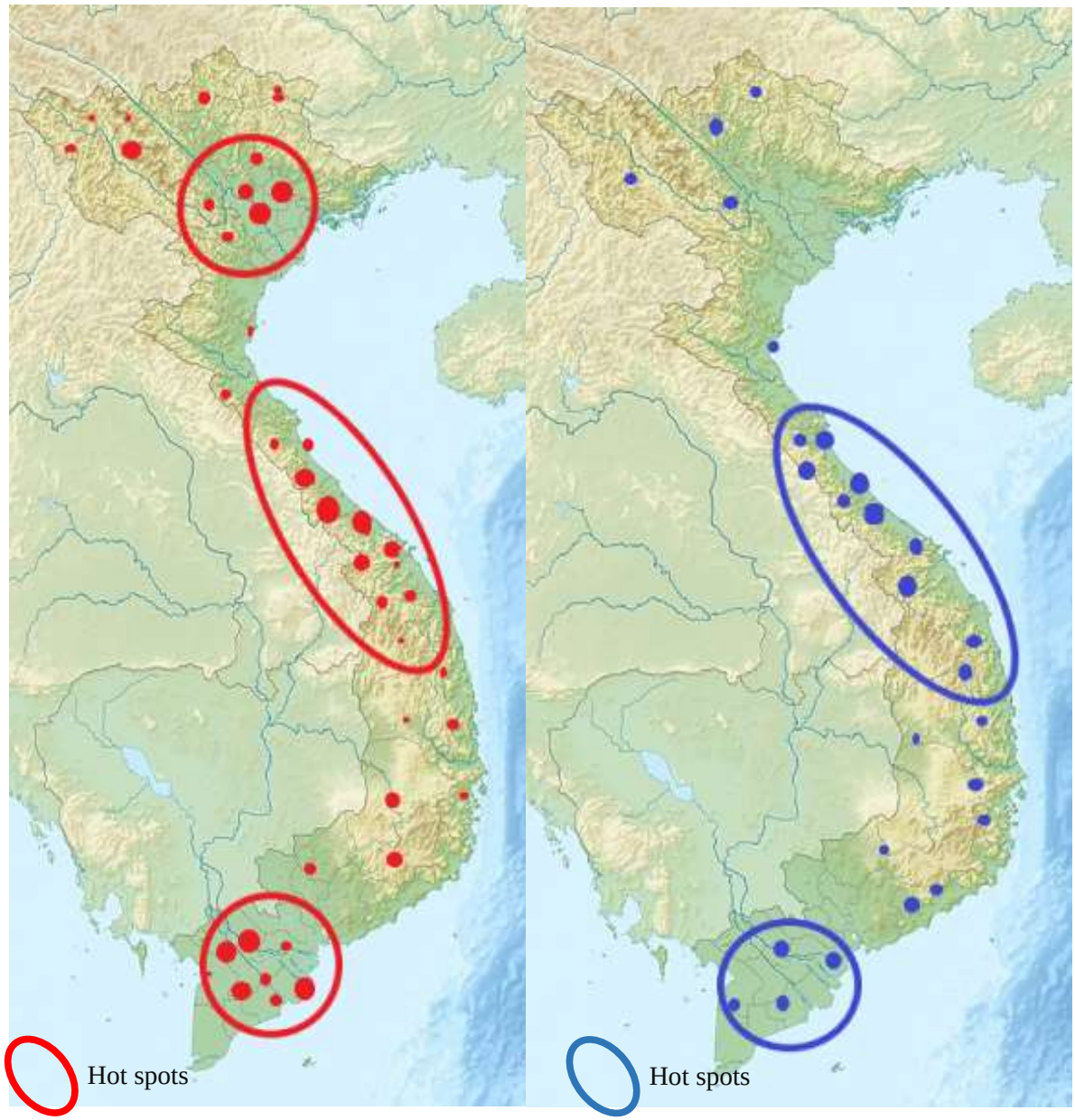


Figure 2.1. Human Losses

Figure 2.2. Economic Losses (% of GDP)

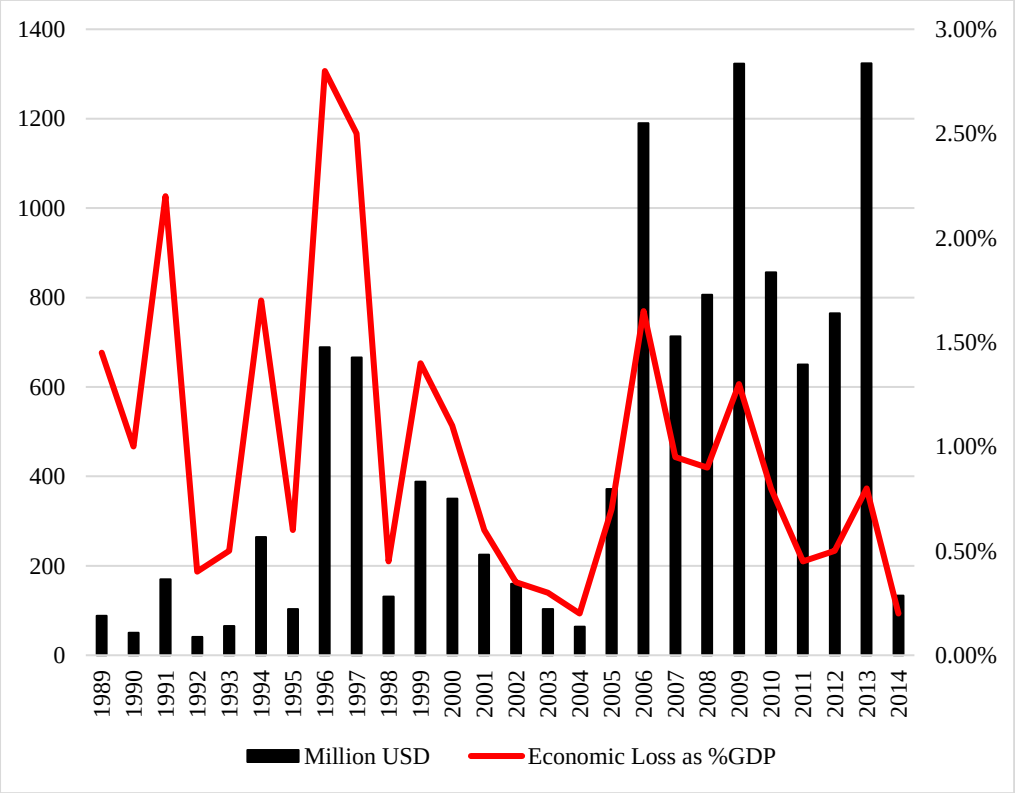
Source: Original figure of this study, compiled from data from Government Portal (2019)

For more than 25 years, Vietnam has formally undertaken post-disaster damage assessments to quantify the physical and financial losses to human life, property, infrastructure, output, and industry. The DDMFSC website has published data for each occurrence by province and the annual total damages. Between 1999 and 2018, the CCFSC recorded a total value of VND 891 trillion (US$ 40.5 billion) in natural catastrophe damages in Vietnam, or an average of VND 45 trillion (US$ 2.025 billion) each year. Over the 20 years, catastrophe losses from

tornadoes, tropical cyclones (including tropical storms and typhoons), floods, flash floods, and landslides resulted in a total loss of life of 26,070 people (an average of 652 lives per year).

The CCFSC data show that the estimated value of damage from natural disasters in the past three years has been much higher than the long-term annual average. Although Figure 3 suggests a trend towards increasing natural disaster losses, this is partly explained by the significant growth in the Vietnamese economy in recent years, the increasing value of underlying national asset values, and the increase in construction costs and rehabilitation costs for property and infrastructure. The average cost of damage associated with a natural disaster is much higher today than in the past.

Figure 3. Average Economic Losses by Natural Disasters in 1989-2014 (% of GDP)



Source: Original figure of this study, compiled from data from Government Portal (2019)

Financial Resources for Disaster Risk Management in Vietnam

The financial sources for the current disaster recovery management in Vietnam are arranged from three primary sources, including (i) State Budget, including State Budget Reserve, Financial Reserve Fund, Project State Archives; (ii) Non-state budget sources include: Natural disaster prevention and control fund; Road Maintenance Fund, Environmental Protection Fund (iii) Voluntary contributions of domestic organizations and individuals; Disaster Insurance and

Financing Initiatives and International Assistance. In addition, the Government of Vietnam can reallocate a small part of the direct investment costs for post-disaster recovery support to essential infrastructure and works.

State Budget

State Budget Reserve

The main financial source for disaster recovery is the central and local budget reserve. According to the 2002 State Budget Law, the central and local state budgets are allocated a reserve of 2% to 5% of the total expenditure for prevention and overcoming of consequences of natural disasters, fires, and essential national tasks about security and other urgent tasks arise outside the estimate. Although the law does not explicitly mention which disaster recovery expenditures are extracted from this source, the reality is that the budget reserve is usually only used for emergency aid and disaster recovery. Expenses for investment, construction, renovation, and upgrading of natural disaster prevention and control works are included in annual investment expenditures and other sources.

From January 1, 2017, when the 2015 State Budget Law takes effect, state budget provision for prevention and control of consequences of natural disasters and disasters will be from 2% to 4% (Moullier, Thomas, 2015). The state budget reserve is used for the following purposes: preventing, controlling, and overcoming consequences of natural disasters, disasters, epidemics, hunger relief; important national defense and security tasks and other necessary tasks; spending support for lower-level budgets to perform the tasks mentioned above after the lower-level budgets have used their provision for implementation but have not yet met the demand; and spending to support other localities to overcome consequences of natural disasters and severe disasters (Nguyen Thi Hai Ha, 2013).

From 2009 to 2018, the total provision budget accounted for 2% to 2.79% (the highest in 2009) of the total state budget expenditure. However, in 2014, the rate was 1.91%. This percentage is in line with the 2002 and 2015 State Budget Laws provisions and is relatively low compared to the allowable provisioning range of 2-4%. Although the number of reserves is quite large, it is used for many different purposes, not only to prevent and overcome the consequences of natural disasters.

Table 2. Balanced expenditure estimates and central/local reserve budgets (trillion VND)

Year	**Estimated total State Budget Reserve**			**Estimated total State Budget Expenditure**	**% State Budget Reserve against Budget Expenditure**		
	Total	Central	Local		Total	Central	Local
2009	13.700	7.600	6.100	491.300	2,79	1,55	1,24
2010	15.30	7.800	7.500	582.200	2,63	1,34	1,29

	0						
2011	18.400	9.400	9.000	725.600	2,54	1,30	1,24
2012	21.700	10.300	11.400	903.100	2,40	1,14	1,26
2013	23.400	10.800	12.600	978.000	2,39	1,10	1,29
2014	19.200	10.300	8.900	1.006.700	1,91	1,02	0,88
2015	25.000	13.000	12.000	1.147.100	2,18	1,13	1,05
2016	26.000	12.500	13.500	1.273.200	2,04	0,98	1,06
2017	29.300	15.800	13.500	1.390.480	2,11	1,14	0,97
2018	32.097	15.800	16.297	1.523.200	2,11	1,04	1,07

Source: Original table of this study, compiled from data from the Government Portal (2019)

The Ministry of Finance of Vietnam, at the Workshop "Financial and insurance policies to respond to natural disaster risks", said that in the period 2011-2015, in addition to the reserve funds of localities, the total support from the central budget reserve for the prevention, control and overcoming of consequences of natural disasters and epidemics in Vietnam is VND 11,239 billion (accounting for about 20% of the total central budget reserve). The annual budget reserve in the period 2010-2017 averaged about VND 22,000 billion. This budget is spent on the following tasks: repairing and upgrading projects, anti-erosion embankments to prevent landslides, and essential, urgent projects to prevent and overcome consequences of natural disasters, rain, floods, hail, tornado, storm; emergency immigration, etc. In addition, the central budget reserve is also used to handle unexpected and urgent tasks that arise outside the estimate for ministries and localities, such as: supplementing ministries to purchase national reserve goods issued (1,800 billion VND); handling and overcoming landslides; supporting localities in the construction of landslide embankments, emergency treatment of landslides, tsunami response drills and search and rescue, etc. In 2016, the central budget supported disaster recovery in cash of 5,608.9 billion VND, monetary support, and in-kind support with a total value of about 2,119.6 billion VND. At the end of 2017, the Government issued Decision No. 1872/QD-TTG dated November 24, 2017, on financial support for localities to overcome the damage caused by typhoon No. August 2017 to early October 2017 with a value of 1,000 billion VND. The total value of the Government's support to overcome the consequences of storms and floods in 2017 is 4,605 billion VND.

Financial Reserve

If the central and local budget reserves have been spent and are not enough for disaster recovery tasks, the provincial and central levels can use the Financial

Reserve Fund to meet spending needs. But the maximum usage during the year is not more than 70% of the fund's opening balance. The financial reserve fund is derived from sources of revenue increase, budget balance, arranged in annual budget expenditure estimates and other financial sources as prescribed by law. The balance of the financial reserve fund at each level shall not exceed 25% of that level's estimated annual budget expenditure. However, Financial Reserve Fund is quite limited in size due to the state budget deficit over the years. The total amount of the Financial Reserve Fund accounted for only 0.04% of total state budget expenditure in the period 2007-2015 and less than 0.01% in the period 2015-2018.

National Reserve

The national reserve is the strategic reserve of the State to meet urgent requirements on prevention, controlling proactively, and overcoming consequences of natural disasters, fires, and epidemics; ensuring national defense and security; stabilizing the market, macro-economy, and performing other urgent tasks of the country. The national reserve organization system is arranged in the central and strategic regions to promptly respond to requests in urgent cases under the management of the Ministry of Finance. The national reserve fund is formed from the state budget decided by the National Assembly. The National Reserve Strategy up to 2010 stipulates: to strengthen the national reserve potential to ensure that by 2015 the total national reserve level will reach about 0.8 - 1% of GDP, and by 2020 it will reach about 1.5. % GDP (Van Ledden et al., 2020). Up to now, the total national reserve is about VND 10,000 billion, an increase of about 1.5 times compared to 2010. However, the size of the national reserve tends to decrease. The total value of national reserves in 2013 reached about 0.24% of GDP. In 2017 it reached about 0.19% of GDP, and it is estimated that up to now, the national reserve level will only reach about 0.18% of GDP. This value is very low compared to the target set out by the National Reserve Development Strategy for 2020 (Van Ledden et al., 2020). With the current total national reserve, it is difficult to proactively respond to unexpected and urgent requests for overcoming consequences of natural disasters, epidemics, and ensuring security and defense, especially when there are unexpected and urgent situations on a large scale and the security and defense situation is complicated (Department of Debt Management and External Finance, 2020).

Non-State Budget

Disaster Prevention and Control Fund

According to Decree 94/2014 C.P., the Fund for Natural Disasters Prevention and Control is established at the provincial level and managed by the province's People's Committee. The natural disaster prevention and control fund does not include the state budget or originate from the state budget. Funds are carried over to the following year. Financial sources of the Fund for Natural Disasters Prevention and Control include:

- Economic organizations with independent accounting: The compulsory

contribution level per year is two-thousandths of the total value of existing assets in Vietnam according to the annual financial statements, but must be at least 500,000 VND, maximum of 100 million VND and accounted for in the cost of production and business activities.

- Vietnamese citizens from 18 years old to the end of working age: (i) Officials, civil servants, and public employees in agencies, organizations, salaried armed forces, and managers in state-owned enterprises water pay 1-day salary/person/year. (ii) Employees in enterprises pay 1-day salary/person/year; (iii) Other employees pay 15,000 VND/person/year.

The disaster prevention and control fund is used to support natural disaster prevention and control activities and prioritizes support for the following actions:

- Emergency relief in food, drinking water, medicine, and other urgent needs for victims of natural disasters;
- Support to repair houses, medical facilities, schools;
- Sanitary treatment of disaster areas.

Road Maintenance Fund

The fund was established under Decree No. 18/2012/ND-CP with the revenue from road maintenance fees and the budget used to repair roads damaged by natural disasters. As of 2015, this fund reached VND 6,381 billion. In which revenue from road maintenance fees is VND 3,067 billion, budget allocation in the fiscal year is VND 3,100 billion, and VND 214 billion carried forward from 2014 to the year. In which, 2015 is the year when the total expenditure for road repair was VND 473 billion.

Environmental Protection Fund

The fund, established in 2002, also provides financial support for environmental protection activities and response to climate change.

Financial Support from Domestic and Abroad

Domestic Financial Support

Many domestic organizations act as a bridge, transferring support funds to people in emergency and disaster recovery. These organizations are the Vietnam Fatherland Front, the Golden Heart Foundation, the Red Cross, etc. In 2017, these organizations delivered 4,400 tons of rice, 607,050 doses of vaccine, 85,000 liters, 240 tons of disinfectant chemicals, etc., to the affected areas to ensure the people's lives. Organizations also support localities with 696 tons of rice seed, 205 tons of maize seed, and 7 tons of vegetable seed. Total support in 2017 of the Vietnam Fatherland Front is 448 billion VND, of the Red Cross is 20 billion VND.

Abroad Financial Support

Vietnam has received very active support from individuals, organizations, and foreign donors in overcoming the consequences of natural disasters. Donations are made in cash and in-kind such as food, water, tents, blankets, medicine, etc. This is out-of-budget support, so data collection and management are not complete and synchronized. Since 2000, USAID, through the Office of Foreign Disaster Assistance (OFDA), has provided more than $20 million for emergency relief and disaster risk management assistance in Vietnam.

In addition, international financial institutions such as the World Bank (W.B.) and the Asian Development Bank, ADB (2015), can make loans to support the construction, restoration, and rehabilitation of infrastructure. In 2005, the World Bank provided Vietnam with a loan of US$20 million to renovate infrastructure. This loan was then used to support eight severely damaged provinces by the two typhoons, Xangsane (October 2006) and Lekima (October 2007). In 2017, the World Bank approved a loan of 358 million USD to Vietnam to implement two projects. Including the Vietnam-Emergency Natural Disaster Reconstruction Project (VENDRP) helps restore and renovate infrastructure in Binh Dinh, Phu Yen, Quang Ngai, Ninh Thuan, and Ha Tinh provinces. The project helps restore and rehabilitate roads, bridges, irrigation systems, water supply systems, and disaster prevention works. The project directly benefits 1.2 million people and indirectly to another 5.1 million people in the five provinces mentioned above (Thuy Duong, 2018).

Financial Shortfall for Disaster Risk Management in Vietnam

Financial Shortfall for Disaster Risk Management is defined as the difference between the total annual loss of the economy as a whole due to a disaster and the financial resources available to offset that loss.

Table 3 shows the state budget reserve and damage from natural disasters in the period 2009-2018. It can be seen that in the years of severe natural disasters such as 2009, 2016, and 2017, the total value of damage across the country far exceeded the budget provisions of both central and local governments. However, this difference cannot be considered as the entire financial shortfall for the disaster. First, the state budget is only responsible for partially compensating for damage caused by natural disasters. Second, not the whole central budget reserve is used for disaster recovery. Third, expenditure on infrastructure renovation and restoration is included in the investment expenditure of the state budget in the years following the disaster (World Bank DRFI Program, 2019).

Table 3. State Budget Reserve and Economic Losses due to Natural Disasters in 2009-2018 (billion VND)

Year	Central and Local Budget Reserve	Economic Losses due to Natural Disasters	Difference
2009	13.700	23.667	-9.967,05
2010	15.300	11.700	3.600,00
2011	18.400	12.703	5.697,00
2012	21.700	16.000	5.700,00
2013	23.400	28.000	-4.600,00
2014	19.200	2.830	16.370,00
2015	25.000	8.167	16.832,51
2016	26.000	39.726	-13.726,43
2017	29.300	60.000	-30.700,00
2018	32.097	20.000	12.097,00

Source: Original table of this study, compiled from data on Vietnamese Government Portal (2019)

The short-term disaster recovery financing shortfall after a disaster is determined by the disaster financial resource less the estimated recovery cost (if negative). Financial resources for natural disasters include budget reserve for natural disasters, domestic and foreign aid. Thus, table 4 shows that financial resources for disaster recovery lacked in 2009, 2016, and 2017. 2009 is considered the year that Vietnam suffered the heaviest disaster consequences in the first decade. This was the first year of the 21st century when Typhoon Ketsana (typhoon number 9) appeared, compared with the destructive power of Super Typhoon Xangsane (2006). 2016 and 2017 also saw record-breaking storms like Mirinae and Damrey (GFDRR, 2018). In addition, Vietnam also suffered considerable damage due to the rapid arrival of floods. In the remaining years in 2009-2018, financial resources could meet the short-term recovery costs.

Table 4. The estimated financial shortfall for disaster recovery in 2009-2018 (billion VND)

	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
State Budget Reserve										
Total	13.700	15.300	18.400	21.700	23.400	19.200	25.000	26.000	29.300	32.097
Central	7.600	7.800	9.400	10.300	10.800	10.300	13.000	12.500	15.800	15.800
Local	6.100	7.500	9.000	11.400	12.600	8.900	12.000	13.500	13.500	16.297
Disaster budget										
State								**5.609**		

Central (40%)	3.040	3.120	3.760	4.120	4.320	4.120	5.200		6.320	6.320
Local (20%)	1.220	1.500	1.800	2.280	2.520	1.780	2.400		2.700	3.259
Others (10%)	1.370	1.530	1.840	2.170	2.340	1.920	2.500		2.930	3.210
Domestic Aid								721.4	191.76	
Foreign Aid								352	172	
Total Resources for Disaster Recovery	**5.630**	**6.150**	**7.400**	**8.570**	**9.180**	**7.820**	**10.100**	**6.682**	**12.313**	**12.789**
Losses	23.667	11.700	12.703	16.000	28.000	2.830	8.167	39.726	60.000	20.000
Recovery cost	5.916,75	2.925	3.175,75	4.000	7.000	707,5	2.041,75	9.931,50	15.000	5.000
Financial Shortfall for Disaster Recovery	-286,75	3.225	4.224,25	4.570	2.180	7.112,5	8.058,25	-3.249,10	-2.686,61	7.789,1

Source: Original table of this study, compiled from data on the Government Portal (2019)

The long-term disaster reconstruction financing shortfall after a disaster is determined by the reconstruction expenditure less the estimated reconstruction cost (if negative). The source of reconstruction expenditure is assumed to be 10% of the investment expenditure of the budget plus the remainder of the disaster recovery budget after the recovery expenditure. The cost of reconstruction, as shown above, is assumed to be 35% of the damage caused by

the disaster. Calculation data show that in years when the damage caused by natural disasters is relatively large (over 20,000 billion VND), the budget is often not enough to reconstruct infrastructure works after the disaster. However, this excludes 2010, although there was less damage, perhaps due to a severe disaster from the previous year.

Thus, if only relying on the state budget, it is impossible to have enough resources for recovery and reconstruction when severe natural disasters occur. Meanwhile, all levels are still heavily dependent on the central budget to cover disaster recovery costs.

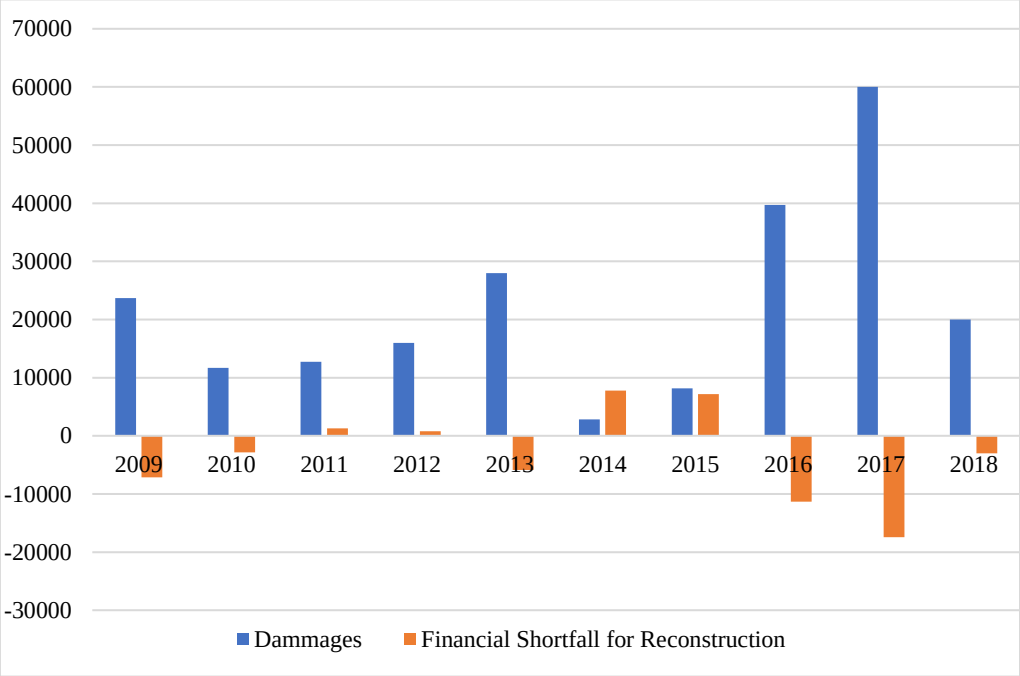
Table 5 shows the estimated financial shortfall for Post-disaster Reconstruction in the period 2009 – 2018.

Table 5. Estimated Financial Shortfall for Post-disaster Reconstruction in 2009-2018 (billion VND)

	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Damages	23.667	11.700	12.703	16.000	28.000	2.830	8.167	39.726	60.000	20.000
Financial Shortfall for Recovery	(286,75)	3.225	4.224,25	4.570	2.180	7.112,5	8.058,25	(3.249,1)5	(2.686,61)	7.789,10
Reconstruction Costs	8.283,45	4.095,00	4.446,05	5.600,00	9.800,00	990,50	2.858,45	13.904.10	21.000,0	7.000,00
Investment Spending	112.800	125.500	152.000	180.000	175.000	163.000	195.000	254.950	357.150	399.700
Finance for Reconstruction	1.128	1.255	5.744	6.370	3.930	8.743	10.008	2.550	3.572	3.997
Financial Shortfall for Reconstruction	(7.155,45)	(2.840)	1.298,20	770.00	(5.870)	7.752	7.149,8	(11.354,6)	(17.428,5)	(3.003)

Source: Original table of this study, compiled from data on the Government Portal (2019).

Figure 4. Natural Disaster Damages and Financial Shortfall for Reconstruction in 2009-2018



Source: Original figure of this study, compiled from data on the Government Portal (2019)

Financial Inadequacies for Disaster Risk Management in Vietnam

Financial Shortfall Inadequacies

The main inadequacies drawn in the financial shortfall analysis include:

Inadequacy 1: There is a massive shortage of financial resources for disaster prevention. Vietnam's Disaster Prevention and Control Strategy and Law clearly state that prevention is the focus. However, there is currently insufficient funding and no formal financial flow for disaster preparedness. As a result, the prevention capacity of stakeholders (Government, community, and people) is inadequate. When the prevention capacity is lacking, the vulnerability of society is very high, leading to direct damage from large disasters due to exposure and destruction. Thus, spending is not consistent with the priorities in the Strategy and Law on Disaster Prevention.

Inadequacy 2: There is insufficient finance for reconstruction after high-damage natural disasters (extreme events). Therefore, it is very difficult to restore the economic capacity of sectors, localities, and households. It amplifies indirect economic losses in the medium and long term (Rozenberg, J, and Hallegatte, S., 2016).

Inadequacy 3: Disaster financing is currently only focused on the relief and recovery (very short) post-disaster period. Despite a local reserve budget, all levels are still heavily dependent on the central budget to cover these costs. Management of contingency budgets at the local level for natural disasters is

poor, while it is also not flexible at the central level. This leads to delays in funding for the recovery, delays in relief, and increased damage.

Financial Institution Inadequacies

Inadequacy 1: The biggest institutional shortcoming is that no unified and harmonious coordinating institution (department) on strategies, policies, and priorities or plans in the disaster risk management plan. There is no comprehensive and unified institution for short-term and long-term goals between the central and local governments, ministries and sectors, and provinces in the same disaster risk area (e.g., the Central region). The plan is not associated with climate change, disaster risk scenarios, and expected damage of natural disasters. This dissonance leads to overlapping gaps in the plans and priorities of disaster risk management action. At the same time, these are inherently the foundation for disaster risk management financial plans. Finance must go hand in hand with plans and policies

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Inadequacy 2: Lack of an institution that harmonizes policy orientation, overall/detailed plans in national disaster risk management, central and local financial system for natural disasters.

Inadequacy 3: Lack of a synchronous disaster financial management institution to harmonize short-term and long-term financial flows, central and local governments. Currently, financial flows are used inefficiently because there are years in excess or shortage. Some provinces have excess or lack financial resources for natural disasters. There are stages in disaster risk management with excess financial (for small disasters), and there are stages in the shortage (prevention and reconstruction). Therefore, there is currently a lack of an institution that harmonizes these flows.

Example: Inadequacies in revenue and expenditure of the Disaster Prevention Fund A financial resource for DRM is the Disaster Prevention Fund established at the provincial level, which is also limited. VCCI assesses the use of the Disaster Prevention Fund as being weak.

Disaster prevention fund is established at the provincial level. There are 61/63 provinces and cities that have funds, but eight provinces have not yet used them. Although established in 2014, in the five years to 2019, localities have only used 918 billion VND and still have 1,442 billion VND left over. Thus, the new expenditure is only 39% of the total revenue. In other words, 1,442 billion VND of money that should have been used in disaster risk management is currently frozen in the fund. Considering this money to be used as a reserve in case of a big disaster is not accurate. In the past five years, funds in all localities have had a surplus or excess. It means the amount spent in the year is always lower than the amount collected in that year. Thus, the demand and capacity to use the fund are deficient. In addition, it is a fact that natural disasters occur unevenly. Some provinces mobilize a lot of money but no natural disasters. While some provinces cannot mobilize, but natural disasters occur very often. Therefore, the Disaster Prevention Fund has not met the actual needs of each locality.

VCCI pointed out that up to 7 localities only collected but not spent funds in the past five years. These localities are Dien Bien (collecting VND 8 billion), Yen Bai (collecting VND 3.4 billion), Hai Duong (collecting VND 9.8 billion), Ha Nam (collecting VND 18 billion), Ninh Binh (collecting 10 billion VND)., 5 billion VND), Quang Ngai (4.6 billion VND), Lam Dong (13.6 billion VND). According to VCCI, the money of businesses and workers in these localities is being misappropriated without serving any specific purpose. Besides, seven other localities have revenue, but the amount used is very low, not reaching 10% of the revenue. These are Bac Kan (collecting VND 15 billion, spending VND 37 million), Vinh Phuc (collecting VND 14 billion, spending VND 712 million), Hai Phong (collecting VND 47 billion, spending VND 610 million), Kon Tum (earning 10 million VND). 0.6 billion VND, spending 800 million VND), Gia Lai (collecting 13.4 billion VND, spending 662 million VND), Vung Tau (collecting 26.7 billion VND, spending 15 million VND), Soc Trang (earning 7.5 billion VND, spending 412 million VND). Thus, the use of funds through the above figures shows that efficiency is not high, a social resource is being frozen.

Inadequacy 4: Lack of a reasonable financial structure, the balance between revenue and expenditure, central and local governments, lack of investment flows for prevention and reconstruction between short-term and long-term financial expenditures according to plans and estimates. Lack of a flexible financial mechanism between the central and local governments to respond to emergencies (localities depend on and rely on the central Government, the central Government does not have a timely allocation mechanism).

Inadequacy 5: Lack of a division that allows connecting financial flows between sources within the budget, outside the budget, public and private sectors, PPP, bond purchases, international financial flows.

In short, financial accounts are fragmented, separate, local, lacking a system, lacking overall management and spending system.

Inadequacy 6: The disaster planning and budgeting cycle have many shortcomings:

- Lack of criteria and system for classifying expenditures for natural disasters in the state budget
- Lack of system to track, monitor, allocate and aggregate expenditure flows for disasters
- Lack of reports and assessment of the results of expenditures made as a basis for building medium- and long-term fiscal frameworks for DRM, no medium and long-term budgetary framework for DRM
- The management information system on expenditures is not yet connected.

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RECOMMENDATIONS

The Vietnamese Government might legally designate a portion of its contingency budget for natural catastrophes.

To avoid a situation in which contingency reserves are nearly depleted when a disaster strikes, the Government of Vietnam may dedicate a predetermined percentage of its contingency budget to paying post-disaster recovery expenses. Over the years 2009-18, government-funded recovery spending accounted for over half of the Contingency budget on average.

The Vietnamese Government may potentially build up reserves for natural catastrophes by allocating yearly funds from the current Financial Reserve Fund.

The Vietnamese Government may supplement the contingency budget with a reserve mechanism for natural disasters, such as a fund built over time from an annual budget allocation to the Financial Reserve Fund. Once the contingency budget has been depleted, these reserves might be utilized to fund post-disaster recovery costs and begin reconstruction activities.

Sovereign parametric disaster insurance could be further explored to protect against the financial impact of major events occurring every ten years or less frequently.

Parametric insurance is an innovative form of insurance triggered by pre-defined parameters such as the wind speed or the excess rainfall for tropical storms and typhoons. It provides immediate liquidity to the policyholder in the aftermath of a disaster. Sovereign parametric insurance against natural disasters has been purchased by many of the Caribbean islands and by Mexico.

The Government of Vietnam could set up a dedicated reserve fund for natural disasters for the post-disaster reconstruction of public assets.

This fund would aim to secure financing for the post-disaster reconstruction of public assets from an annual budget allocation and external funding, including insurance. The national disaster fund FONDEN in Mexico is an interesting case the Government of Vietnam may want to explore further. Such a fund could build upon the ongoing rapid disbursement facility under the Natural Disaster Risk Management Project co-financed by the World Bank.

In the medium term, the Government of Vietnam could promote the development of the local property catastrophe insurance market, especially for private urban dwellings of middle and high-income households.

The private residential property insurance market in Vietnam is still under-developed. As this market develops in the future, the Government could promote a private residential catastrophe insurance program by establishing a catastrophe insurance pool, like in Turkey.

In the medium term, agricultural insurance could also be promoted through public-private partnerships.

The agricultural sector in Vietnam is highly exposed to natural hazards, and this sector incurs approximately one-third of the reported value of the damage. Currently, Government support to affected farmers is restricted to small payments in-kind (inputs of seeds and fertilizers). The provision of agricultural insurance in 2009 is highly limited, and the past attempts have not been very successful. Further work could build on the ongoing initiatives to design and pilot-implement an agricultural insurance program based on public-private partnerships. Currently, the Government is investigating options to introduce a national agricultural insurance program.

CONCLUSIONS

Vietnam is one of the countries hardest hit by natural disasters and climate change in the Asia Pacific region. In Vietnam, disaster risk financial management is in its infancy. Vietnam has proactively built its own unique disaster risk management system and has considered developing Disaster Risk Finance instruments at the national level. However, until recently, the financial resources for disaster management were still in short supply, mainly focusing on the relief phase. There was no adequate investment in prevention and reconstruction work after natural disasters, especially in years when major natural disasters occur. This study examines the financial resources for disaster, analyzes the financial gaps and institutional challenges to mobilize and use financial resources effectively for disaster management in Vietnam.

Vietnam now has opportunities to ease these challenges. The financial solution for disaster risk is built on forecasting and financial planning to respond to the consequences of natural disasters. Thereby helping governments, both at the national and local levels, be in a stronger, more resilient, and more predictable position to respond promptly to relief, recovery, and reconstruction after a disaster.

Potential financial instruments include annual budget reserves, insurance, standby credit, post-disaster reallocation, debt, and tax increases. Insurance solutions have been evaluated as the best starting point for several pilot localities in Vietnam. If they choose to implement the tool, localities will quickly be provided with an additional source of financing after a disaster such as the agreement occurs. This financial resource can be used for any purpose that the locality deems appropriate and necessary at the time. Another significant advantage is that cities will be guaranteed access to liquidity at a predictable annual fee. This results in more accurate budgeting and less disruption to the Government's recurrent and investment plans after a disaster.

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