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Typhoon Damrey Early Recovery Analysis Report: Viet Nam 2017

Ha Noi, January 2018

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Cover photo: UNDP Vietnam/ Phan Huong Giang

Acknowledgements

This report builds on findings from an inter-agency early recovery rapid assessment conducted shortly after Typhoon Damrey and also draws on data and analysis from many experts and agencies operating at all levels. The assessment team comprised representatives from the VDMA, UN, CIAT and experts from impacted provinces, including:

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This report has been drafted based on inputs from the team, with technical oversight from **Jenty Kirsch-Wood** and **Duong Van Hung** of the Climate Change and Environment Team of UNDP's Viet Nam Country Office, with communications and information management support from **Phan Huong Giang** and **Marie-Florine Thieffry**.

While the recommendations have been developed by the UNDP team, they draw on recent global good practice, and have benefitted immensely from the insights of community members and experts from the commune to the national level. UNDP would also particularly like to express our sincere gratitude to local authority officials in the affected provinces, particularly in Khanh Hoa and Quang Nam for providing us with necessary data and information.

Preface

This typhoon Damrey Early Recovery analysis report is the product of active collaboration between UNDP and Government of Viet Nam's newly established Viet Nam Disaster Management Authority. It builds on findings from an inter-agency early recovery rapid assessment conducted shortly after Typhoon Damrey but also draws on data and analysis from many experts and agencies operating at all levels.

The report provides a preliminary analysis of damages and early recovery needs for the nine most affected provinces. It gives a snap-shot of how this typhoon impacted lives and livelihoods and how impacts were spread across key sectors, how impacts varied across provinces and at how men and women, and people from different age or other groups were differently impacted.

Overall, Typhoon Damrey affected over 4.3 million people and particularly among poor and near-poor households exacerbating pre-crisis vulnerabilities in terms of incomes, food security and other basic needs. While the Government was very active in responding meet both humanitarian and recovery needs, total economic damage caused by Typhoon Damrey was estimated at US$ 1 billion, and continued resource mobilization is on-going in partnership with the UN, international NGOs, bilateral donors, and local NGOs needs are significant.

As the Government of Viet Nam looks towards mid-term recovery strategies, support for livelihoods and housing and reconstruction are key, but so are innovative approaches. Actors such as the private sector can play a more active role in helping to livelihoods and to minimize the impacts of distressed selling in heavily impacted areas. Extension and expansion of existing development programs, crop diversification research programs and provincial programs could also help fast track support. Stepped up investment in information management and in analyzing costs, losses and recovery needs can help incentive preparedness for future events and can make the case for financial risk management strategies like insurance. For example, this report is limited in its analysis of cost estimates of losses and recovery needs- but action now could ensure that such data is available in future events, aiding the accuracy and effective of action.

Recovery assistance and resilience planning is rightly becoming an increasing priority for the Government of Viet Nam. Relief action, and the repair of roads, bridges, schools, upgrading of river control and irrigation systems is important, but this needs to be complemented by more effective and targeted support to those most impacted by the disaster- with an emphasis on reaching poor and marginalized groups. Well planned action today to ensure that plans, programs, policies, systems and capacities are developed with the active involvement of key stakeholders, including communities, can reduce suffering and save money in the future.

For Vietnam Disaster Management Authority

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Photo: UNDP Viet Nam 2017/ Phan Huong Giang

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Acronyms and abbreviations

CCFSC	Central Committee for Flood and Storm Control
CERF	Central Emergency Response Fund
CV	Chevaux-vapeur
DRM	Disaster risk management
DRR	Disaster risk reduction
GDP	Gross domestic product
GoV	Government of Vietnam
GSO	General Statistics Office
MARD	Ministry of Agriculture and Rural Development
MOC	Ministry of Construction
MOLISA	Ministry of Labor, War Invalids and Social Affair
MPI	Ministry of Planning and Investment
NGO	Non-Governmental Organization
ODA	Overseas Development Assistance
PCC	People's Central Committee
SDG	Sustainable Development Goal
UNDP	United Nations Development Programme
VDMA	Vietnam Disaster Management Authority
VND	Viet Nam Dong
VNRC	Viet Nam Red Cross

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Executive Summary

Typhoon Damrey

On 4 November 2017, Typhoon Damrey (Storm No. 12) made landfall in Viet Nam with winds of up to 135 km/hour. The storm impacted a total of 15 provinces, with nine being particularly severely affected. Typhoon Damrey was the strongest storm to impact Viet Nam since 2001[1]. Damrey was distinctive not only for its strength, but also for its storm track: Typhoons rarely make landfall on the southern coast, but Damrey hit the southerly Khanh Hoa province and then continued to move inland through Dak Lak. While it remains hard to directly attribute any storm to climate change, Damrey's peculiarities seem very much in line with the Government of Viet Nam's official climate projections, which forecast more intense typhoons that take less predictable, and often-southerly track.

Annually, Viet Nam loses about 1-3 percent of its GDP due to natural disasters (World Bank, 2017). With 3,440 kilometers of coastline, approximately 71 percent of the population and 59 percent of the land area is vulnerable to disasters. Floods and storms are the most frequent and destructive in terms of fatalities and economic damage. Viet Nam lies within the Southeast Asian typhoon zone and experiences an average of 6-10 large storms per year. Floods occur primarily in the Central plain, along the Red River basin and Mekong Delta, and account for more fatalities, whereas storms occurring along the central and northern coastal region bring more physical damage. Between 1990 and 2010 Viet Nam experienced 74 catastrophic floods and typhoons, most of which impacted central provinces such as Quang Binh, Thanh Hoa, Quang Tri, Thua Thien – Hue, Quang Ngai, and Binh Dinh.

The impact of a disaster event such as Damrey is determined not only by the strength of the storm but also by the pre-disaster vulnerability of the population living in the area and how directly exposed people are to the event. As such, factors such as poverty, housing quality, and preparedness measures have long been known to impact disaster vulnerability. The impacted provinces varied widely in their pre-disaster vulnerability and underlying poverty rates. The pre-disaster vulnerability may in part help explain why inland provinces like Dak Lak with high rates of poverty managed to sustain damage on par with coastal areas more directly hit by the storms force.

Damrey impacts were concentrated in the South-Central region (Khanh Hoa, Phu Yen, Binh Dinh, and Quang Ngai), the Northern-Central region (Thua Thien – Hue and Quang Nam), and inland areas directly on the storm path such as Dak Lak in the Central Highlands. Fatalities totalled 107 and concentrated in Khanh Hoa, which lost 44 people. More than 134,000 houses were damaged with 3,550 completely-destroyed. A total of 38,385 hectares of rice and crops affected. 1,944 hectares of shrimp farms flooded, and 73,664 aqua-culture cages swept away. More than 4.3 million people were affected directly by the storm, 2.2 million of whom are women and girls and 1.0 million are children.

Total disaster damages in 9 most severely provinces have been estimated by the Government to have reached around VND 22,130 billion or roughly US$ 1 billion[2]. Khanh Hoa and Phu Yen Provinces which were in direct path of the typhoon when it made landfall suffered heaviest in losses and damage. Khanh Hoa accounted for 66.4 % of total damage (around VND 14,700 billion) followed by Phu Yen accounted for 14.7 % (around VND 3,263 billion) (Source: VNDMA update, December 2017).

1. Damage from Damrey is comparable with the slightly weaker 2005 typhoon which battered Viet Nam's 13 northern coastal provinces from Danang to Quang Ninh with winds of 133km/hour. The 2005 typhoon killed 59 people, damaged over 120,000 houses and 240,174 hectares of crops. Economic losses were estimated at US$220 million.

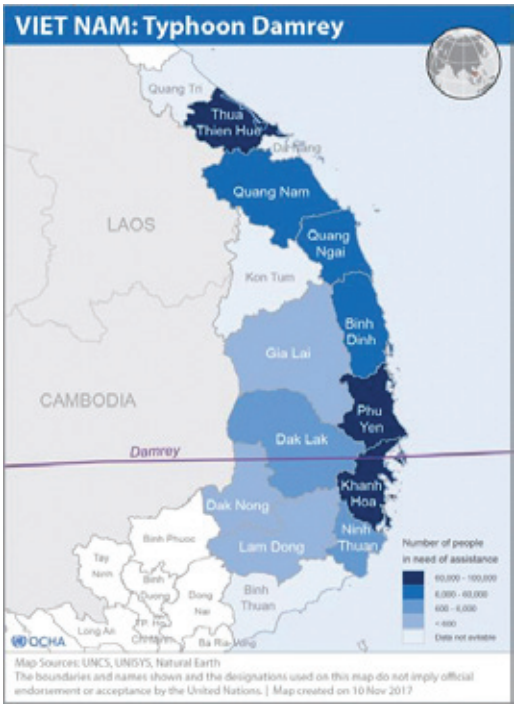
2. This figure is based on the aggregate damage/loss value of all sectors from 12 provinces, 9 of which were severely affected.

Emergency Response

A fast, coordinated and multi-stakeholder response was initiated by the Government of Viet Nam (GoV) together with the UN and other development partners to respond to immediate humanitarian needs. On November 6, the GoV officially requested the UN to provide recovery support. The Inter-Agency Joint Rapid Needs Assessment undertaken by the UN, GoV, and civil society organizations, was completed on 16 November 2017. It identified housing and livelihoods as the most urgent needs for impacted communities.

The map below shows the magnitude of the typhoon's impact in terms of people needing assistance. The December 2017 report from Local Authorities showed that there Thua Thien-Hue had the highest number of people needing immediate assistance at 97,270 followed by Khanh Hoa at 80,380 and Phu Yen at 78,840 as depicted in blue in the map below.

Figure 1: Number of people in need of assistance after typhoon Damrey



(Source: Vietnam Disaster Management Authority, December 2017)

The UN in Viet Nam, including FAO, IOM, UNDP, and UNICEF received 4.2 million USD from the UN Office for the Coordination of Humanitarian Affairs through the Central Emergency Response Fund (CERF) to support relief activities on Emergency Shelter, WASH, and Food Security and Livelihoods to be carried out with Government, Viet Nam Red Cross (VNRC) as well as NGO partners. Support was also received from OCHA Emergency Response Fund, the Viet Nam Red Cross, and other NGOs including World Vision, Save the Children, CARE, Plan and bilateral Governments including Korea, Japan, United States, New Zealand and Russia.

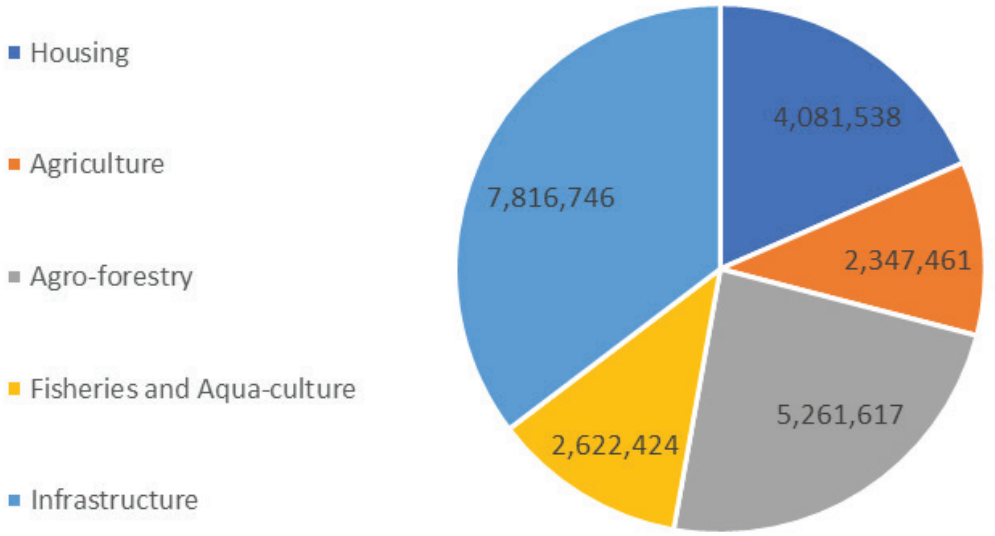
Based on the results from the joint rapid needs assessments, after the search and rescue phase completed, priority was given to (i) restoring food and livelihoods security of severely affected communities; (ii) ensuring access to sanitation and clean water; (iii) repair/ building of houses damaged or destroyed by the storm.

Development Impact

The total damage caused by Damrey in 9 most severely provinces is estimated at VND 22,130 billion which amounts to almost 0.49 % of GDP[3]. The housing and agro-forestry sectors account for the largest share of damage, with less resilient homes and standing crops worst impacted. Income losses when considered at the provincial level were not significant and much of the costs were incurred by private housing stock. This will, therefore, have a low level of direct impact on the annual output of the national economy. As the cost of recovery will be phased over one-two years, the fiscal burden placed by the recovery programme is manageable when compared to the national GDP. Recovery funds have been pledged by the Government to provide a portion of early recovery costs.

3. GDP of Vietnam in 2016 is 4,502.700 billion VND, Source: General Statistics Office of Vietnam

Figure 2: Economic Damage per sector (in million VND)



Khanh Hoa incurred the highest value of damages (accounts for 66.4% of the total economic damages) although it is not the poorest province (only 2nd in terms of multidimensional poverty rate). Khanh Hoa was in the direct path of the storm thus sustained the highest damages in houses and in major and high-value agricultural production (especially aqua-culture farms, acacia plantation, etc.). Dak Lak province is an inland/landlocked area and predominantly a vegetable producer which has relatively lower value than aqua-culture, plantation crops, and forest trees. It also sustained the lowest damages in houses though it has the most number of semi-permanent houses due to its location.

Table 1: Economic Damages per province

Province	Estimated economic Damage (in million VND)	Percentage
1. Quang Tri	255,308	1.2%
2. Thua Thien-Hue	310,000	1.4%
3. Quang Nam	827,618	3.7%
4. Quang Ngai	951,400	4.3%
5. Binh Dinh	866,000	3.9%
6. Phu Yen	3,263,000	14.7%
7. Khanh Hoa	14,700,000	66.4%
8. Dak Lak	821,000	3.6%
9. Kon Tum	135,460	1.2%
Total (VND)	**22,129,786**	**100%**

(Source: VDMA update, December 2017)

Impacts, however, are most concentrated within poor households least able to cope and without targeted support, impacts at the household level for those still striving to climb out of poverty can be devastating. If not supported by some form of external support, recovery for heavily impacted poor households will take many years. A lack of support may result in permanent changes such as urban migration by the young, rural poor to urban centers.

Among the most affected provinces, Dak Lak has the highest multidimensional poverty (more than 17%) followed by Quang Ngai (more than 13%).followed by Khanh Hoa 7.44%, Hue at 7.19%, Phu Yen at 10.23%, and Binh Dinh at 10.65%. Initial assessments suggest that ethnic minority populations, particularly in the highland areas, as well as those who are already poor or near poor were the most vulnerable to the storm's impacts (UNDP Viet Nam 7 December 2017 Report).

Table 2: Percentage of poor and near poor households across 9 severely affected provinces in 2016

Province	Poor Household	Percentage	Near Poor Household	Percentage
Quang Tri	22.313	13,49%	12.001	7,26%
Thua Thien-Hue	20.623	7,19%	15.777	5,50%
Quang Nam	45.330	11,13%	24.808	6,09%
Quang Ngai	45.260	13,06%	30.500	8,80%
Binh Dinh	44.637	10,65%	27.070	6,46%
Phu Yen	25.765	10,23%	22.050	8,75%
Khanh Hoa	21.379	7,44%	21.440	7,46%
Dak Lak	76.434	17,83%	41.377	9,65%
Kon Tum	28.990	23,03%	8.359	6,64%

(Source: Decree 945/QĐ-LĐTBXH /MOLISA/22 June 2017)

Damage and Recovery needs

Disaster damage

Based on initial analysis from the Government, the total damage caused by Damrey have been estimated at VND 22,130 billion. This does not fully include personal household losses. While some of the important assets in the public sector have been included, damage to the private sector, to other sectors, or to small-scale community infrastructure has not.

Table 3: Summary of direct damage of 9 severely provinces

Sector	Unit	Total
Housing		
Completely-destroyed	House	3,515
Partially damaged (from 30%-70%)	House	122,502
Agriculture		
Paddy rice	Hectare	8,879
Vegetables	Hectare	20,646
Perennial crops	Hectare	15,920
Annual crops	Hectare	46,868
Fruit Trees	Hectare	15,016
Livestock		
Buffalo, Pig, Cow	Head	11,587
Poultries	Head	614,814
Damaged barns	VND (million)	58,683
Agro-forestry		
Natural Forest	Hectare	38,671
Plantation Forest	Hectare	10,922
Fisheries and Aqua-culture		
Fish pond	Hectare	2,255
Shrimp	Hectare	1,944
Fish cage	Cage	73,624
Fishing vessel	Vessel	1,803
Transportation		
National Highway damaged by landslide/erosion	Meter	35,778
Inter district, commune road damaged by landslide/erosion	Meter	894,234
Bridge	Bridge	250
Culvert	Culvert	687

(Source: VDMA update, December 2017)

Recovery needs

For UNDP globally, recovery needs are usually considered as comprising four elements: 1) the reconstruction of damaged infrastructure and physical assets, 2) the resumption of production, service delivery and access to goods and services, 3) the restoration of governance and decision-making processes and 4) the reduction of risk.

Viet Nam does not yet have tracking systems that enable accurate estimates of composite recovery needs. However, available data suggests that the composite costs of meeting the recovery needs of Typhoon Damrey in terms of livelihood, housing and basic infrastructure in 9 severely affected provinces are in excess of 8,000 billion. The chart below provides a summary of current estimates by sector of early recovery needs in the nine most impacted provinces in the wake of Typhoon Damrey.

Table 4 : Summary of early recovery needs of 9 severely affected provinces

Sector	Amount in million VND
Housing	1,538,785
Agriculture	885,019
Agro-forestry	1,983,688
Fisheries and Aqua-culture	988,683
Infrastructure	2,947,000
Total	**8,343,175**

(Source: VDMA update from December 2017 and VDMA consolidation from 9 Provincial People's Committee's Request from 8-10 November 2017)

Although the cost of the early recovery may appear high, careful planning of the recovery programme would ensure that it is fiscally prudent. Early recovery is not just a Government responsibility. It is important that the programme brings together a number of stakeholders, the most damaged being households themselves. Resources are also expected from development partners, non-Governmental and mass organizations and the private sector. An early recovery programme with an earmarked budget would be a clear demonstration of the Government's commitments to the people's recovery.

Moving forward, ensuring that systematic assessment damages and early recovery needs will be essential to promoting continued economic growth and sustainable development in high disaster impacted provinces.

(Source: UNDP Viet Nam /Duong Van Hung)

Photo: UNDP Viet Nam 2017/ Phan Huong Giang

1. Methodology and objective of the analysis report

Following the emergency focused inter-agency assessment mission, the GoV also collected significant information on post-disaster early recovery needs. A Government led rapid early recovery mission was also undertaken with support from UNDP and the UN system. This report aims to bring together and provide initial synthesis and analysis from these multiple data sources.

The report focuses on data from the nine most impacted provinces including Quang Tri, Thua Thien-Hue, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Kon Tum and Dak Lak, particularly focusing on the most impacted sectors: shelter, agriculture and livelihoods, and a part of infrastructure. Data was collected based on commune-level Government reports, reports from sectoral ministries, and from the inter-agency relief and early recovery assessment missions.

The data was compared with baseline data on key factors such as underlying poverty rates and pre-disaster housing stock trends to help contextualize damage and loss. The total cost of early recovery was calculated by aggregating the preliminary cost of early recovery needs of all sector but has not included risk reduction measures. The Ordinance number 02/2017 ND-CP on support for livelihood recovery and some additional provincial decrees on support for recovery are applied to calculate the early recovery needs.

The following chapter presents a detailed analysis of disaster damages and recovery needs. This is followed by suggestions for components of a Recovery Strategy that could be implemented in the immediate, medium and long-term with a span of three years. The final chapter of the report proposes a resilience framework to undress some of the underlying vulnerability and risk that exist in the affected areas. A comprehensive recovery approach that helps the most affected and vulnerable recover from Damrey, and to increase its longer-term resilience to future typhoons, is essential to ensure that Viet Nam remains on track to achieving the Sustainable Development Goals (SDGs).

2. Disaster Effects and Recovery Needs

2.1 Housing

In Viet Nam, damage to housing/shelter is usually classified into four categories: a) minor (less than 30%); b) moderate (30-50%); c) severe (50-70%); and d) completely-destroyed (more than 70%).

In 9 most severely province, typhoon Damrey damaged a total of 136,991 houses in which 3,515 houses fell under the completely-destroyed category. In impacted areas, affected people continue to live in their own homes. These houses are mainly independent free-standing structures, which include one or more rooms or spaces, usually enclosed by walls that extend from the foundation to the roof.

The size and type of housing depend on the economic status of the family. Above average families generally, have larger concrete houses while average and below average families live in semi-concrete housing structures made of thatched roof with some using iron sheets for roofing and concrete walls. A house primarily serves as a dwelling unit but also a venue for economic activities (i.e., production area, a store, or renting out some available space or rooms), meaning that damage to the house automatically also disrupts the economic activities of the household.

Disaster effects

Among the 9 most severely affected provinces, 80% of the total housing damage happened in the Khanh Hoa Province, where most of these houses were of the poor/near poor. In some districts, like Khanh Vinh and Van Ninh in Khanh Hoa province, up to 95% of houses damaged were owned by ethnic community members (JAT Report Khanh Hoa and Phu Yen).

Figure 3: Damaged houses in Khanh Hoa province

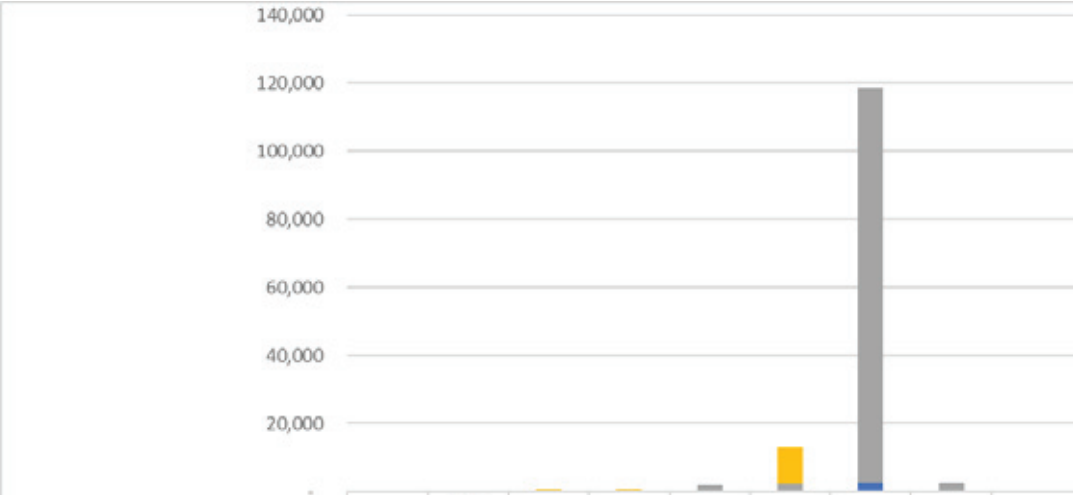
(Source: UNDP Viet Nam /Duong Van Hung)

Combined with the hit of a full force storm, and high rates of "semi-permanent" homes seem to have contributed to higher damage rates. Based on reports from the local authorities, the 6 provinces with a significant number of completely-destroyed houses have more permanent houses than semi-permanent houses. Although Khanh Hoa has a comparatively low poverty rate among impacted provinces, it is third in terms of highest percentage of households (almost 50%) living in "semi-permanent" housing structures (GSO 2016). Being the poorest, the province of Dak Lak has the highest number of population (75%) living in semi-permanent houses.

Further validation needs to be done to determine the exact extent to which permanent houses were also completely-destroyed. Location is a major factor but further assessment of the damaged houses is needed to determine other root causes, such as adherence to safety and resilient construction standards (i.e. quality materials and prescribed technology, etc.) as required by the Government.

The figure below shows the location of the completely-collapsed houses and those partially damaged by the typhoon. It shows that the province of Khanh Hoa has the highest number of completely-collapsed houses since it was directly hit by the typhoon.

Figure 4: Summary of direct damage to housing in 9 severely affected provinces



	Quảng Trị	Thừa Thiên Huế	Quảng Nam	Quảng Ngãi	Bình Định	Phú Yên	Khánh Hòa	Đắk Lắk	Kon Tum
Minor (< 30%) (slightly damaged houses)	5		158	90		10,661			
Moderate (30% -50%) (lifted roof)		1	241	196	1,735	1,859	115,585	2,423	-
Severe (50% -70%) (collapsed wall, lifted roof)	1		31	73		349			68
Completely-destroyed (> 70%) (completely collapsed houses)		1	21	39	260	203	2,817	174	

(Source: VDMA update, December 2017)

Recovery needs

The Government plans to provide assistance in rebuilding (though not the full replacement cost). The total funding requirements to build new houses for the 3,515 families who totally lost their houses and 133,476 families who sustained partial damages is estimated at VND 1,538,785[4]. This is based on the cost and specifications to approximately build a 15-30 square meter flood and storm-resistant home being employed by the existing national target programme on flood resilient shelter[5]. The Government support is purely for materials while labor, extension or any other improvements will be covered by the homeowner beneficiary.

4. In Khanh Hoa province which account for 80% of the completely-destroyed houses wrought by Typhoon Damrey, the provincial government has reported that the 2.817 completely-destroyed houses will be rebuilt within the first quarter of 2018. It has pledged to provide financial assistance at VND 40 million or US$ 1,800 (20 million from the province and additional 20 million from social sources). The support is based on the Degree No. 136/2013/ND-CP governing the scale/level of damages. The amount varies across areas depending on the provincial and/or district allocation and additional funds mobilized from other sources. Based on findings during the validation mission in Quang Nam province on 11-12 Dec. 2017, the Bac Tra My District has allocated VND 70 million per collapsed house with VND 40 million from national government, 10 million from district, and 20 million from other organizations.

5. See Prime Ministerial Decision No. 48/2014 / QD-TTg of August 28th 2014. Estimated budget to build a new house with safety standards designed by Ministry of Construction is VND 57 million/house (Ref. JAT for Khanh Hoa and Phu Yen)

Table 5: Summary of recovery needs of housing in 9 severely affected provinces

Type of Damage	Recovery Needs	
	Number	Amount (million VND)
Completely Destroyed	3,515 at VND 57 million/unit	200,355
Partially Damaged (from 30-70%)	122,562 at VND 15 million/unit	1,838,430
Total (Million VND)		**2,038,785**

(Source: VDMA update, December 2017)

Figure 5: Rebuilt house in Bac Tra My district, Quang Nam province

(Source: UNDP Viet Nam/Nguyen Dang Nhat)

The Government, Red Cross, UN agencies, and a range of humanitarian organisations have been providing support for housing repair to with below 70% damage. The Khanh Hoa Validation mission on 11-12 Dec 2017 raised the possibility that a significant number of damaged houses may not be included in the support plan. Given that the affected families also lost assets and livelihood, they will not be able to cover the required funds to improve their housing conditions in the next six months without external assistance.

Families whose homes were destroyed are living with relatives while those with partially damaged structures continue to live in their damaged houses exposing them to further risks. Based on observations during recent field validation missions in the provinces of Quang Nam and Khanh Hoa, there are opportunities to speed up the provision of housing assistance both in Damrey and in future storms.

In addition, in areas where construction work has started, technical supervision from the Government and its partners is needed to develop the design, provide proper guidance on the proper type of materials and construction methods or technology to ensure better quality resilient houses. The State Agency for Construction Quality Inspection under the Ministry of Construction can be engaged to guide, inspect the implementation of legal documents on quality management in the construction phase: building surveying, building design, construction, check and take over, warranty and maintenance buildings.

A more detailed assessment of the profile of the affected families has to be done in the immediate term to determine the actual requirements for reconstruction. There could be families who are not poor or near poor but with completely-collapsed houses, thus with the capacity to undertake

reconstruction on their own or with lesser financial assistance. The qualification criteria need to be developed or reviewed and clearly communicated to the affected families to ensure proper and fair targeting.

Looking forward beyond Damrey, it is clear that housing reconstruction requires huge amounts of financial resources and that action to incentivize for housing insurance systems would be timely and appropriate. Together with the private sector, the Government could consider developing a comprehensive insurance program on shelter which will not only cover the structure but also the key assets of the household. Without this, the affected families will have to rely largely on support from the Government and other agencies to rebuild their shelters, straining state resources while still providing only a fraction of the actual costs required for full recovery.

2.2 Agriculture

Agriculture, including forestry and fishing, accounts for 16.32 % of the Viet Nam's GDP[6]. Average land holding among farmers is 1 hectare[7]. Farmers practice both integrated farming and mono-cropping depending on the terrain. Lowland areas affected by the storm were more likely to practice integrated farming. Since the small parcel of land is apportioned to several crops, income on a per crop basis is small. Mono-cropping is practiced by farmers near the mountain areas with big tracks of land which are largely planted to fruit trees and acacia.

Disaster effects

The agriculture and forestry sectors faced substantial damage because of Damrey with impacts varying significantly across the impacted provinces based on storm strength but also other factors such as if key crops, such as paddy had already been harvested or were still in the fields. A total of 38,525 hectares of rice and crops were damaged by the storm and related flooding.

Impacts on rice crops that are key to food security and a mainstay of many rural poor families varied significantly across provinces. Khanh Hoa Province recorded the highest rate of damage at more than 10.96%. Although Thua Thien-Hue has the largest total areas of rice paddies, it was not strongly affected by Typhoon Damrey as crops had recently been harvested. Quang Nam, Phu Yen and Dak Lak all have smaller total rice crop areas but were more severely impacted because rice was still standing the fields when the storm struck.

Other heavily damaged annual crops include maize and sugarcane which are largely grown as monocrops. Other cash crops like peanuts planted as inter-crop or on crop rotation basis as well as poultry which were the main income sources of the farmers were also damaged. Food stocks including rice as well as those set aside as seedlings were also damaged and lost.

Cash crops were most affected in Phu Yen, Khanh Hoa, and Dak Lak. Although Phu Yen has one of the smallest cash crop areas in total thousand hectares, it had the highest cash crop damages at 28.81% as a percentage of the total area. Khanh Hoa had the second highest degree of damage at 25.01% of the total cash crop area. Dak Lak has the highest total cash crop area of the 9 provinces examined, and it was the third most affected at 20.31% of the total cash crop area. Phu Yen and Khanh Hoa had the highest level of damage for annual crops, followed by Dak Lak. The varying degrees of damage in these areas need to be further studied to properly explain the root causes. Geographical location, proximity to infrastructures like dams, irrigation canals which may overflow during heavy rains, and types of crops could be some of the reasons for the variation in damages and losses.

Apart from the heavy damage to the main agricultural crops and livestock, loss of land due to flooding was also a major setback in some areas, especially in the Bac Tra My district in Quang Nam province. The flood water carried sand and debris which filled up 204 hectares of land planted to vegetables (Quang Nam validation mission report, 11-12 December 2017). The farmers tried to use hand tools to remove the sand and mud dumped into their farms but the volume will require heavy equipment which is expensive at a time when the farmers are still recovering from the disaster. Part of the short-term solution was to plant crops that are suitable for sandy soil.

Although support for livelihood recovery has been slow across the affected areas, some farmers have started cultivating

6. *GSO 2016*
7. *CIAT interview*

their land. Cash crops like mung beans, cabbage, and bitter melon have been planted and growing. Some provinces like Quang Nam have prepared the vouchers to exchange different agricultural inputs but will only distribute to the farmers who have completed land preparation. Households are also trying to salvage the damaged crops like acacia and fruit trees for resale though revenues from this are limited.

A summary of total losses to agriculture, including livestock in the most affected provinces is provided in the table below:

Table 6: Summary of direct damage to agriculture sector in 9 severely affected provinces

Sector	Unit	Total
Agriculture		
Paddy rice	Hectare	8,879
Vegetables	Hectare	20,646
Perennial crops	Hectare	15,920
Annual crops	Hectare	46,868
Fruit Trees	Hectare	15,016
Livestock		
Buffalo, Pig, Cow	Head	11,587
Poultries	Head	614,814
Damaged barns	VND (million)	58,683

(Source: VDMA update, December 2017)

Recovery needs

The total recovery need for the agriculture sector has been estimated at 885,019 million VND[8]. This estimate does not include activities to replace or repair assets such as engines or agricultural sheds, or the repair of often essential irrigation systems.

Estimation of the value of damage and loss to agriculture and the requirement for recovery is still ongoing across the provinces. Although Quang Nam province cited VND 1.6 billion estimated value of damages, it is not disaggregated per sector. Khanh Hoa province projected to complete this evaluation by the middle of January 2017 (Khanh Hoa validation mission, 11-12 December 2017).

For households planting annual crops like rice with a net surplus of resources before the storm, they will be able to recover relatively quickly from the negative impacts and losses. However, farmers who have lost perennial crops or were into aqua-culture operations, recovery will take longer. Among this group, poor families already in debt are worst impacted and may be left destitute.

All types of crops (i.e., cash, annual, perennial/long-term) will need seeds or planting materials, fertilizers and other inputs like manure as an ingredient for composting to replant for the next season. For more than 204 hectares of vegetable farms covered with sand in Dai Loc District in Quang Nam province, support for heavy equipment rental is urgently needed to clear the farmland in preparation for the next cropping season. In the immediate term, some farmers have started identifying alternative sites suitable for vegetable farming ensure they have food and cash in the next months.

The impacts of Damrey and related flooding will continue to negatively affect the livelihoods of the worst-hit communities for years to come; with impacts in relative terms being concentrated in the poorer households.

8. The Ordinance number 02/2017 ND-CP on support for livelihood recovery and some additional provincial decrees on support for recovery are applied to calculate the recovery needs of all sectors.

Table 7: Summary of recovery needs for agriculture in 9 severely affected provinces

Type of Damage	Recovery Need	
	Number (hectare)	Amount (million VND)
Rice	8,879 (hectare)	17,758
Vegetables	20,646 (hectare)	41,292
Perennial crops	15,920 (hectare)	63,680
Annual crops	46,868 (hectare)	187,472
Fruit trees	15,016 (hectare)	60,064
Heavy equipment rental (for vegetable farms covered with sand)	204 (408 households owning 0.5 hectare/household) x 10 million/household	408,000
Buffalo, Pig, Cow	11,587 (head)	5,214
Poultries	614,814 (head)	12,296
Damaged barns		58,683
Research		30,000
Total (Million VND)		**885,019**

(Source : VDMA update December 2017 and JAT report November 2017)

2.3 Agro-Forestry

In many parts of central Viet Nam, fruit trees like acacia, oranges, coconut and citrus fruits are grown as a monocrop in large tracks of land. Acacia monoculture plantations provide the main source of income particularly to ethnic minority communities in the highland areas of provinces like Khanh Hoa. Although profitable, monoculture farming is more vulnerable to typhoons. On farms where more mixed farming systems were employed (i.e., agroforestry intercropped with shorter-term crops), or mixed crop combinations (such as orange and coconut, banana, pineapple and/or pomelo mixed with annual crops like maize), impacts of the storm were often less extreme.

Disaster effects

Of the 9 heavily affected provinces, 38,641 hectares of forest (natural forest) areas were damaged with the highest rate in Khanh Hoa, which accounts for 23,485 hectares or 61% of the total damage. In total 10,922 hectares of forest plantations were damaged, mostly in Phu Yen (7,106 hectares) and Khanh Hoa (3,813 hectares)[9].

Young acacia trees are highly vulnerable to typhoon winds, being easily broken and having shallow roots systems. Many trees in the affected areas were 1-3 years old when the typhoon struck and have been irrevocably damaged.

Damage to citrus trees was significant but less long-lasting. Impacted farmers often lost 100% of this crop, and trees will most likely take 1-2 years to recover. Coconut trees provided more resilience to the storm with less significant rates of damage.

As part of coping mechanism, households have sold their premature acacia trees at 25-50% lower than the regular or pre-disaster price just to convert the damaged trees to much-needed cash. With increased transportation and labor, even the trees 3 years and above were sold to the middlemen at a price five times lower than the price for the matured trees.

Table 8: Summary of damage to natural and plantation forests 9 severely affected provinces

Sub-sector	Unit	Total
Natural Forest	Hectare	38,671
Plantation Forest	Hectare	10,922

(Source: VDMA update, December 2017)

9. *VNDMA update, Dec. 2017*

Recovery needs

There is a clear need to provide seedlings to replant damaged and destroyed acacia plantations, particularly in Khanh Hoa where 23,490 hectares and Phu Yen where 13,160 hectares need to be replanted. Given the characteristics of the acacia tree which is the main plantation crop, there is a need for further work on forestry diversification, i.e., beekeeping, medicinal plants, and cash crops to spread the risk. This will require technical assistance by fielding experts to provide advice in areas including:

- Strengthening resilience of acacia tree-choice of possibly a more resistant variety as well as care and management such as pruning techniques and observing proper tree density
- Crop diversification – proper choice of complementary crops and planting calendar
- Mixed system (agroforestry, intercropping): mixed fruit trees: orange and coconut, banana& pineapple, and pomelo/fruit tree &annual crops. This approach could be one way of coping with climate variability and market fluctuation. This can also serve as a platform for the exchange of learning among farmers to improve the approach.

For a mixed system that combines agro-forestry and agriculture support will be needed in the form of seedlings, setting up of fruit tree nursery in the district/ commune, strengthening irrigation systems and in providing technical training on management and farm design. Improved access to climate information services could also help farmers to develop better plans in terms of the choice of the right and suitable crops, time of planting, and management practices during the cropping season. This should be the focus of the extension services of the Government.

Table 9: Summary of Recovery Needs for forest rehabilitation in 9 severely affected provinces

Type of Damage	Recovery Need	
	Number (hectare)	Amount (Million VND)
Natural Forest	38,671	1,546,828
Planting Forest	10,922	436,860
Total (million VND)		**1,983,688**

(Source: VDMA update December 2017 and JAT report November 2017)

2.4 Fisheries and Aqua-culture

Viet Nam has 1,072.2 million hectares of water surface for aqua-culture[10]. Total aqua-culture production reached 3,641 million tons as of September 2017[11]. Given the country's long coastline and extensive network of rivers and lakes, fishing is also a major industry for Viet Nam, with substantial revenues being generated from sources such as shrimp and catfish[12].

As shown in the chart below, the Quang Nam, Khanh Hoa, and Thua Thien-Hue Provinces were the top 3 producers of aqua-culture products as of October 2017.

10. *GSO 2016*
11. *MARD, Oct. 2017*
12. *World Bank Country Profile: Viet Nam*

Table 10: Aqua-culture Areas in some affected provinces

Province	Area of Water Surface for Aquaculture (Thousand Ha.) (GSO 2016)	Production Aquaculture Sept. 2017 (Ton) (MARD Oct 2017)
Thua Thien-Hue	7.10	10,022
Quang Nam	8.3	21,200
Quang Ngai	1.9	3,500
Binh Dinh	4.9	2,500
Phu Yen	2.6	9,981
Khanh Hoa	5.0	11,300
Dak Lak	8.10	0
Whole Country	**1,072.2**	**3,640,647**

(Source: GSO 2016)

Disaster effects

In the aqua-culture sector, an estimated 4,470 hectares of shrimp farms were flooded and 38,360 aqua-culture cages were swept away across the 15 affected provinces. The figure below shows that of the impacts in the nine provinces most heavily damaged by Typhoon Damrey, with Khanh Hoa (which lost 1,750 hectares of shrimp) and Thua Thien-Hue (which lost 2,113 hectares of fishponds) being most impacted.

Shrimp farms were flooded and aqua-culture cages were swept away. Although the owners of many shrimp farms are not classified as poor, this sector employs significant numbers of poor daily wage earners. Delay in the provision of recovery support, or in the restoration of production in the affected farms could have dire impacts on already poor and vulnerable daily wage earners over the next months.

Table 11: Summary of damage to Fisheries and Aqua-culture in 9 severely affected provinces

Sub-sector	Unit	Total
Fish pond	Hectare	2,255
Shrimp	Hectare	1,944
Fish cage	Cage	73,624
Fishing vessel	Fishing vessel	1,803

(Source: VDMA update, December 2017)

Recovery needs

Damage to aqua-culture was mainly concentrated in Khanh Hoa province and Thua Thien Hue in accordingly. The total amount and type of support to address the reconstruction needs of this sector are still being established by the Government. Although the aqua-culture owner-operators are not the poorest nor near poor, immediate support will be very helpful to jump-start reconstruction, hire back the workers and cover the cost of daily operations from the cash flow. It is also urgent for the Government to work out a mechanism withbanks and social policy institutions to help the aqua-culture operators recover through loan restructuring and/or re-financing at reasonable or preferential terms.

In some communes, significant losses of fishing boats occurred which will put a heavy burden on fishers to cover the high costs of repair and replacement for both boat and engine. There are 1,809 fishing vessels destroyed in which 35 fishing vessels with capacity over than 90 chevaux-vapeur (CV) will be paid insurance. Almost vessels under 90 CV have no insurance. The local authorities have worked with banks to extend loan duration without interest and proposed to support more than 100 new big fishing vessels for new established cooperatives of impacted groups with the cost around 700 million VND/vessel.

Evaluating the lost value of shrimp farms (or aqua-culture in general) has been a challenge due to the difficulty of the

farmer-operators to quantify the losses in their farms. The farmers were required to inform the local authorities on the size of operations in terms of area and amount (level of capitalization) before starting their shrimp cultivation but systems are not yet in place to accurately support this kind of data collection.

In the next few months, more farms will start operating. Hatchery development to ensure reliable supply of quality shrimp and fish fingerlings supply is urgent which the Government may consider as a separate support. An estimated 20% of the damaged aqua-culture farms have already re-started operations.

Apart from the financial and technical support to the operator-owners of the aqua-culture, the daily wage laborers working in these farms are the most vulnerable sector in the industry. A more thorough profiling of this group needs to be conducted in the immediate term to determine their needs for more appropriate and timely provision of support.

In areas without natural mangrove defences, higher rates of damage to shrimp/ aqua-culture investments have been recorded. Mangrove rehabilitation may also be an effective long-term investment and can also have positive knock-on impacts in terms of providing natural defences for the fish and aqua-culture farms as well as other marine life and providing opportunities for eco-tourism and livelihoods diversification.

Table 12: Summary of recovery needs for fisheries and aqua-culture

Type of Damage	Recovery Need	
	Number	Amount (Million VND)
Fish pond	2,255 hectares	22,553
Shrimp	1,944 hectares	19,440
Fish cage	73, 624 cages	736,240
Fishing vessel		
- Repair	*1,809 fishing vessel*	*90,450*
- New	*100 fishing vessel over 90 CV*	*70,000*
Mangrove rehabilitation	500 ha	50,000
Total (VND)		**988,683**

(Source: VDMA update December 2017 and JAT report November 2017)

2.5 Infrastructure

Damage to key infrastructure was also recorded as a result of Typhoon Damrey, though damage as a total percentage of the available stock was less pronounced, and major long-term disruptions in key services were not recorded.

Disaster effects

- *Transportation*

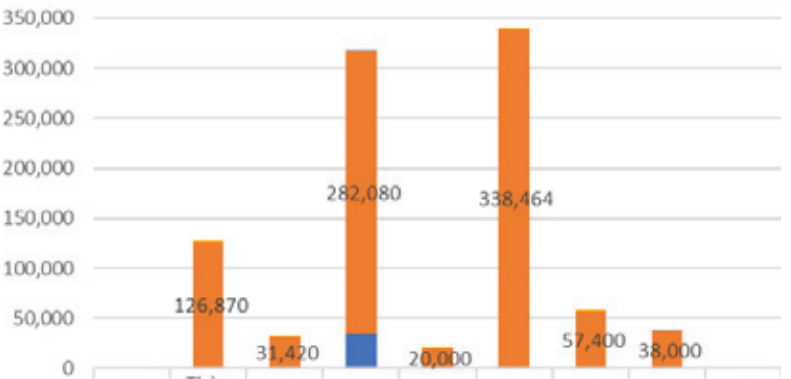
Both national and provincial roads were also impacted by the storm, particularly in Hue and Quang Nam. These provinces also reported the most significant losses in terms of bridges as a result of widespread and prolonged flooding following the storm itself.

A total of 35,788 meters of national Highway and 894,234 meters of inter district, commune road damaged by landslide/ erosion were damaged by landslide/erosion in seven out of the nine most heavily affected provinces. Road damage was mainly due to landslides on smaller local roads at provincial, district, and commune. Phu Yen and Quang Ngai had the most damage[13].

A more systematic and accurate methodology for estimating damage and loss of roads need to be established. In parallel, an assessment of the quality of roads and bridges could help provide information on how best to enhance the existing standards for construction of roads and other horizontal infrastructure based on Damrey.

13. *Source: Local Authorities update as of Dec. 2017.*

Figure 6: Damage in transportation across 9 severely impacted provinces



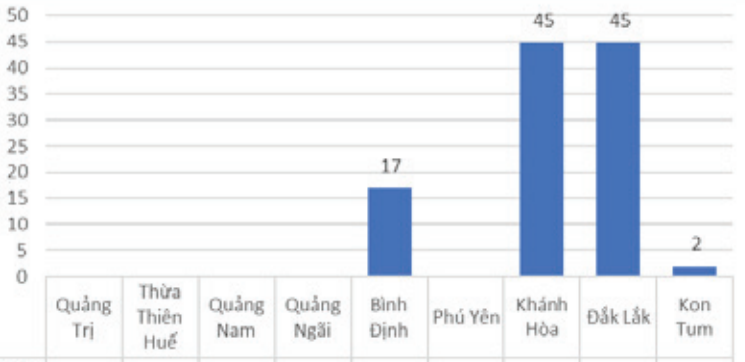
	Quảng Trị	Thừa Thiên Huế	Quảng Nam	Quảng Ngãi	Bình Định	Phú Yên	Khánh Hòa	Gia Lai	Đắk Lắk
Number of damaged culvert		620	34		25	2	6		
Number of damaged bridge	3	145	9	30	31	4	17	11	
Length of inter district, commune road damaged by landslide/erosion (M)		126,870	31,420	282,080	20,000	338,464	57,400	38,000	
Length of national Highway damaged by landslide/erosion (M)		200		35,000		578			

(Source: VDMA update, December 2017)

- *Schools facilities*

The figure below shows that 325 schools were damaged in five of the nine severely affected provinces. The community and the military conducted immediate repairs that facilitated the immediate return to normal operations and resumption of school activities. The JAT report of Khanh Hoa and Phu Yen cited that 90% of the students were back in school after 9 days. However, support is still needed to restore and replace damaged teaching equipment and books.

Figure 7: Damage in school across 9 severely impacted provinces



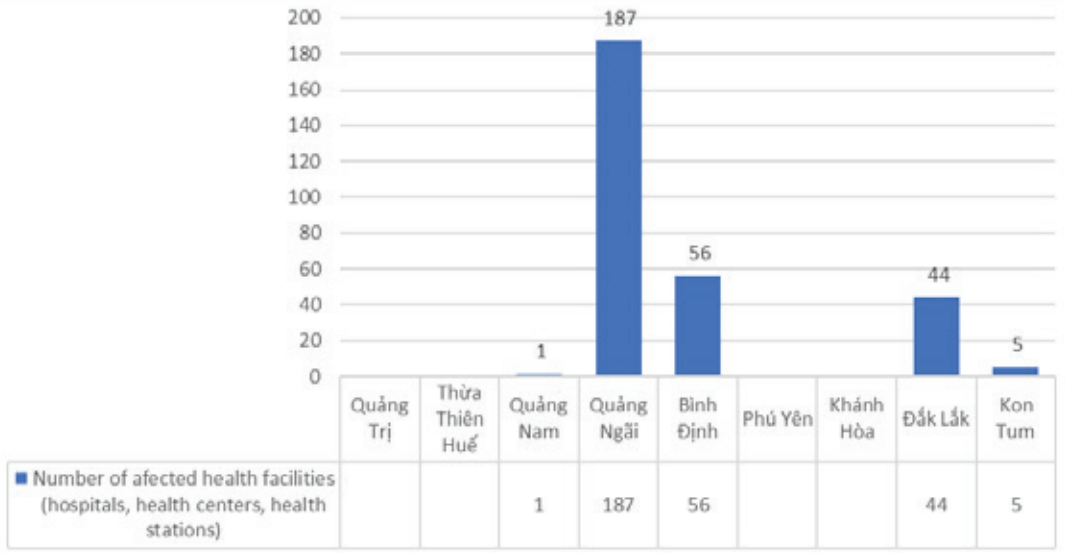
	Quảng Trị	Thừa Thiên Huế	Quảng Nam	Quảng Ngãi	Bình Định	Phú Yên	Khánh Hòa	Đắk Lắk	Kon Tum
Number of affected schools/satellite schools					17		45	45	2

(Source: VDMA update, December 2017)

- *Medical Facilities*

A total of 123 medical facilities in 5 provinces were also destroyed with damaged equipment and roofing structure. Medical facilities were given priority in the repair of electrical connections to ensure continuous medical services.

Figure 8: Damaged medical facilities across 9 provinces

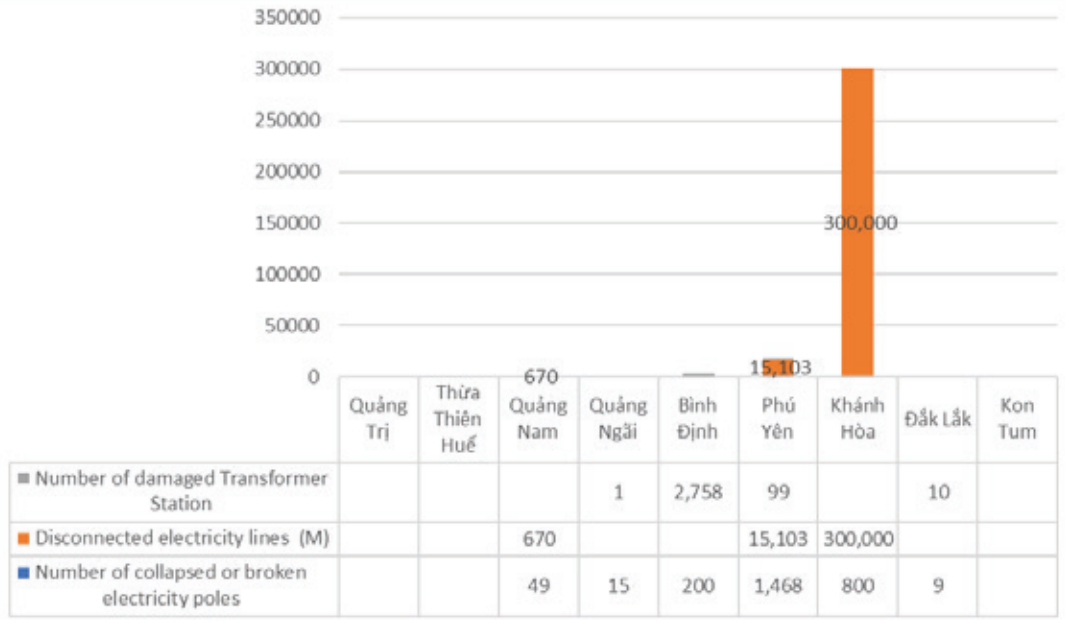


(Source: VDMA update, December 2017)

- *Power*

The provinces of Phu Yen and Khanh Hoa had the most number of power posts damaged while Binh Dinh had the highest number of affected transformers. Despite temporary disruptions in services, electricity lines remained largely intact after the disaster. This prevented an outbreak of diseases and other illnesses especially water-borne diseases.

Figure 9: Electrical infrastructure damaged in 9 provinces



(Source: VDMA update, 14 December 2017)

- *Industry*

A number of factories or industrial parks reported significant damage due to the disaster and there is some evidence that the private sector was impacted by the storm. However, further data collection is necessary to collect information on these needs. For example, authorities in Khanh Hoa noted that district reported a number of cashew nut processing factors had closed as a result of the storm, making their workers redundant. Other corporations which suffered serious

damages and financial losses as a result of the typhoon include Khanh Hoa tobacco company, Sanest Khanh Hoa, and other key agricultural-aqua-culture processing factories. Their damages and losses, as well as disruption in business operations though temporary, would mean that Khanh Hoa will not be able to collect the much-needed taxes to finance Government basic services.

Recovery needs

Government services, including health, education and electricity have been restored, although many schools still require repair and replacement of teaching equipment and books. Road access has been restored, although a number of bridges, access roads, dykes, and reservoirs have been damaged by the storm. The December 2017 validation missions in Quang Nam and Khanh Hoa provinces confirmed that there are still district level roads which need to be repaired.

Recommendations from some schools in the heavily affected provinces include retrofitting/reconstruction of old schools as these will be at risk of being totally damaged in the next disaster. Two-storey buildings have been recommended in the JAT reports to ensure a safer place to relocate important school equipment given timely information. There is also a need to construct the one-storey satellite schools in higher elevations. In general, it is important to develop better designs for the schools to consider flooding in the near future.

The Province of Quang Nam reported that the provincial committee had allocated VND 95 billion for the repair of infrastructure particularly roads and irrigation system. This will facilitate immediate access to the farms and markets thus support the replanting of cash crops and selling the produce by the farmers right after harvest.

The recovery needs to basic infrastructure is cited from the VDMA consolidation from 9 severely affected provinces. The proposed amount is VND 2,947,000 million. One of the immediate next steps is to conduct an in-depth assessment of the damage and losses of all public and community infrastructures to determine the proper action for retrofitting or reconstruction. Old buildings which may need replacement will require substantial budgetary allocation from the Government.

Photo: UNDP Viet Nam 2017/ Phan Huong Giang

3. Approach to Typhoon Damrey Recovery

3.1 Recovery Strategy

Typhoon Damrey affected over 4.3 million people. While affected families are beginning to recover and return to their fields and homes, many are in need of support to repair or rebuild the homes and to resume their livelihoods and income to meet family needs. Particularly among poor and near-poor households, the storm has exacerbated pre-crisis vulnerabilities in terms of incomes, food security and other basic needs.

At the same time, affected families have managed to arrange temporary solutions to survive. Some of those that totally lost their houses now live with relatives or have rented a one-room makeshift structure made of scrap materials recovered from destroyed houses without WASH facilities and no provision for safety and privacy. Many farmers have started replanting cash crops, clear up land covered by sand and debris, sell and have premature acacia trees for immediate income. A significant number of aqua-culture farms have started to operate, and a few affected families who have readily available land and have received Government support have started house reconstruction. Government services, including health, education, and electricity have been restored, although many schools still require repair and replacement of damaged equipment and books. Road access has been restored, although many bridges, access roads, dykes, and reservoirs have been damaged by the storm.

Total economic damage caused by Typhoon Damrey was estimated at US$ 1 billion. The Government committed to allocate VND 1,000 billion and continues to mobilize resources together with its partners including the UN, international NGOs, bilateral donors, and local NGOs to respond to the urgent needs of the poor and near-poor affected families in the severely hit provinces.

As the Government of Viet Nam looks towards mid-term recovery strategies those with destroyed homes and/or high rates of poverty and livelihoods destruction will require further support from the central and provincial Government.

An immediate package of mid-term assistance could consist of support for:

- Replanting, restocking and further diversification of sustainable livelihood options especially non-farm income sources
- Livelihoods regeneration in agriculture, forestry, and aqua-culture /fisheries
- Support to poor/near poor households for emergency shelter and house rebuilding and scale-up of storm resilient housing programme.
- Improved partnerships with private sector to reduce economic impacts of distressed selling, and to support future diversification of livelihoods, shelter, and access to insurance
- Options for strengthening provincial land use and economic planning
- Extension and expansion of existing development programs, crop diversification research programs and provincial programs could help fast track support.
- Stepped up information, post-disaster reporting and information management systems.

3.2 Recovery considerations

Balancing Household and Infrastructure Recovery

In the medium term, households need to be assisted in terms of durable assets and livelihoods. Physical infrastructure will need to be restored and improved. A recovery strategy should balance between socio-economic recovery and physical recovery of assets. Neglect of household level recovery could have serious implications for wider poverty alleviation efforts.

At the same time, improving the resilience of key infrastructure to future typhoon risk must be considered. Key infrastructure such as hydro-power dams, roads, and bridges were damaged or put under physical stress by the storm and related heavy rainfall. More emphasis on repairing and maintaining these vital assets will be key in the future. Given climate change projections there is also strong case to be made for considering the strengthening of current codes and standards in the future and placing more stringent requirements for adhering to standards put in place.

Broadening Coverage and Strengthening Targeting of Population and Sectors

While relief assistance has been effective in preventing a humanitarian catastrophe, supporting those families most affected to recovery from the storm will require more targeted assistance. Families who lost income earners during the storm should be prioritized, and further work is needed to better understand their needs and how best these families can be supported in the future. It is important that the specific circumstances of vulnerable sub-groups like landless day-laborers be considered in planning recovery support.

While developing a recovery plan, it is extremely important to consider gender equity. Post disaster recovery provides an opportunity to not only build back better- including in terms of providing more gender equitable access to decision making and resources. Post-disaster recovery programmes should not only identify and assist women-headed households to cope with the double burden of income generation and household care but should also aim to better engage women in leadership and decision-making roles.

Enabling Rapid Recovery

Agriculture and fisheries are the mainstays of most of the communities worst impacted by Typhoon Damrey. Farmers must be assisted as soon as possible to resume their cultivation. In some cases, the private sector or social banks can play a key role in expediting credit to profitable farmers to restart operations- a function that ideally can be paid for in the future through insurance programs. However, for the poorest farmers, further grant support may be necessary to avoid trapping already vulnerable families in unsustainable levels of indebtedness.

Facilitating Resilient Recovery through institutional system strengthening

Effective recovery to Damrey, and future typhoons will be key to sustainable development in central Viet Nam. Disaster risk management approaches need to shift from being primarily relief focused on putting additional emphasis on early warning systems and risk reduction measures that can reduce exposure to typhoon impacts in the future.

The post-Damrey recovery period is also an ideal time to lay the foundations within the newly founded NDMA for a consolidated architecture, data management system and funding structure to more rapidly and effectively put in place systems for future recovery efforts for the 2018-2019 typhoon season.

Going beyond Government Recovery

A collective recovery approach that brings together Government, development partners but also the private sectors and the affected population will be more effective in expediting recovery action. Banks, cooperatives and business groups can be key actors in recovery planning and action.

Greater participation from impacted people, particularly women, can be highly effective in helping to best target support and can increase accountability and transparency. Placing an emphasis on information dissemination of programs and progress using the public media and other channels is also essential.

Implementing a recovery strategy

The housing component is recommended to be implemented through the owner-driven modality. Support for livelihoods could be provided through NGO or national programmes which focus on the provision of livelihoods.

Improved data collection on beneficiaries and progress is required. Ideally, this can serve as a baseline to evaluate the impact of the recovery programmes on impacted populations.

One of the ways that the Government will make resources available for recovery is to provide allocations through its regular development programs.

While the Government is the principal supporter of the recovery programme, it must be noted that programmes beneficiaries also contribute significantly to their own recovery.

4. Towards a Disaster Resilience Framework in Viet Nam

4.1 Resilience approach

Recent statements and action by the Government to highlight attention not only on a response but also on recovery are positive developments. Recovery assistance and resilience planning have not been the priority for the disaster risk reduction system in Viet Nam to date. The Government has tended to prioritise relief operations, followed by repair of primarily public infrastructure after disasters. The repair of roads, bridges, schools, upgrading of river control and irrigation systems is important, but this needs to be complemented by more effective and targeted support to those most impacted by the disaster- with an emphasis on reaching poor and marginalized groups. Action to upgrade recovery systems in these three areas of livelihood, housing and infrastructure would also need to be underpinned by further investments in information management, better targeting assistance towards those who need it most, and in incentivizing insurance, risk transfer and household pre-disaster resilient action.

Without adequate plans, programs, policies, systems and capacities as well as the involvement of key stakeholders especially the vulnerable communities, huge resources will be needed to undertake response and recovery work on a yearly basis.

4.2 Resilience framework elements

Moving forward, three key pillars for resilience building in Viet Nam could focus on activities aimed at strengthening institutional resilience, physical resilience and economic resilience, as outlined below.

Institutional Resilience[14]

National and local Governments with capacity to effectively and efficiently plan, implement and monitor response and recovery interventions in partnership with the affected communities and other stakeholders.

Key actions to support institutional resilience building can include:

- Finalising Standard Operating Procedures for Recovery for the Government. This should include a training package for provinces, data collection tools, reporting templates, and a clear recovery guidance to improve the Circular 43.
- Incorporate recovery guidance into damage and need assessment provisions to improve the existing Circular 43. The guidance should cover both qualitative and quantitative information, promote the regular collection of baseline data, and elaborate on recovery needs.
- Organise training courses (using a training package, tools and reporting templates) for MARD staff at all levels to improve local capacities. The training courses can help improve understanding the difference between relief and recovery actions, and on how to conduct an effective needs assessment. As a follow-up step to these training courses, develop refresher e-training and video tools to reinforce learning.
- Formulate a national-level group of core persons having technical expertise in developing recovery plans (including assessment, plan development, and fund-mobilisation). After disasters, this team can be partners with provincial/ local level experts to develop a recovery plan and framework
- Identify and review national and local policies for disaster recovery
- Review funding mechanisms currently governing the National Disaster Prevention and Control Fund, and annual contingency budget (at both national and local level) to open funding channels for short and medium-term recovery efforts after large-scale disasters.
- Consider if existing social safety-net programs targeting the poor and near-poor could be adjusted and utilized to provide rapid and higher cash-based

14. This provides the enabling environment through appropriate policies, systems, plans, programs and projects, standards (consider different hazards of the areas), structure, budget, tools (assessment of damage/losses and needs, data/info gathering, storage and sharing, etc.), capacity development, and partnerships to make sure that physical and economic resilience are achieved in the disaster-prone areas and protect the vulnerable sectors of the population. Since the government drives the recovery efforts, it has to ensure that all these elements are in place to ensure efficiency in the response and recovery work.

support for short-term recovery needs and household level compensation after disasters

- Establish connections, partnerships and coordination mechanism with other sectors (MPI, MONRE, MOET, MOH, etc) to incorporate recovery planning guidance into sector development plans and into annual socio-development planning at local levels. This can be explored further by establishing a technical level inter-sector group at the national level.
- Monitor resources allocation for disaster recovery programs
- Create a web-based form on which MARD's directorates, other sectors, development stakeholders, and provinces can share information on resources allocation for disaster recovery programs.
- Operate a technical level inter-sector group at the national level to share information, discuss coordination and resources allocations for recovery projects/programs (after a large-scale disaster) funded by either national or international stakeholders to avoid overlapping and to promote transparency, inclusiveness.
- Design a feedback mechanism that receives feedback (from affected communities, international stakeholders, NGOs, the press on recovery programs) on resources utilization and on progress being made toward recovery goals and objectives.
- Undertake evaluations and consolidation of good practices in recovery programs
- Evaluate or undertake a mid-term review of recovery programs to explore effectiveness, draw on lessons learned and consolidate good practices to promote replication. An initial recovery project that could be evaluated is the drought recovery in the South or flood recovery in South Central that is directly managed by UNDP-MARD.
- Clarify structures and reporting mechanisms for recovery and all for effective land-use and zoning to reduce future risk, ensuring clear systems are in place for Structure –national, provincial, district, and commune level reporting and analysis.
- Review budget allocation policy and system for DM funds with clear guidelines for possible reprogramming without violating the finance and audit rules

Physical Resilience[15]

Affected families live in safe and secure shelters (located in areas declared safe, complete with WASH, power, basic services and waste management facility) designed according to needs, and with access to resilient public infrastructure (i.e. schools, medical facilities, roads, evacuation centers, etc.)

Since Damrey is the strongest typhoon to hit Viet Nam in recent years, this should be used as the new norm or benchmark in the review and enhancement of construction standards (i.e., types and specifications of materials and technology to be used according to the type of infrastructure). This should benefit from the review and enhancement of the construction standards to be done by the Ministry of Construction and from the strict enforcement of such standards by the State Agency for Construction Quality Inspection. Key actions to promote physical resilience could include:

- Resilient design – housing designs developed and implemented according to the needs and sub-culture of affected families and follow updated and relevant Government construction standards; public infrastructure to follow enhanced Government construction standards
- Construction materials and methodology - subscribe to new/ updated resilient standards prescribed by Government; in case of temporary shelter assistance, consider the use of the same materials used in constructing permanent shelter (especially the roofing, doors, etc.) to save on cost; pursue partnership with the private construction suppliers for discounts on volume purchases, training, and technical assistance/supervision during construction

15. Physical resilience consists of actions to ensure safety, security, livability, sensitivity to needs of specific groups (i.e., gender, elderly, ethnic minorities, differently-abled, etc.), and affordability of housing structures, and durability of public infrastructure (vertical and horizontal) including evacuation centers.

- Location – result of hazard mapping and consistency with the revised/enhanced Land Use Plan need to be enforced and strictly followed in identifying safe sites; certificate of safety to be obtained from the relevant Government department or office
- Household contribution – conduct of consultation with the affected families to get their input in the designing of the house based on Government standards; sharing of family/household resources – financial (possible expansion beyond the Government funding support) and sweat equity contribution especially if assistance is totally given as a grant
- Ownership status – ownership with land title, long-term lease, etc. to ensure the security of tenure for the affected families of certain parcels of land needs to be discussed and clarified with the families; sites of public infrastructures like schools, medical facilities, evacuation centers, etc. should be certified as the property of the Government
- Housing insurance – given the projected increased intensity and frequency of typhoons, access to affordable housing insurance to cover possible damage or loss of the housing structure as a result of natural and manmade disasters should be enforced or made mandatory
- Partnership Development/ Strengthening – particular interest is the strengthening and formalizing the partnership with the private sector as a mechanism for resource sharing through support to housing reconstruction (i.e., training on proper technology, price discounts on volume purchase of construction materials, institutional market for products (agri, aqua, agro-forestry) and services (construction-related and other manpower skills, quick deployment of heavy equipment with discount, etc.); develop joint Government-private sector Contingency Plan or response plan (i.e. pre-positioning of goods, etc.); insurance system for agricultural products and housing
- Data/information management – capture, analysis, reporting, storage, sharing; documentation of good practices and lessons learned

Economic Resilience[16]

Affected families with sustained income from viable agriculture and non-agriculture livelihood activities using environment-friendly technologies and practices in partnership with established markets

Key actions to promote economic resilience in Viet Nam could include:

- Market-oriented demand for the products and services (alternative/ non-agri) as only products and services with clear and expressed demand from the market (i.e., individuals, groups, or institutions like Government and private sector) will be supported and promoted; review the one-commune-one product (OCOP) program and ensure its subscription to the market-based principle
- Resource-based – optimize sustainable use of local resources and support the rehabilitation of industrial crops like maize, cassava, sugarcane, etc.; review link with OCOP program; opportunity to be involved in the entire value chain
- Location – considers enhanced/ updated Land Use Plan, hazard map, and suitability analysis (i.e., soil type, topography, climatic condition, etc.)
- Sustainable technology and practices – organic or natural farming technology and practices consistent with build-back principle; the Viet-Gap programme could be a good starting point which could be enhanced towards full organic/ natural farming/fishing
- Alternative livelihood promotion-skills training for employment or self-employment (i.e., construction-related skills, skills needed by hotels like bartending, chef, etc.); link with employers (i.e. groups, individuals, institutional – Government, industries in and outside of province/district); possibility for formation of manpower association which could be engaged as sub-contractors of larger construction companies, etc.)

16. Economic empowerment of the population especially the poor/near poor segment is an important, if not the most important resilience objective that the government and its partners should aim for. People could easily bounce back or recover if they have sufficient economic resources to cover their needs.

- Multi-targeting – support additional member/s of the household (in addition to the head who is usually into agri/ fishing which are high-risk ventures) for a different livelihood activity to reduce or spread the risk
- Gender – women-led agri and micro-enterprise activities supported, promoted and linked to markets
- Safety nets – all productive sectors will have insurance coverage for their economic activities regardless of size; for the poor/near poor segment, active promotion and adoption of savings schemes should be pursued, in addition to insurance coverage, as their internal source of capital to bounce back and re-start operations right after a disaster thus giving them stronger economic leverage
- Value-adding/processing – within the value chain continuum, support prospects for processing, post-harvest facilities management, product consolidation, and marketing, etc.
- Industry-based – gear up livelihood support for the damaged industrial crops and expand the role of the farmers to product processing, post-harvest handling, and consolidation and marketing; this will generate more employment and income in the locality

Given the geographical location of Viet Nam and the worsening impacts of climate change, the country will continue to be at risk for severe disaster events. Climate change projections for Viet Nam suggest that disasters brought by typhoons, landslides, and flooding will recur and will even become stronger and more frequent. As Viet Nam continues its rapid development, the aggregate value of assets at risk is increasing, particularly in coastal areas. Moving forward, Viet Nam's risk management system needs to evolve from one in which the Government of Viet Nam de-facto assumes most of the financial risk from disasters. Current systems focus on compensating a large number of impacted households with small relief-based payments, rather than concentrating relief to those most in need, and sharing the financial burden of disasters with the insurance industry and incentivizing middle-class households to invest in resilience building before storms to limit damage.

Concerted action to implement an integrated resilience framework in the wake of typhoon Damrey could not only improve resilience to floods and storms but could also form the base for multi-hazard action. Implementation of such an approach would not only enhance implementation of Viet Nam's Law on Disaster Prevention and Control but would also improve sustainable development progress. Proper adoption and implementation of recommended actions under this framework could also reduce expenditure by the Government and its partners on disaster response and recovery work in the future.

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Annex 1: List of People consulted

No	Name	Position/Organization
VDMA		
1	Doan Thi Tuyet Nga	Head of International Cooperation Dept
2	Nguyen Hiep	Vice head of Disaster response and recovery Dept
3	Ta Ngoc Tan	Specialist of VNDMA
4	Pham Thi Thu Hang	Specialist of Center of Policy and Techology for Disaster Management
Quang Nam Province		
5	Huynh Tan Duc	Director of Quang Nam DARD
6	Truong Xuan Ty	Head of Quang Nam Irrigation Department
7	Tran Quang Hoa	Specialist of Quang Nam Department of Invalid, Labor, and Social Affairs
8	Le Van Minh	Specialist of Quang Nam Department of Finance
9	Nguyen Ngoc Khai	Head of Quang Nam DMC
10	Huynh Xuan Thieu	Bac Tra My DARD
11	Nguyen Le Anh	Bac Tra My WU
12	Nguyen Thi Minh Lanh	Bac Tra My Fatherland Front
13	Dinh Van Linh	Bac Tra My Red Cross
14	Tran Van Mai	Chairman of Dai Loc PPC
15	Ho Ngoc Man	Vice-chairman of Dai Loc PPC
16	Vu Duy Khanh	Head of Dai Loc DARD
17	Cu Thi Hue	Specialist of Dai Loc WU
18	Two Group of farmers in Dai Loc (vegetable farms damaged by flood)	
19	Two Group of farmers Bac Tra My District (house and forest damaged by landslide)	
Khanh Hoa Province		
20	Le Tan Ban	Director of Khanh Hoa DARD
21	Dinh Van Dung	Specialist of Khanh Hoa DOLISA
22	Bui Thi Khanh Van	Deputy of Budget Department/Khanh Hoa PPC
23	Huynh Quoc Thuyen	Deputy of Khanh Hoa CCFS
24	Pham Thanh Khiet	Deputy Director – Construction Department

Photo: UNDP Viet Nam 2017/ Duong Van Hung

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