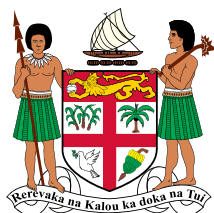


PDNA Guidelines Water & Sanitation

FIJI INFRASTRUCTURE SECTOR



07 FEBRUARY 2023



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The United Nations Development Programme delivered output 3 of such Project with the aim to enhance technical capacities for recovery planning, and implementation, including adapting the Post Disaster Needs Assessment (PDNA) and Disaster Recovery Framework (DRF) guidelines to national contexts and specific infrastructure sectors, with the focus of this guidance being Fiji's WASH sector.

This publication has been developed with collaboration and input from various partners, including the Ministry of Rural & Maritime Development and Disaster Management, the Ministry of Lands and Mineral Resources, the Ministry of Infrastructure and Meteorological Services, the Ministry of Health and Medical Services, Water Authority of Fiji and Fiji WaSH Cluster Partners including UNICEF.

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ABBREVIATIONS

DISMAC	Disaster Management Committee (Divisional, Provincial and District Level)
DSLO	Disaster Service Liaison Officer
DWS	Department of Water and Sewerage
ER	Early Recovery
GIS	Geographical Information System
GPS	Global Positioning System
HIC	Humanitarian Information Centre
IASC	Inter-Agency Standing Committee
NDC	National Disaster Controller
NDMA	Fiji Natural Disaster Management Act 1998
NDMC	National Disaster Management Council
NDMO	National Disaster Management Office
NDMP	Fiji National Disaster Management Plan 1995
NDRRP	Republic of Fiji National Disaster Risk Reduction Policy 2018 - 2030
NEOC	National Emergency Operations Centre
NGO	Non-Governmental organisation
OHCHA	United Nations Office for the Coordination of Humanitarian Affairs
PDNA	Post Disaster Needs Assessment
UNDG	United Nations Development Group
UNDP	United Nations Development Programme
WAF	Water Authority of Fiji

GLOSSARY

Build Back Better (BBB) - a strategy aimed at reducing the risk to the people and infrastructure of nations and communities in the wake of future disasters and shocks. The approach promotes recovery that is sustainable, resilient, and inclusive.

Consultation – A two-way exchange of information, comments, ideas, and suggestions. Consultation outputs are considered as inputs for decision-making; they must be considered but need not determine decisions.

Damage – (Disaster Effect) Total or partial destruction of physical assets existing in the affected area. Damage occurs during and immediately after the disaster and is measured in physical units (i.e., square meters of housing, kilometres of pipework or roads, etcetera). Its monetary value is expressed in terms of replacement costs according to prices prevailing just before the event. The value of damage is used as the basis for estimating reconstruction needs.

Disaster – A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

Displaced persons – persons who, for varied reasons or circumstances, have been compelled to leave their homes.

Early recovery – Recovery that begins early in a humanitarian setting. Early recovery is not intended as a separate phase within the relief-development continuum, but rather as an effort to strengthen the effectiveness of the linkage. Early recovery encompasses livelihoods, shelter, governance, environment, and social dimensions, including the re-integration of displaced populations.

Infrastructure – The fundamental organisational and physical structure required to run a successful organisation, community, or country. Communication and transportation, sewage, water, education, health, and monetary systems are all examples of basic infrastructure in an organisation or for a country.

Losses – (Disaster Effect) Changes in economic flows arising from the disaster. They occur until full economic recovery and reconstruction is achieved, in some cases

lasting for several years. Typical losses include the decline in output in productive sectors (agriculture, livestock, fisheries, industry, and commerce) and the lower revenues and higher operational costs in the provision of services (education, health, water and sanitation, electricity, transport, and communications). Also considered losses are the unexpected expenditures to meet humanitarian needs during the post-disaster emergency phase. Losses are expressed in current values.

Participation – A process by which stakeholders are active and equal partners in decision-making and may have shared ownership and control over project/ programme design and implementation (and eventual evaluation).

Physical Asset- An item of economic, commercial, or exchange value that has a material existence. Physical assets are also known as tangible assets.

Protected area – Portions of land protected by special restrictions and laws for the conservation of the natural environment. They include large tracts of land set aside for the protection of wildlife and its habitat; areas of great natural beauty or unique interest; areas containing rare forms of plant and animal life; areas representing unusual geologic formations; places of historic and prehistoric interest; areas containing ecosystems of special importance for scientific investigation and study; and areas that safeguard the needs of the biosphere.

Rehabilitation – The full, or at least partial, restoration of degraded landscapes and/or impaired ecosystem services to their state prior, for example, to the site being occupied as a site for transitional shelter for displaced people.

Vulnerability – The extent to which a community, structure, service, or geographic area is likely to be damaged or disrupted by the impact of a particular hazard.

WaSH – Water supply, Sanitation and Hygiene.

Water catchment – An area, often a combination of mountain ranges and basins, that ‘catches’ rainfall. Water from rain is absorbed into the soil and stored in underground reservoirs, or is fed into a river, aquifer, or lake.

1. Introduction to the Fiji WaSH PDNA Guidelines

The Post-Disaster Needs Assessment (PDNA) process is an internationally accepted methodology for determining the physical damages, economic losses, and costs of meeting recovery needs after a natural disaster through a government-led process. In 2008, the European Union (EU), the World Bank (WB) and the United Nations Development Group (UNDG) agreed to mobilise member institutions and resources to harmonize post-disaster assessment methods to better support governments and affected populations with a coordinated approach for recovery.

The guidelines are a set of documents for assessing the effects and impacts of disasters, as well as providing a methodology for planning for the disaster recovery:

- **Post-Disaster Needs Assessments Volume A Guidelines:** A generic multi-sector guide to the PDNA process and methodology.
- **Post-Disaster Needs Assessments Volume B Guidelines:** A multi-volume series documenting the PDNA process and methodology by sector in more detail than Volume A. The series also includes volumes dedicated to cross-cutting issues such as Environment, Culture, Governance, and Gender.
- The **Disaster Recovery Framework (DRF) Guide** is a practice-based, results focused tool to assist governments and partners to plan for resilient post-disaster recovery using the results of the PDNA.

The **PDNA** is designed to support Governments to estimate damages and losses, to assess the impact of a disaster, identify recovery needs, estimate recovery costs, and define a broader strategy for recovery and provides an evidence base for resource mobilization. The **DRF** is a complementary tool that helps in articulating a vision and clear objectives for recovery, prioritized and sequenced interventions, resourcing requirements, implementation arrangements and guidance on financing, implementation, and monitoring mechanisms for recovery. The general hierarchy of the documents is illustrated below, and the that are

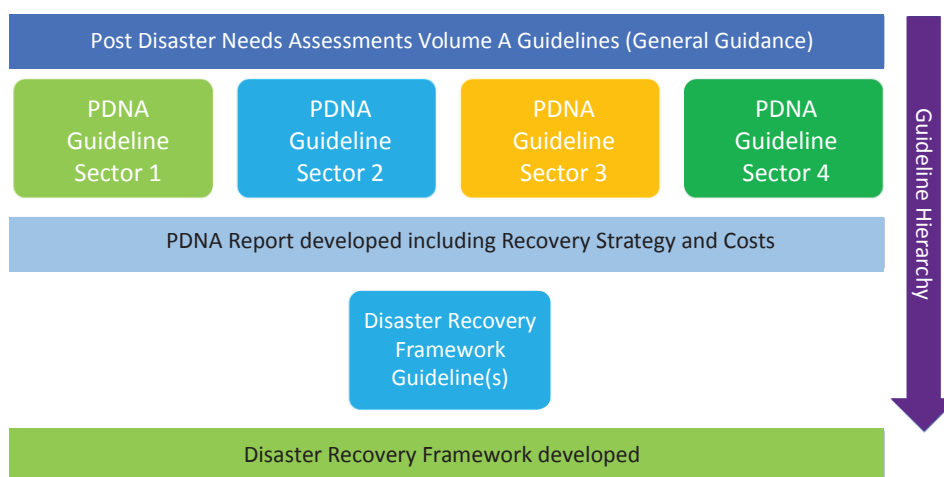


Figure 1: Hierarchy of PDNA and DRF Guidelines

The Fiji WaSH Sector PDNA guidelines¹ complements PDNA Guidelines Volume A and is contextualised for the Fiji WaSH Sector. It is primarily intended for use by members of the Fiji Government and for members of the PDNA WaSH Assessment Team, who are normally drawn from the Ministry of Infrastructure and Meteorological Services, Water Authority of Fiji, Department of Water and Sewerage, Mineral Resources Department, Ministry of Health and Medical Services, Ministry of Education, Division and District representatives, the UN Pacific Regional Office, and the Fiji WaSH Cluster.

¹ A detailed Standard Operating Procedure (SOP) has been written for performing a PDNA in the Fiji WaSH Sector. It details the roles and responsibilities of the actors involved and should be referred to for specific guidance.

1.1 The Fiji WaSH PDNA Context

Under Fiji’s Natural Disaster Management Act 1995, the National Disaster Management Office (NDMO) is responsible for day-to-day operations during any disaster response. The National Disaster Controller from the NDMO will be responsible for the implementation of the PDNA if triggered. In Fiji, the institutional context for WaSH is heavily focused on the WaSH Cluster, headed by the Ministry of Health and Medical Services. This is one of many clusters that operate under non-emergency conditions and enable humanitarian and post-disaster recovery efforts in partnership with Government. The relationship of the Clusters to the disaster management system is shown in Figure 2.

The WaSH Assessment Team will include representatives from the WaSH cluster and are listed in **Table 1** below.

Table 1: Members/Partners of the Fiji WaSH Cluster

Government Lead	Co-Lead	Key Partners
Ministry of health and Medical Services	UNICEF	Ministry of Women, Children and Poverty Alleviation Water Authority of Fiji (WAF), Ministry of Infrastructure and Meteorological Services, Department of Water & Sewerage, FRCS (Fiji Revenue and Customs Service), Ministry of Provincial Development - Divisional Offices, WHO, SPC, UNDP, UNWomen, IFRC (International Federation of Red Cross and Red Crescent Societies), Save the Children, AusAID, NZAID, Fiji Water Foundation (Rotary), Fiji Live and Learn, Fiji Water / Aqua, ADRA (Adventist Development and Relief Agency), Habitat for Humanity and UNOCHA

The WaSH team will work in collaboration with representatives from the other sectors/clusters, particularly Health and Nutrition, Education, Safety & Protection, Food Security & Livelihoods and Shelter clusters. The scope of the WASH assessment will be discussed and agreed with other Clusters members to ensure there is no duplication of reporting on damages and losses. For example, the assessment of water resources may be done jointly with the energy sector if a reservoir is used for both water supply and power generation. The health and hygiene components of the WaSH assessment should be captured and treated in consultation with the health & nutrition and education sectors². Public systems for solid waste disposal have previously been included under the WaSH sector PDNA analysis but reporting information regarding private solid waste disposal systems was captured by the housing assessment team. Members of the Fiji Cluster system support these assessments, according to their sector of interest (see Figure 2 for the cluster allocations).

The PDNA approach and the cross-cutting nature of WaSH are reflected in the following general classification of assessment and response areas for the WaSH PDNA. These include Water Supply,

² For an example of how WaSH impacts across other sectors, see Annex I: Checklists for Roles and Responsibilities between Sectors – Health, Nutrition and WaSH Clusters. This matrix defines the responsibilities and accountabilities of the Health, Nutrition and WaSH Clusters during emergency response and areas of potential overlap.

Sanitation – Excreta Disposal (Sewerage), Hygiene Promotion, Sanitation – Solid Waste Management (includes medical waste), Vector Control and Drainage.

The water and sanitation components of the PDNA are considered as a set of sub-sectors as follows:

- Water supply, wastewater, and sanitation services (often viewed together in the same sub-sector but should be considered separately).
- Water resources policy and administrative management.
- Water resources protection.
- Education and training in water supply, sanitation, and health/hygiene issues.
- Hydropower and agricultural water.

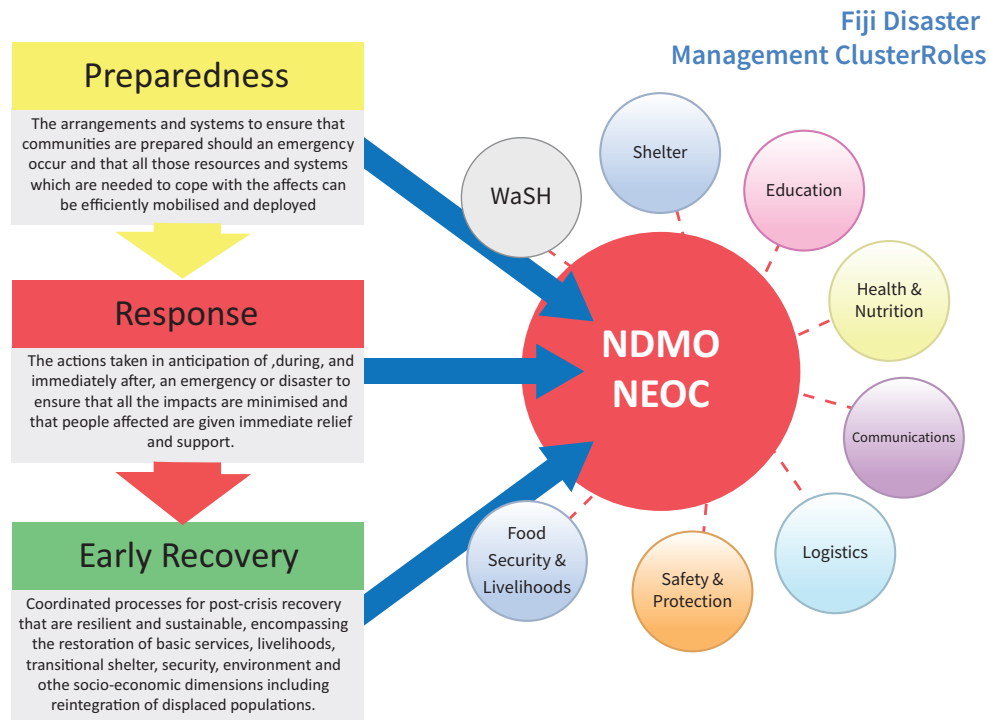


Figure 2: Fiji Disaster Management Cluster – Structure and Roles

2. Overview of The Fiji WaSH PDNA Process

The PDNA process has five assessment steps:

1. baseline (context) analysis
2. disaster effects analysis
3. disaster impact analysis
4. recovery needs determination and
5. recovery strategy development.

The PDNA steps are described in detail in the Standard Operating Procedure (SOP) for Post Disaster Needs Assessment (PDNA) activities in the Fiji Water Sector (2022).



Figure 3: The PDNA Methodology

In Fiji, a PDNA is initiated by decision of the National Emergency Operations Committee (NEOC) and the National Emergency Operations Centre Standard Operating Procedure (NEOC SOP). The overall PDNA chronology and key participants for the Fiji WaSH PDNA process are listed in Table 2. The PDNA WaSH Team is responsible for data collection and analysis, estimation of damages, losses and recovery needs and development of the recovery strategy. The team is also responsible for drafting the WASH Sector Report.

Table 2: Overview of the WaSH Sector PDNA Process – Timing, Activities and Actors

Timing	Activity	Lead Agency	Other Participants
Week 1	Initiation and overall planning: <ul style="list-style-type: none"> » Agree on Terms of Reference with key stakeholders and development partners. This should include sectors to be assessed, sector leads and co-leads, geographical scope of the assessment, and timelines. » Define the scope of the WASH Sector analysis. » Compose the WASH sector PDNA Team and establish coordination mechanisms. » Orientation Training on PDNA methodology. » WASH sector baseline data collection and review. 	NDMC	<ul style="list-style-type: none"> » NDMO » UNDP » WaSH Cluster members including MoHMS, MoEHA, Ministry of Economy, WAF, MRD, SPC. » Divisional Commissioners. » District Officers. » Sector Specialists

Week 2 - 3	<p>Assessment stage:</p> <ul style="list-style-type: none"> » Data collection on damages and losses of the WASH sector by the local authorities under the supervision of the PDNA WASH team. » Conduct field survey (if needed). » The PDNA WASH team cross-checks, validates, and synthesizes the collected disaster and loss data into one aggregate assessment. » The PDNA WASH Team calculates of disaster effects (damages and losses) 	NDMC	
Week 4	<p>Analysis stage:</p> <ul style="list-style-type: none"> » Macro-Economic analysis » Human Impact Analysis » Estimating reconstruction and recovery needs » Report drafting 	NDMC Ministry of Economy	
Week 5 - 6	<p>Dissemination stage:</p> <ul style="list-style-type: none"> » Publishing and launching of the final PDNA report 	NDMC Ministry of Economy	

The PDNA process results in a detailed report on the effects and impacts of the disaster on WaSH infrastructures and services and recommends a recovery strategy. The report includes:

- a) the monetary value of the effects (damage and loss) and impacts and
- b) an estimation of recovery needs and costs of rebuilding the WaSH sector.

All data and information collected in the form of maps, satellite information, data sheets on water resources, services, costs, consumption, and population figures both in its original and edited formats, should be archived with the NDMO and Ministry of Economy for reference and future access. The PDNA report is compiled using the information prepared during the consultation, assessment and analysis process discussed above. The main steps involved are:

- Drafting the WaSH Sector PDNA report section, based on the template provided in ANNEX 4: Example WaSH Sector PDNA .
- Submitting it to the central writing team which prepares and finalises the overall PDNA Report.
- Preparing a summary table with damages, losses, and recovery needs. (See Annex 3)

Once the draft PDNA Report is submitted, it is circulated by the government to various ministries/departments for their comment, validation, and endorsement.

- Incorporating comments from the Government to finalise the PDNA Report.

Pre-Disaster WaSH Context

The first step in the PDNA process is to understand the pre-disaster context in the affected areas. It is important to build a clear understanding of the pre-disaster infrastructure, assets and services that are normally in place for the provision of water supply and sanitation services, and their status. It is necessary to specify whether the population being serviced is rural, peri-urban, or urban. While the technology level can be the same for both (e.g., latrines and shared water points), the management institution varies with locality in Fiji³. Locality of the infrastructure also creates links to responsibility in the recovery phase. The baseline data allows for comparison of the pre- and post-disaster situation to assess the extent of damage and loss due to the disaster.

This guideline section provides advice on how to develop an overview of the pre-disaster situation in the WaSH sector and key documents to be used.

2.1 WaSH Sector Baseline Information

With UNDP and the Fiji Government's collaborative efforts as part of the UNDP-ADB Project: Building disaster-resilient Infrastructure through Enhanced Knowledge, a baseline data set for the Fiji WaSH sector was established in 2022 and is held by the NDMO. This initial baseline data set is predominantly MRD data from rural locations, complemented by urban/peri-urban data from the Water Authority of Fiji (WAF). It includes water source and wastewater service information and access and level of service data. The data is held in excel spreadsheets referenced by a main index. The baseline data set includes:

- Rural water supply and sanitation facility data from the Department of Water and Sewage.
- Rural and outer island groundwater bore and reticulation system specifications including construction costs from the Mineral Resources Department.
- Analysed 2017 Census data from UNICEF.
- Summary information for water treatment and wastewater treatment from Water Authority of Fiji; and
- The latest WHO/JMP/UNICEF Fiji WaSH sector summary data for WaSH overall, Wash in Health Care Facilities and WaSH in Schools.

Other sources of WaSH sector asset data that should be included and regularly updated in the baseline data set include:

- Water Authority of Fiji – details of (mainly) urban water supply and wastewater infrastructure and services.
- Ministry of Health and Medical Services – details of water and wastewater assets in health facilities; and
- Ministry of Education, Heritage, and Arts – details of water and wastewater assets in schools.

³ Water Authority of Fiji mostly managed Urban areas with some coverage of reticulated water supplies in Rural locations, Department of Water and Sewerage mostly has rural assets and Mineral Resources Department has groundwater bores and reticulation in Rural areas.

Sources of pre-disaster baseline information include but should not be restricted to the sources listed in **Table 3**.

Table 3: WaSH Sector – Existing Baseline Data Sources

Data Custodian	Data Held by Stakeholder	Contact
NDMO	WaSH Sector Asset Database	Director - NDMO
Department of Water and Sewerage*	Location details and general descriptors of Rural WaSH infrastructure (water source descriptor, # of water tanks per location with construction material and capacity, # of water standpipes, # of toilets, # of showers). It flags the presence or absence of water treatment and the type. The data includes some schools. GIS (map) layers are available online.	Director – Department of Water and Sewerage.
Water Authority of Fiji*	Summary descriptors of some (Urban) WTP and WWTP assets.	Chief Executive Officer – via the Director, Department of Water and Sewerage.
Fiji Bureau of Statistics (FBOS)*	Summary statistics for water supply access, handwashing facilities and toilet access aggregated at Province and new Tikina level.	Chief Statistician (Household Survey Division)
UNICEF*	Detailed statistical analysis of the 2017 FBOS Census data based on JMP water and sanitation access ladder classification statistics.	Cluster Co-Lead – UNICEF,
Mineral Resources Department*	MRD’s data will includes specifics of the groundwater bores, pumps, reticulation systems installed by MRD and associated detailed costing.	Director - Mineral Resources Department
Ministry of Health and Medical Services	WaSH data for health facilities.	WaSH Cluster Lead – Ministry of Health and Medical Services, Secretariat WASH Cluster - Ministry of Health and Medical Services
Ministry of Education, Heritage, and Arts	WaSH data for schools.	Head of National Education Service Delivery

*Data currently included in the NDMO baseline data set for annual update by data owners.

This data gathering and review will familiarise team members with the pre-disaster context and aid planning of the post-disaster assessment. The information collected should be packaged (electronically) for assessors to take into the field for reference during the site assessments.

2.2 Baseline Data Management

The NDMO is the primary custodian of disaster management related data in Fiji and will have responsibility for the consolidated baseline WaSH sector data set. The NDMO or its designate (e.g., Department of Water and Sewerage) will maintain the latest version of the PDNA WaSH data collection tool and make it available for use by sector stakeholders as needed.

2.3 Description of WASH Infrastructure and Physical Assets

Typically, WaSH infrastructure is considered to include built items such as tanks, pumps, and piped distribution systems. Assets include infrastructure plus items such as surface water sources, waste disposal pits, and business software. However, assets also include transportation such as utility vehicles, water or sewage tankers, treatment materials (chemicals) and spare parts to name a few.

The types of items which should be assessed for disaster effects in Fiji include:

2.3.1 Water Sources, Water Distribution and Water Treatment Systems

Water sources	<ul style="list-style-type: none"> » surface water sources such as rivers, lakes, ponds, or weirs / dams, including intake structures. » groundwater sources such as boreholes and hand-dug wells. » rainwater harvesting household or other building rooftop and (rarely) surface water capture.
Water treatment systems and components	<ul style="list-style-type: none"> » large-scale treatment plants (including chlorine gas systems). » large- and small-scale filtration systems (EPS, roughing filters, rapid sand, slow sand, charcoal). » households scale treatment such as Biosand filters. » treatment chemicals and materials for filtration such as Alum.
Water distribution systems	<ul style="list-style-type: none"> » reservoirs, water towers or household rainwater tanks. » pumping stations – motor, wind, solar. » gravity fed piped distribution systems. » pumped pipe distribution systems. » trucks for transporting water. » Point of use items including domestic tap-stands, bulk water standpipes.

2.3.2 Sanitation Facilities, Infrastructure and Systems

Large-scale sanitation facilities	<ul style="list-style-type: none"> » urban and small-town sewage collection systems. » stormwater runoff collection systems. » wastewater and sewage treatment facilities such as waste treatment and settling ponds. » sewage pumping systems
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Small-scale sanitation systems ⁴ , often at individual household level but can also be collective, including:	<ul style="list-style-type: none"> » Latrines. » Showers. » Septic tanks. » French drains (slotted pipe buried in a gravel-filled trench). » Sewage carts.
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2.3.3 Collection and Management of Solid Waste

Solid waste infrastructure is found in the rural, urban, and peri-urban contexts. Solid waste collection management in rural communities and villages is often simple and may only comprise of household waste pits but include communal waste management. Given the impact of solid waste on community and public health, the following points may be suggested:

Urban Settings:	<ul style="list-style-type: none"> » shared collection points such as large waste and rubbish containers. » collection transport such as trucks. » waste management site for dumping, sorting, compacting, or burning, with accompanying infrastructure such as road access, drainage, and fencing.
Rural and Peri-Urban Settings:	<ul style="list-style-type: none"> » household pits or burning barrels, with fencing for protection

2.3.4 Hazardous Waste

Hazardous waste management includes waste from industrial, agricultural and health care facilities. This is usually not part of WaSH assessments except for where; in some contexts, the safe management of waste from Health Care facilities such as clinics and hospitals, which can be managed on a small to medium scale with separation, safe storage, or incineration protocols. In general, most hazardous waste requires specialist infrastructure for transport, storage and/or destruction, and can include waste from industrial processes (oils, fuels), abattoirs, or banned or out of date toxic chemicals for agriculture, firefighting and pharmaceuticals. Information identified on hazardous waste and hazardous waste treatment, or storage facilities should be forwarded to the NDMO and assessment sectors such as Health, Infrastructure and Agriculture.

2.4 WaSH Sector Indicators

In addition to documenting the physical water and sanitation infrastructure, the baseline assessment considers the availability of WaSH services and the level of access to them by the population affected. This includes large scale through to household and small-scale community or village-level infrastructure for water and sanitation.

⁴ Information regarding the small-scale sanitation facilities associated with private dwellings, schools or health institutions may also be collected by the Social Sector Team from the subsectors of Housing, Health and Nutrition or Education. The same holds true for the management of solid waste. Confirm with those teams to avoid duplication of effort.

It is crucial to assess the baseline capacity of the local resources to measure how the local population may cope with disasters. Indicators are used in the WaSH Sector to describe the level of access to WaSH services. This serves to complement the physical assessment of infrastructure and assets, providing a measure of levels of capacity, service provision and ease of access to WaSH.

Table 4 lists common WaSH indicators for Fiji and examples of the associated infrastructure types.

Table 4: WaSH Indicator Type Examples and Associated Infrastructure

Indicator	Examples of Infrastructure Types
Inventory of water sources, treatment, and distribution assets	<p>Examples.</p> <p>Water Sources:</p> <ul style="list-style-type: none"> » Stream (protected or unprotected intake) » Hand dug well » Groundwater bore » Rainwater harvesting and storage <p>Treatment:</p> <ul style="list-style-type: none"> » Trash Screen » Roughing Filter » Ecological Purification System (EPS) » Chlorination <p>Distribution:</p> <ul style="list-style-type: none"> » Submersible pump » Centrifugal pump » Storage tank » Distribution pipework and fittings » Water truck or cart
Location, JMP classification and number of water supply services / supply points	<p>Examples:</p> <ul style="list-style-type: none"> » Piped Water into dwelling (Improved) » Public tap, standpipe (improved) » Unprotected Well (Unimproved) » Uncovered Cistern or Tank (Unimproved)
Inventory of wastewater collection and treatment assets	<p>Examples:</p> <ul style="list-style-type: none"> » Flush Toilet » Pour Flush Latrine » Dry Latrine » No Facility (open defecation)
Location, JMP classification and number of sanitation facilities	<p>Examples:</p> <ul style="list-style-type: none"> » To piped sewer system (Improved) » To septic tank (Improved) » To open drain (Unimproved) » Ventilated Improved Pit (Improved) » Pit Latrine WITHOUT Slab / Open Pit (Unimproved)
Number of households and individuals accessing the water supply and sanitation services at each location	Inventory / count.
Location and type of solid waste management assets and services	<p>Examples:</p> <ul style="list-style-type: none"> » Burning Bin – Household » Community Waste Pit » Solid waste removal service

2.5 Governance and Decision-Making Processes

These processes include people's ability to exercise their citizenship and deliver against priority development policy objectives.

2.5.1 Governance for Social processes

An understanding of the past and knowledge of the current and potential future WaSH policy frameworks is important in the formulation of a needs assessment that will address recovery in the long term. In concert with the larger policy framework, it is important to describe the key partnerships at work prior to and following a crisis. Good key partnerships are marked by the following characteristics.

Relevant Policy context in Fiji includes:

- Fiji National Water Resources Management and Sanitation Policy 2022 (Under review August 2022).
- Rural Water and Sanitation Policy 2021.
- The present outputs from the sector – service provision (public /private).
- The institutional setting and context, i.e., role of government, WAF, MRD, non-state actors in planning and coordination at the national, regional, and local level as well as needs and socio-economic realities; and
- The capacity of the key sector organizations to fulfil their defined or mandated role.

3. Assessment of Disaster Effects

Disaster effects are the immediate results of the event that is to be assessed and is expressed in quantitative and qualitative terms, disaggregated by sector, geographic divisions, and gender, age, and ethnicity. Effects are analysed and valued under four dimensions:

- a) Partial or total destruction of infrastructure and physical assets (damage).
- b) Disruption to governance and decision-making processes
- c) Disruption to the production of goods and services (loss).
- d) Emerging risks or vulnerabilities⁵.

NB: effects can be described as tangible as well as intangible⁶.

Damage due to the disaster is valued using the cost to repair or replace the item(s) at the market price prevailing just before the disaster. Disaster related damage costs should not include the value of damage due to poor maintenance or incorrect operation over time.

Losses arising due to the disaster are measured in terms of changes in economic flows when compared to the baseline data. Losses are expressed in current values.

Post-disaster data is compiled then analysed with the baseline data to measure the disaster-related effects on infrastructure and assets (damages), and service delivery (losses).

3.1 Post-Disaster Data Collection and Analysis

To provide a standardised and rigorous approach to collection and reporting of the WaSH sector PDNA data, a detailed PDNA Damage and Loss Assessment Tool (spreadsheet) has been developed by the UNDP and provided to the Government of Fiji. Detailed instructions for use of the PDNA spreadsheet tool are included in the Standard Operating Procedure (SOP) for Post Disaster Needs Assessment (PDNA) Activities in the Fiji WaSH Sector

3.1.1 Effects on Infrastructure and Physical Assets (Damage)

The value of destroyed physical assets (damage) must be estimated for each of the drinking water supply, wastewater, and solid waste subsystems in urban, peri-urban, and rural areas. This will usually include a valuation for the main individual components such as dams, wells, and water-treatment plants, pumping stations, pipelines, storage tanks, distribution grids, sewerage facilities. In rural and peri-urban areas it includes community and household water capture, treatment and storage, latrines and septic tanks, and solid waste collection, treatment, and disposal facilities.

The replacement value of destroyed assets must be ascertained using pre-disaster construction or replacement costs, which can be obtained from private contractors presently involved in similar work in the affected country or area, as well as from the planning department of the affected utility enterprises that may have new, similar projects in the planning or construction stages. **The replacement values to be adopted for the estimation of the value of damage are those that prevailed at the time just prior to the disaster, since adjustments for disaster related cost changes are dealt with later when discussing overall reconstruction needs after the disaster.**

⁵ This may include information on emergency response taken to address the risks

⁶ All effects are tangible; some are quantifiable immediately in monetary terms and some are not. The latter are highly relevant in providing the full picture of the human development impact to inform the process of estimating needs (quantified as investments or resources required to compensate for those 'intangible' effects)

This section supplies an overview of the main infrastructure and associated types that need to be valued to assess total or partial destruction. Post-disaster data may be obtained from a variety of sources and per the PDNA SOP:

From Primary Sources:

- Collection by the government agencies and PDNA team through surveys, field visits and direct inquiry / interviews.
- Consultation with and reports from the key informants in the field, typically the District Officers.

Data may also be obtained from Secondary Sources such as:

- Sector-level surveys after the disaster
- Situation reports
- Cross referencing to the baseline data for the affected areas to confirm details of damaged infrastructure and assets.
- Media information
- Extrapolation of the verified damage estimate from one area to other locations based on baseline data.

Major unit items that should be assessed for costing in the template include but are not limited to the following⁷:

- **Partial or complete collapse of water supply facilities, urban or rural**, which are part of the source, collection, treatment, and distribution of urban water supply. Care must be taken to include household systems, such as rooftop rainwater harvesting tanks, backyard or communal hand dug wells or shallow boreholes, which may exist outside of the main urban supply networks. Smaller systems may often occur in peri-urban and informal urban periphery settlements, which may not be administratively recognized by authorities and therefore unlikely registered or recorded.
- **Partial or complete collapse of sanitation facilities, urban or rural**, which are part of the larger piped sewage systems for the urban context. This can also include fleets of trucks, tanks and pumps for emptying septic tanks and then transporting the waste to central management and treatment. Sewage treatment facilities, including sewage treatment plants and settling ponds, are also part of the sanitation system, which can be damaged or destroyed. Where the value of household and multi-household septic tank and drainage systems have been estimated, this information, as in the previous case of water supply facilities, should be passed to the housing team to ensure no double counting.
- **Partial or complete collapse of solid waste management facilities, urban or rural**, is often particularly essential to a post-disaster response. This can include destruction or damage to central collection facilities such as collection and rubbish containers, central collection sites and the access to the sites, loss, damage, or destruction of the collection transport network such as trucks, motorized or donkey and hand- carts. Donkey and handcarts are sometimes used in rural and village settings where there are community solid waste initiatives. Dumping sites may become damaged: security fences may be destroyed, waste pits may be covered by landslides, or their solid waste content mobilized by flooding.

7

Data collected by WaSH Experts in the infrastructure team should be transferred to the Housing Team. Infrastructure value is calculated with the Housing Sector (as part of the Social Sector).

- Partial or complete collapse of administrative buildings, laboratories, storage sites and Operations and Maintenance (O&M) materials and supplies. These essential for the administration and management of delivery of services, and for ensuring the necessary operation and maintenance of facilities. The secure storage and content of chemicals for treatment facilities or spare parts for repairs are essential for maintaining the delivery of services. Once again, it is important to ensure that this information is shared with the infrastructure team to avoid double counting.
- **Damage to physical assets pertaining to the administrative functions of the sector** (buildings, infrastructure and major equipment of the government agencies and NGOs, at the central and local levels). This also may be captured by the Infrastructure Team, so close collaboration with this team is required.

In assessing the damage to physical assets and infrastructure, the PDNA Team will consider various levels of damage and performance loss based on the PRIF classifications embedded in the tool. Consideration should include infrastructure and system materials that can be easily rehabilitated, to those requiring a more in-depth structural analysis of their condition and those beyond repair that must be replaced. These categorizations should be as similar as possible to existing country classification systems if available. If this proves difficult, a common methodology within the PDNA process is the next option, used for baseline and post-disaster data. This is also the point where the WaSH PDNA team should consult with other PDNA sectors such as infrastructure, agriculture, health, and education. At a later stage, this assessment of the degree of damage will help to better position the sector needs within the Disaster Recovery Framework, preparing for prioritisation.

To account for the typical range of installed costs for infrastructure in the Fiji WaSH sector, list of installed costs for “standard” items have been sought from the key sector stakeholders, primarily the Ministry of Lands and Mineral Resources and the Ministry of Infrastructure and Meteorological Services. These actual costs have been processed and incorporated into lookup tables in the PDNA costing tool and are linked to the asset descriptions used in the damage estimate cost calculations.

If the price is not available for any infrastructure item, the engineer (or technical expert) in the assessment mission, in consultation with community, can determine the cost from local resources by analysing the efforts and resources required in each step of the construction method and entering the unit cost estimate into the tool with an explanatory note. Where specialty materials or items are not available locally, such as pumps, treatment units, laboratory units or high resistance construction materials (e.g., ceramic bricks for incinerators), the costs of items (including shipping to site and installation) must be sourced externally.

The aim of the post-disaster assessment is not to be of utmost accuracy, but to provide a credible and useful estimate of the extent of the effects of the event and its impact on the economy and society. Such an assessment will allow for the development a realistic recovery strategy for the socio-economic, environmental, public health and well-being, and of the communities and their livelihoods.

3.1.2 Effects on Delivery and Access to Goods and Services (Losses)

The delivery of goods and services will be affected, and this is reflected in impacts on the production flow within the sector. Production flow changes are then estimated by comparing the non-disaster to the post-disaster performance of each sub- system, ensuring that the following issues are also valued:

- **Decline in operational revenues** of WAF, until services are brought back to normal levels, due to the temporary total suspension of operations, and the partial supply of services while assets are under repair, and due to possible temporary decrease of demand from consumers⁸.
 - » Treatment capacity problems at the Waila Water Treatment Plant caused by high feedwater Turbidity, and debris in the intake screens as well as damage to the WTP itself, results in reduced supply to customers and lower income to WAF.
- **Increase in operational costs** (due to use of alternative sources or means of water, wastewater and solid waste supply and disposal, the temporary operation of damaged system components, or the temporary, more-intensive operation of undamaged system components)⁹.
 - » Increased operating and maintenance costs for WAF arise through the need to use additional chemicals to treat water of lower quality (i.e., dirty water); having staff work extra hours to identify and repair damage and clear debris from water intakes; additional labour and energy is required at Wastewater Treatment Plants to compensate for additional debris in the sewerage network, changes to flows and variable wastewater composition.

WaSH implementation does not depend on infrastructure alone, but also requires an institutional, regulatory and a qualified human resource capacity to ensure the delivery of goods and services. Damage may include destruction of administrative infrastructures such as buildings and offices, and in some cases, permanent displacement of key individuals or even loss of life. The costs of bringing the institutional capacity to provide goods and services up to the level of the population's needs can include repair or reconstruction (Damage) of buildings (offices, laboratories, dispatch centres, service, and supply centres) and replacement and training of individuals necessary for the provision of goods and services.

The effects of limiting access to water supply and sanitation services, as well as management of solid waste, can be very suddenly felt among the affected population, as follows:

- Knock-on effects of increased costs of WASH services reducing disposable income for individuals and households.
- Increased water costs for commercial activities lead to increased costs for products.

In addition to estimating the damage and losses relating directly to water and sanitation infrastructure, the post-disaster assessment considers the losses associated with changed availability of WaSH services and access to them by the population affected. This includes large scale and household or small-scale community or village-level infrastructure for water and sanitation.

Support for the restoration of community-based water supply and sanitation facilities will include restoring destroyed access (e.g. roads or bridges), cleaning community ponds and

8 The operation of the services may be fully stopped during an initial short period of time immediately after the disaster (a few hours to a few days), to be partially resumed during the period of repairs until full system reconstruction is achieved. In addition, service demand may drop due to extensive destruction in cities caused by the disaster and the subsequent overall lower economic activity. These temporary interruptions or partial operations for each subsystem would result in corresponding revenue decline for the enterprises.

9 Among the possible items to be considered under this heading are: temporary higher costs of chemicals required to ensure quality of drinking water; higher water distribution costs when temporarily using tanker trucks to reach users and/or the temporary free distribution of bottled water; the more intensive operation of water systems to compensate for higher water flow losses in damaged system components (such as distribution or conveyance water mains); cleaning of sewerage systems and treatment plants after flooding; and higher transport costs to collect and dispose of solid waste, etc. In some cases, salt-water desalination plants are installed and operated in coastal areas or in Small Island Developing Countries affected by disasters, which imply a very high cost of operation. Such higher costs of post-disaster operation translate into higher intermediate consumption for the macro-economic impact analysis.

water supply sources, repair and restarting water treatment plants, restoring or installing shallow or deep tube wells and boreholes, repairing village water supply storage and distribution systems, installing/repairing rainwater harvesting, setting up adequate low-cost sanitary latrines for communities and restoring safe solid waste disposal systems.

3.1.3 Effects on Governance and Decision-Making Processes

Governance and decision-making processes refer to the systems for developing and implementing policies, enforcing regulations, and implementing sector programs for the provision of services and management of public sector assets and infrastructure. After a disaster, the ability of the public authorities to respond to the emergency and plan for a long-term recovery will be affected.

Factors to assess are discussed in more detail in the PDNA SOP. Effects on governance structures and processes that can lead to economic costs can be summarised as:

- Disruption of human resources, minor equipment, financial resources, and supplies, which reduce or impair the ability of the public authorities to carry out their administrative functions.
- Damage of documentation and baseline data, both in paper and electronic forms, which are essential to guide the assessment and recovery processes.
- Disruption of administrative functions typically exercised by the public authorities (WAF), such as provision of services; in the post-disaster context, this would include carrying out impact assessments, planning and implementing urgent safeguarding measures, providing support to sector stakeholders and the public.
- Disruption of key decision-making, policy and strategy formulation and coordination mechanisms for the sector, due to loss of staff, and difficulty in communication and transportation; and
- Disruption of social and community structures, such as CSOs that normally work in parallel with the authorities to assist vulnerable members of the population (the elderly, women, girls, the disabled, the ill) to access services.

3.1.4 Effects on Risks and Vulnerabilities (Losses)

A key element of the assessment is to identify immediate risks to the affected population, particularly new potential threats that may deteriorate conditions if the necessary measures are not taken in a timely manner. Priority mitigation and preparedness measures are identified to avoid another disaster or the further deterioration of current livelihood conditions. Below are examples of effects to examine:

- Current water and sanitation practices that can have a negative effect on the population's health, such as solid waste and rubbish disposal (e.g., collection system, burning, burial).
- Threats to WaSH facilities, such as potential contamination of water sources.
- Secondary stocks, such as the potential spread of disease resulting from inappropriate supplies of clean water.
- Environmental risks, such as the salinisation of underground water.
- WaSH practices which may not be sustainable and that can negatively impact the environment (e.g., open defecation), and ways these can be avoided.
- Population groups (economic, social, and geographic) who are especially vulnerable.
- Additional hazards such as further landslides, an approaching cyclone season,

- Climate forecasting, such as on forthcoming seasons that may bring anticipated storms, or temperature extremes and drought.
- Social and political risks, such as upcoming elections, religious events, or other potential conflict between social groups.

Some cross-cutting issues such as gender, environment, climate, and culture have been included here but will be discussed in more detail later.

The cost associated with increased risks and vulnerability can be measured by the cost of reducing the risk or by the increase the costs of the expected loss in future associated with increased risk. The comparison of these two types of costs is useful in determining the financial added value of implementing DRR strategies in the recovery process and beyond. The application of costs to the changing risks in the WaSH sector, usually increased or compounding risk, is typically based on effects costed for infrastructure, human costs such as health or displacement, and governance costs such as administrative and institutional capacity to respond to disaster or implement risk reduction.

Assess and value the need for additional hygiene promotion related to water and sanitation, especially priority actions linked to hygiene risks and behaviours, and those that need to form part of the recovery response in the sanitation sector. Consider the following practices that may need to be addressed:

- use and maintenance of facilities (taps, showers, toilets, latrines, etc.).
- hand-washing practices after defecation and before food preparation and eating.
- hygienic water collection, transport, and safe storage (protection) of water.
- bathing and laundry facilities and practices.

Also consider the population's known structures, beliefs, cultural sensitivities, and taboo subjects as well as their understanding of the relationship between water, vectors, and disease. Identify knowledge gaps that can be addressed by outreach and education.

4. Assessment of Disaster Impacts

Impacts are the consequences of the disaster effects and are analysed at the macroeconomic level and the human development level.

4.1 Macroeconomic Impacts

The impact of damage and losses on Fiji's macro-economic performance needs to be estimated. Macroeconomic Impact Analysis measures the temporary macroeconomic imbalances as well as temporary decline in employment, income and well-being of affected individuals and households. Estimates are also made of the well-being of persons and households in the absence of post-disaster interventions. The macro-economic impact analysis evaluates the possible impact on GDP and the impact on the balance of trade and payments on the fiscal budget, especially when the sector enterprises are government-owned, or receive government subsidies.

Examples of macroeconomic impacts which arise due to damage or destruction of WASH infrastructure include:

- External impacts (impacts on balance of payments, imports, exports): increased import costs due to replacement of large treatment plant components or service vehicles;
- Public finance impacts (tax revenue and expenditure and fiscal deficit): increased expenditure associated with higher operational costs and recovery-related investments and repairs (all WASH stakeholders) while lower revenues are being achieved (Water Authority of Fiji) The combination of a decline in tax revenues and an increase in sector spending will put pressure on the fiscal balance in the medium term.

4.2 Human Development Impacts

In addition to the significant effects that disaster events have on the economy, disasters severely impact people's well-being. Disaster events can deprive households of their basic living conditions and standard of living, destroy their livelihoods and income base, erode their productive assets, reduce their access to basic services, such as health and education, and compromise their food security. These impacts include:

- The decline and deterioration of livelihoods, employment, and income due to lack of access to adequate supplies of clean safe water. This in turn leads to temporary increases in poverty and reduced food insecurity.
- WaSH impacts are also observed through reduced adult female and child malnutrition due to reduced access to water for food production and cooking
- Increased morbidity due to greater prevalence of WASH related disease.
- Declining post-disaster school enrolment related to childhood illness and increased family poverty.

As a result, poverty may become entrenched, inequality may increase, and human development progress may be undone or at risk. When disasters occur, poor households suffer disproportionately. While the total share of economic losses sustained by poor households may be low, the impact upon these households is usually very high. This is because poor people often live in hazard-prone regions, are exposed to hazards more often, are more vulnerable and lose a bigger proportion of their wealth and assets in the disaster. They also have a lower capacity to cope in the aftermath and receive less support from safety nets and social protection mechanisms.

Human development Impact Analysis measures the disruption to the population's normal livelihoods and income, as well as their access to basic commodities and social services. The overall goal of a

human development impact assessment is to evaluate the impact of disasters on people, their living conditions, health, access to education, livelihoods, food security, social status, as well as on overall levels of poverty and human development. More specifically, the objectives of a human impact assessment are to:

- understand the human dimension of the disaster's impact
- inform the recovery strategy, especially to mitigate the impact on humans
- guide priority recovery actions and identify population groups, for example, to prioritize and target households and areas with the highest human impact or incidence of poverty
- inform the adjustment of national development plans, poverty reduction strategies and social protection programmes
- analyse how the impact on humans may compromise the achievement of national SDG targets and policy considerations.

5. Cross-Sectoral Linkages

There is a need to be aware of cross-cutting issues, their existence in other sectors and their impact on WaSH and vice versa. It is important to know how sectors and their cross-cutting issues have addressed overlaps or shared responsibilities. This cross-linking is mapped in the matrices of Checklists of Roles and Responsibilities of WaSH and other sectors of Education, Health, and Nutrition (see Annex I).

The WaSH assessment should provide inputs that integrate disaster impacts on local economic and social activities linked to facilities such as:

- Public markets.
- Schools and early childhood education centres.
- Churches.
- Productive sectors such as agriculture, small business and industry.
- Transport (busses, goods)
- Health service infrastructure.

The following sub-sections identify cross-cutting themes and sectors as well as key actors and focus areas that contribute to the WaSH sector. These themes, sectors and focus areas all require assessment to evaluate:

- the extent of damages and losses during a disaster, including loss of skills and capacities to provide services.
- their role and contribution necessary for recovery.
- their technical and human resource needs and requirements for them to fulfill their role.

5.1 WaSH Links to Other Sectors

In Fiji, Disaster Response and Preparedness systems and responsibilities incorporate a National Cluster System, based on the UN Global Cluster System. The WaSH Cluster is a significant part of this structure. The individual clusters are active on an on-going basis and collaborate for disaster response under the guidance of the NDMO and NEOC, integrating into the PDNA teams.

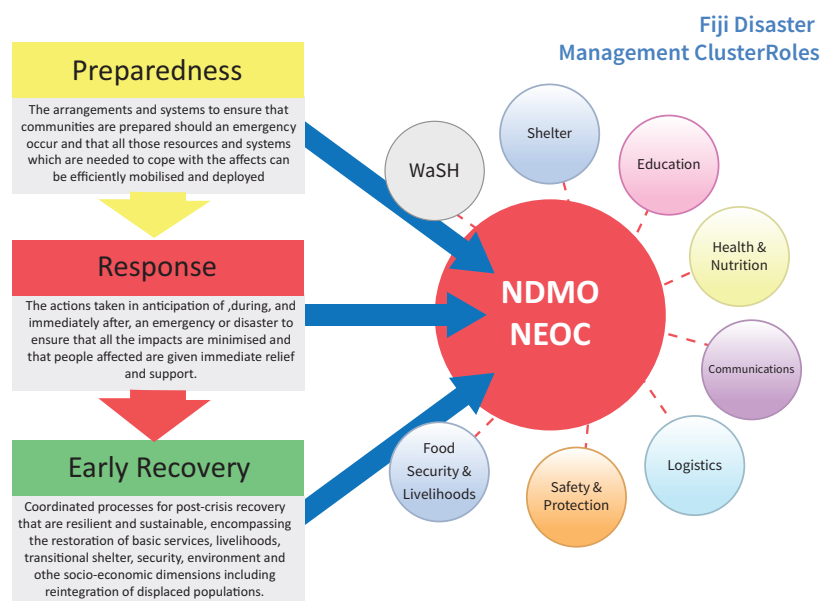


Figure 4: Fiji's Disaster Management Cluster (UNICEF)

The National Cluster Structure is replicated at Division level and implemented at District level through the operation of agencies and partnerships between Divisions and Districts.

Fiji Disaster Management National Clusters at Divisional and District Levels

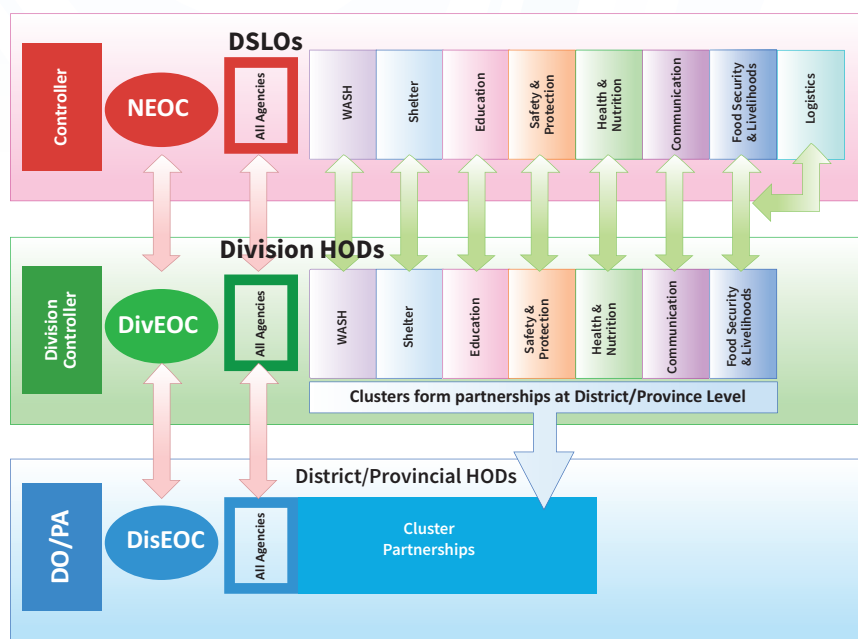


Figure 5: Fiji's Divisional and District Cluster Structure (Modified from UNICEF, 2013)

5.1.1 Environmental Considerations

Existing and pre-existing environmental problems must be identified in the PDNA assessment to evaluate whether they had impact on, or were sensitive to, WaSH services. Ascertaining what these impacts may have been, and what their influence may be on recovery strategies relevant to WaSH is important for planning.

5.1.2 Culture Considerations

Issues of communication and language, gender, and age, and social, religious, and family dynamics, as well as other cultural aspects can influence the smooth implementation of a WaSH assessment and post-disaster response. Planning for any post-disaster intervention should include a systematic consideration of the cultural environment in which such interventions are to take place. Religion, gender, ethnicity, and socio-economic status are just a few considerations to keep in mind when planning interventions.

5.1.3 Gender Considerations

The role of women and young girls regarding the WaSH sector is well known in general (water transporters, source protection, management of household health and hygiene, agricultural users), but the degree and extent of their roles in decision making or influencing decisions can vary from context to context. However, gender does not automatically imply that a bias towards women is required; support and opportunities should remain equitable. Each assessment should be conducted with sufficient preparation and focus on gender participants' respective existing and future roles and capability to influence decisions based on informed choices. The specific role of men in decision-making processes should also be assessed. These assessments will indicate which elements will have impact on which transitions because of disasters (e.g., women or youth becoming head of households, reduced freedom of movement).

5.1.4 Climate Change Considerations

In the WaSH sector, Climate Change can affect accessibility of water resources for commercial or domestic use, frequency and need for irrigation or effectiveness of certain sanitation activities such as sewerage removal and management of wastewater. It is necessary to quantify these events, which can often also be performed in the baseline survey, to allow for comparison to previous events.

5.1.5 Disaster Risk Reduction Considerations

Managing disaster risk cuts across traditional development sectors, such as health, education, infrastructure, water, and agriculture. Due to the difference in population densities, the potential risk to affect large populations can be higher in urban areas compared to rural areas. Achieving efficient development progress requires each of these sectors to invest in risk management and resilience measures. Given the projected increase in the occurrence of disasters (particularly cyclones), development progress will be contingent more than ever before on measures to avoid or reduce disaster impacts (Mitchel, 2012).

5.1.6 Additional Considerations related to WaSH

Policies & Legislation

- Policy (or its absence) for WASH Recovery, including provisions on upgrading facilities in terms of hazard-resistance design and accessibility.
- DRR being integrated into watershed management programs (IWRM) and in land-use planning.

Advocacy & Awareness

- Sustainable water use and sanitation awareness programs and support materials are made available to local communities, including appropriate training and installation of secure WaSH facilities and different types of emergency responses and protocols.

Coordination of Actions and Capacity Development

- Contingency plans exist in Fiji for delivery of WaSH services in post-disaster contexts (e.g., floods, droughts, earthquake). Plans should be regularly reviewed to reflect occurrence of both chronic and extreme events, and the corresponding risks considered most likely to occur.
- Sanitation teams and water technicians are trained, either locally or in the general community, to clean wells regularly, to treat stored water and to provide information for households on treating and storage of domestic water.

Building Back Better

- Risk-proofing and monitoring process implemented, including strategies for access to parts and tools during emergencies.
- Risk assessments performed for site-location of water pumps, supply systems, drainage and sewage systems, and sanitation facilities.
- Survey and potentially establish backup water supply bores in high-risk settings where primary water sources may be compromised in a disaster.
- Community drainage systems, sanitation facilities, waste management systems are constructed, which are risk-proof. (e.g., site selection, design, and choice of materials, shared management, and responsibilities).

- The local authorities and communities engaged in training and information exchange on risk reduction and how it can be implemented.
- Quality control exercised by the community by participating in the creation of community drainage systems, sanitation facilities, and waste management protocols and processes.

Consulting iTaukei leaders, local communities, water committees, CSOs, local government authorities, and national and international organisations specialising in water and sanitation in DRR can help identify potential mechanisms and techniques to be applied to the recovery of the sector. This will reduce the exposure and vulnerability to future hazards of the new water and sanitation facilities that will be repaired or built. This may include identifying the following:

- examples of good DRR practice already used by communities, including WaSH systems that may have survived the disaster and can serve as models.
- other local technologies, techniques, designs, and know-how that can be adapted and applied.
- locally available expertise able to provide technical assistance to authorities on DRR in the sector.

6. Estimating Recovery and Reconstruction Needs

The financial requirement for the recovery of the WASH sector is defined as the amount of financing required to ensure the well-being of the population and ultimately assisting communities to return to a normal existence. This will include reconstruction of infrastructure and restoration of service delivery in the affected community to help re-engaging population into a normal life, providing a spirit of recovery and control of their future. The critical elements of recovery needs, accounting for the intention to build back better, are:

- Reconstruction of infrastructure and physical assets in improved conditions. (e.g., Reconstruction of pipelines using updated materials and/or alternative routing)
- Resuming production of goods (e.g. restoration of water supply enabling resumption of food production).
- Resumption of access to service delivery (e.g., WTP returned to service and supplying water to consumers).
- Restoration of governance and decision-making processes (e.g., WAF offices re-opened)
- Reduction of risks (e.g., improved water disinfection system installed)

Recovery needs are defined based on the effects costs and should also incorporate the costs associated with building back better. So, recovery needs are identified by distinguishing the needs to restore and resume to pre-disaster levels, from needs that will improve access to services and goods, catalyse the economy, build livelihoods, strengthen DRM of the government and communities, and reduce risks and vulnerabilities to future disasters. Such measures should, as far as possible, be context specific¹⁰.

Examples of BBB philosophy in the WaSH Sector include:

- Upgrading stream intakes for gravity fed water systems to include robust trash screens and other physical protection for resilience. Incorporate roughing filters for removal of bulk solids prior to the EPS.
- Constructing VIP latrines rather than conventional pit toilets for improved sanitation management.
- Constructing stronger health facilities (e.g., cement blockwork) rather than using timber. This will protect the structures in a cyclone and provide safe shelter for community members.

For each of the elements presented above, the recovery needs should be planned for short-term (1-2 years), medium term (2-3 years), and long-term (up to 5 years). Criteria may be developed by the WaSH Sector Team during the recovery planning (or previously by the PDNA Team) to guide the prioritisation process. Some suggested criteria for prioritisation are provided in Section 4.2.1 of the DRF Guideline.

The recovery needs identified in the PDNA should be presented in tables as follows:

- Aggregate recovery needs at the national level.
- Recovery needs at the sub-national level
- Recovery needs for the short-, medium-, and long-term.

¹⁰ All BBB interventions contribute to resilience of government, systems, and communities. Needs for BBB related should be aligned to/informed by pre-existing national development and/or poverty reduction

Table 5: Example of Reconstruction and Recovery Needs by Division

DIVISION	Short-Term Needs	Medium-Term Needs	Long-Term Needs
WASH Infrastructure needs: To repair / rebuild damaged infrastructure and physical assets (Restore to pre-disaster level with BBB for reconstruction of infrastructure and physical assets).			
Central	Repair and reinforce damaged pump station structure at Wailea.	Identify location and construct alternative run of stream intake in location.	Connect existing and new intake supply lines to common supply main.
Western	Replace damaged pipework on EPS plant at Bukuya village.	Augment EPS for additional capacity and redesign / replace support structures for additional wind resistance.	
WASH Service delivery and production needs: access to services and goods (Restore service delivery and production capacity and ensure access to services and goods BBB needs for service delivery and production of goods, and access to services and goods).			
Western	Reinstate health visits to Bukuya village using mobile clinic.	Return staff to HF once staff housing is reconstructed to new standards and water supply reinstated	Train more residents to be first aid / health workers.
Governance Needs – BBB needs for Governance and DRM			
Northern	Gather members of village WASH committees to guide recovery steps	Provide additional training and resources for WASH committee economic management	Incorporate more funding from District budget for WASH committee works.
Risk Management Needs - Mitigation risks and vulnerabilities to future disasters			
Western	Install more temporary potable water storage	Identify location and construct alternative run of stream intake in location.	

7. Development of Recovery Strategy

The analysis processes above result in a report of the damages, losses, and recovery needs that is then summarised into a Recovery Strategy. The recovery strategy sets the pathway for resolving the disaster impacts and improving on the underlying conditions to improve disaster resilience. The Recovery Strategy identifies priority interventions as well as the intended outcomes of the recovery interventions. It provides the critical link between assessment results and a comprehensive Disaster Recovery Framework. The Recovery Strategy forms part of the PDNA and constitutes its main goal.

The Recovery Strategy identifies the following elements for recovery:

- **Identify reconstruction and recovery needs including Building Back Better:** this includes the four elements presented above: reconstruction of physical assets, restoring access to goods and services, restoring governance and decision making, and reducing risk and vulnerabilities.
- **Outline overall Recovery Vision and Guiding principles** as agreed with Government and stakeholders. The sector vision and recovery objectives should be aligned to the Republic of Fiji 5-Year & 20-Year National Development Plan (2017). The vision shall also integrate a Building Back Better (BBB) component, i.e., considerations for strengthening the resilience and disaster risk preparedness of the sector through the recovery and reconstruction phases.
- **Stakeholder Consultation:** Consultation is required throughout the PDNA process and is especially important at the time of developing the Recovery Strategy. Consultation at this stage of the PDNA process may be conducted as part of the overall Recovery Strategy consultation process rather than separately, as determined by the overall PDNA Leader.

Identify intended sectoral results, specifically the priority needs and interventions, recovery costs, expected outputs and intended outcomes. In line with the PDNA guidance on the recovery framework, the WaSH sector recovery strategy should be formulated following a results-based model and Error! Reference source not found. below provides an example of how this may be set out.

Develop a broad sectoral implementation strategy accounting for cross-cutting themes and key assumptions and constraints for the region, focusing on partnership coordination and management, linking the strategy to development plans.

Table 6: Example of Reconstruction and Recovery Costs by Division

Priority Recovery Need	Interventions	Recovery Costs		
		Short Term	Medium Term	Long Term
1. To assist those affected by the disaster in Central Division with the rehabilitation of sanitation facilities	<ul style="list-style-type: none"> » Supply construction materials and sanitation inputs » Sanitation technical assistance » Capacity building support 	US\$3,525,000	US\$4,125,000	US\$7,650,000

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ANNEX 1: Checklists for roles and responsibilities within the Fiji WASH Sector

Table 7: Potential Synergies in Responsibilities of the Education and WaSH Clusters

Area of Potential Synergy	Specific Activity	Responsibilities	
		Education Cluster	WaSH Cluster
Standards			
WaSH – ED Standards	Ensure agreement on WaSH–ED standards and indicators.	For education facilities, as per national Ministry of Education Heritage and Arts (MoEHS) / international (especially INEE) standards.	Outside education facilities, as per context-specific national/ international standards.
	Ensure the dissemination and the promotion of standards.	For education facilities	Outside education facilities.
	Ensure that service providers subscribe to the agreed standards and that their performance is monitored.	For education facilities, as per national MoEHS/ international standards.	Outside education facilities, as per identified context-specific national/ international standards.
Hygiene Promotion			
Hygiene Promotion (HP)	Ensure that teachers are provided with adequate training.	For education facilities	Coordinate relevant training for teachers as requested.
	Ensure teachers are provided with adequate resources.	For education facilities	Coordinate common messages between clusters, and conduct HP outside education facilities, e.g., by providing hygiene promotion material.
	Monitor hygiene promotion practices and support schools where necessary.	For education facilities	Outside education facilities. Inform Education Cluster about prevalent WaSH related diseases in the community.
	Support schools with additional capacity and financially for hygiene promotion.	Responsible – identify sources of potential support/resource mobilization.	Support the Education Cluster as requested.

All Facilities					
Needs Assessment	Ensure WaSH needs are assessed (as per identified context-specific standards; see 1.2 above).	For education facilities	Support coordinated design and/or conduct of WaSH-ED assessments		
Community Consultation / System Design	Ensure that designs meet community needs, are child-friendly, address gender and teacher/student issues, are safe, are appropriate in terms of ongoing costs and operation & maintenance, and will be maintained in the long term.	For education facilities (with technical input from WaSH).	Outside education facilities. Provide support to Education Clusters on appropriateness of systems		
Construction/ Rehabilitation	Ensure that a quality contractor is engaged and managed, in collaboration with the Ministry of Education.	For education facilities	Support joint consultation and design to ensure appropriate-ness for all population sub-groups.		
	Ensure that quality control system is in place.	For education facilities	Outside education facilities.		
Maintenance	Ensure that facilities are maintained.	For education facilities	Outside education facilities.		
Use	Ensure that facilities are used.	For education facilities	Support the Education Cluster as requested.		
Area of Potential Synergy		Responsibilities			
Water		Education Cluster		WaSH Cluster	
Water Quality	Identify country testing capacity and facilities.	Involve educational facilities in water quality assessment.	Coordinate		
	Ensure testing capacity.	For Education facilities	Outside education facilities.		
	Ensure testing conducted.	For Education facilities	Outside education facilities (including source, storage, and distribution). Provide training to other Clusters as required.		

	Ensure that a monitoring system is in place for water quality tests.	For education facilities	Outside education facilities
Water Quantity	Ensure adequate quantity	For education facilities	Outside education facilities.
Water Facilities	Ensure adequate access	For education facilities	Outside education facilities.
Water Treatment	Provision of chemicals	For education facilities	Provide advice and support to the Education Cluster as requested.
Others			
Excreta disposal	Ensure adequate and sufficient access.	For education facilities	Outside education facilities.
Drainage and waste- water	Ensure adequate disposal.	For education facilities	Outside education facilities.
Waste Management	Ensure maintained, construct-ed and renovated as required.	For education facilities	Outside education facilities.
Improve sanitary environment	Ensure a sanitary environment (e.g., removing standing water).	For education facilities	Outside education facilities.
Vector Control	Ensure adequate vector control.	For education facilities	Outside education facilities.
Emergency Preparedness	Ensure that schools are supported in the training of teachers and pupils for emergency preparedness.	Responsible	Support the Education Cluster as requested.

ANNEX 2: Example PDNA Terms of Reference template

Example PDNA ToR Structure and Guidance Notes

This is a working model to provide the basis of a ToR for conducting an overall PDNA. This TOR must be developed jointly with the sector stakeholders and adopted by consensus between the Government, the UN system, the WB, the EU as well as other key actors. It is critical to the success of a PDNA to have a well-fleshed out ToR adopted with mutual consent.

Background

The Disaster Event and Characterization of Impact: a brief description of the disaster effects and the available preliminary impact figures. This should include affected sectors and geographic areas, urgent needs and priorities, vulnerable population groups, inter-sectoral considerations, current and planned responses of the NDMC and NDMO and International partners. If available, include a description of the disaster risk profile of the affected area and any information about previous/recent disaster events.

Objectives of the Assessment

Depending on the context, and subject to agreement reached with the Government, the key objective of the PDNA is to assist the National Government (and local government) to assess the impact of the event and define a strategy for recovery including its financial costs: from restoration of services to complete rehabilitation and reconstruction of infrastructure, livelihoods and economy while building resilience to future disasters.

The specific objectives of the PDNA could be as follows are:

- Estimate the overall impact of the event on the socio-economic development of the country at the national level and on affected states and communities.
- Assess the effects and impacts of the disaster to develop a Recovery Strategy the early, medium- and long-term recovery and reconstruction needs with costs and a timeline in one consolidated report.
- Ensure that strategies for recovery integrate concepts of disaster risk reduction and “build back better” and address gender and environmental concerns.
- Develop a recovery strategy is representative of the needs and priorities of the affected communities.
- Recommend and define a strategy for Disaster Risk Management in the country.
- Recommend institutional mechanisms and policy options to be undertaken in support of the recovery and reconstruction process and that promote long term disaster resilience.

Deliverables of the PDNA

- One consolidated Report of the effects and impacts for each sector.
- A recovery strategy with early medium and long term needs by costs and timeline for each sector.
- A disaster risk management strategy.

Coordination of the PDNA

The PDNA exercise will be led by the Government of Fiji under the direction of the NDMO, supported by United Nations (UN) System, World Bank (WB) and the European Union (EU) will provide overall direction to the PDNA. It will be supported by the Cluster members, responsible line ministries and the Ministry of Economy. Technical experts will be drawn from the sector partners to provide daily guidance and technical oversight of the PDNA process.

Methodology for the Assessment

The WaSH Sector PDNA methodology has been documented in the Fiji WASH Sector PDNA Standard Operating Procedure (SOP). The methodology integrates the WB/EU and UN methodology for assessment of the impact

of the disaster on the affected areas which will include a comprehensive assessment of the effects and impact of the disaster from the municipal to the state level, combining social, economic, and financial aspects of the effects of the disasters. The assessment will take into consideration early recovery requirements as well as longer-term rehabilitation and reconstruction needs. The assessment includes the identification of disaster risk management measures designed to mitigate the occurrence of future disasters.

The assessment will make extensive use of data from the existing secondary sources and information gleaned from all available sources at the time of the assessment, including maps, records, and media reports. As information requirements make it necessary, primary sources on effects and needs will be generated from surveys, focused group discussions and other data gathering methods.

The assessment will have the following phases:

- Training Phase – intensive training for all Government officials as well as sector leaders and focal points.
- Preparatory and Desk Review Phase - to assess existing baseline information, determine the scope of the respective sector-wide reviews, identify information gaps, and prepare data collection templates. The desk reviews will be conducted to analyse and compile all available baselines information for the various sectors, to identify gaps in baseline data, and to also identify various data sources for the collection of both baseline and damage and losses data.
- Field Visits: to validate the data, collect additional data from the affected communities and hold consultations with the State and local government authorities, public and community representatives.
- Data Analysis and development of sector reports – The Field visit will be followed by review and analysis of the data by sectorial/core teams to prepare the draft sector reports including impact, damage, losses and needs. The Macro-economic and Human development expert team will then aggregate the sector specific results into the macro-economic analysis and human development impact and write-up.
- Final consultations and Report writing- the sector teams will undertake cross team consultations and consultations with key stakeholders to prioritize recovery strategies and costs to finalise the report.

Sub-Sectors and geographic areas to be assessed

The decision on the sectors and the geographic areas to be assessed is determined by NDMO and NEOC. The sector teams are led by the Government officials from Line ministries and the WASH Cluster and supported by representatives from the World Bank and the UN.

ANNEX 3: Damage & Losses Cost Summary Template

This table can be used as a guide for summary reporting of PDNA data.

Table 8: Sample Table For Estimation of The Value of Damage and Loss

Estimation of Damage to Infrastructure and Physical Assets		Total Value	Value by Ownership		Total Value	Value by Ownership		Total Value
			Public	Private		Public	Private	
Water Supply								
Urban & Peri-Urban areas	Water intake structures (Surface Water)							
	Water Bores							
	Water Treatment Facilities (including desalination)							
	Reservoirs & Water Towers							
	Distribution Pipe Networks							
	Water Pumps (Solar or mains powered)							
	Distribution Pump Stations							
	Water Supply Points							
	Water Supply Support Facilities (e.g. WAF/ DWS Offices, workshops, warehouses)							
	O & M Supplies (parts, chemicals, equipment)							
Service or water delivery vehicles								
Household / School / Health Facility Systems (Wells, Rainwater)								
Hand Pumps								
Rural areas	Water intake structures (Surface Water)							
	Water Wells (protected or unprotected)							
	Water Bores							
	Water Pumps (solar or mains powered)							

	Partially Damaged* (Repair Value) FJD million	Completely Destroyed* (Replacement Value) FJD million			Change in Economic Flows CEF (Losses) FJD million			Recovery Cost FJD million
		Total Value	Value by Ownership		Total Value	Value by Ownership		
			Public	Private	Total Value	Public	Private	Total Value
	Water Treatment Facilities (including EPS, desalination & others)							
	Reservoirs & Water Towers							
	Distribution Pipe Networks (gravity or pumped)							
	Water Pumps (solar or mains powered)							
	Distribution Pump Stations							
	Water Supply Points / Tap stands							
	Water Supply Facilities (Offices, workshops, warehouses)							
	O & M Supplies (parts, chemicals, equipment)							
	Service or water delivery vehicles							
	Hand Pumps							
Sanitation & Hygiene								
Urban & Peri-Urban areas								
	Toilets (water seal - flush or pour flush)							
	Septic tanks and effluent fields							
	Dry Latrines (VIP, Pit etc.)							
	Handwashing and Bath / Shower Facilities							
	Wastewater disposal system (including wet wells, screening stations)							
	Sewerage Network (Gravity Mains, Rising Mains, manholes)							
	Wastewater pumping (fixed and trucks)							
	Wastewater treatment works (inlet works, lagoons, trickling beds, mechanical treatment, etc)							

	Partially Damaged* (Repair Value) FJD million	Completely Destroyed* (Replacement Value) FJD million		Change in Economic Flows CEF (Losses) FJD million		Recovery Cost FJD million
		Total Value	Public	Private	Total Value	
	Treated effluent disposal (outfall pipelines, irrigation to land, other)					
Rural areas	Toilets (water seal - flush or pourflush)					
	Septic tanks and effluent fields					
	Dry Latrines (VIP, Pit etc.)					
	Handwashing and Bath / Shower Facilities					
	Wastewater pumping (fixed and trucks)					
Solid Waste						
Urban & Peri-Urban areas	Collection Point Facilities / Containers					
	Waste Transport Facilities					
	Waste Management Site Facilities					
Rural areas	Community Waste Pit					
	Waste Collection System (if any)					
	Household Waste Pits					
	Household Burning Barrels					
	Total estimated damage, FJD million (USD)					
	Estimation of Change in Economic Flows (CEF)/Losses					
Disruption of access to goods and services						

		Partially Damaged* (Repair Value) FJD million			Completely Destroyed* (Replacement Value) FJD million			Change in Economic Flows CEF (Losses) FJD million			Recovery Cost FJD million
		Total Value	Value by Ownership		Total Value	Value by Ownership		Total Value	Value by Ownership		
			Public	Private		Public	Private		Public	Private	
Water supply	Urban areas										
		Lower revenues									
		Higher expenditures for									
		Water potabilization									
		Water distribution									
		Water purchases									
		Other expenses									
Rural areas											
		Cleaning/deepening of wells									
		Water potabilization									
Sanitation & Solid Waste	Urban areas										
		Lower revenues									
		Higher expenditures									
		Cleaning of wastewater network									
		Increased use of chemicals									
		Higher transport costs for solid waste									
Rural areas											
	Lower revenues (eg reduced visitor income)										

	Partially Damaged* (Repair Value) FJD million	Completely Destroyed* (Replacement Value) FJD million		Change in Economic Flows CEF (Losses) FJD million		Recovery Cost FJD million		
		Total Value	Value by Ownership		Total Value		Value by Ownership	
			Public	Private			Public	Private
Additional Information for Macro-Economic Impact Estimation								
Import of equipment and materials for recovery and reconstruction								
Possible losses in sales of electricity to other systems								
Revenue loss for government- owned utilities								
Higher operational costs for government-owned utilities								

*Note: Damage may be classified as **Partially Damaged** if less than (40)% of the asset is damaged, structure is still sound and repair cost would be less than (40)% of the total asset value. Damage may be classified as **Completely Destroyed** if more than (40)% of the asset has been damaged or if the replacement cost of the damages would be more than (40)% of the total value of the asset. The WASH sector team should apply the % bracket(s) considered most appropriate taking into consideration the type of hazard and damaged infrastructure, for their estimations.

ANNEX 4: Example WaSH Sector PDNA Report Section Template

Sector reports are limited to a maximum of 7 pages including related tables and figures. Please use Font Calibri 11, single line spacing, 1-inch normal margin on all 4 sides. Additional guidance can be found on the last page.

1. **Executive Summary**

(2 paragraphs)

2. **Disaster Context and Pre-disaster Baseline Context**

(1-2 paragraphs – one page maximum)

- Sector characteristics and conditions prior to the disaster
- Inventory of infrastructure assets (general aggregate figures)
- Status of service delivery and institutional capacity
- Sector developmental challenges

3. **Assessment of Disaster Effects: Damage and Loss Estimates¹¹**

(2 pages + summary table)

- Aggregate sector analysis
- Aggregate infrastructure and physical damage [overview of what has been assessed, overall damage levels in numbers and percentage relative to the baseline (pre-floods inventory), damage by asset type, sub-sector damage trends]
- Aggregate change in economic flow in the sector and effects on service delivery (losses)
- A table summarizing the effects and its appropriation (Public, Private) in **FJD and (USD)**.

		Damage		Loss	
Detailed list of damage identified (Physical assets and infrastructure)		Public	Private	Public	Private
Central Division					
Eastern Division					
Northern Division					
Western Division					
Detailed list of losses identified (Forgone income, additional costs)					
Central Division					
Eastern Division					
Northern Division					
Western Division					
Total		FJD (USD)	FJD (USD)	FJD (USD)	FJD (USD)

¹¹ Damage may be classified as **Partially Damaged** if less than 40% of the asset is damaged, structure is still sound and repair cost would be less than 40% of the total asset value. Damage may be classified as **Completely Destroyed** if more than 40% of the asset has been damaged or if the replacement cost of the damages would be more than 40% of the total value of the asset. **The WASH sector team should apply the % decision point considered most appropriate taking into consideration the type of hazard and damaged infrastructure, for their estimations.**

- Clearly indicate the assumptions and approximations used to make the cost estimate. Identify sources of information and any other relevant aspect that informs the reader about the aspects of the analysis in this particular sector.
- Refer to cross-cutting issues (gender, environment, employment and livelihoods, governance, DRR- Disaster Risk Reduction) whenever possible.

4. **Linking the Effects to the Human Impact**

(1-2 paragraph– 0.5 page maximum)

- Discuss how the effects identified in the sector can impact living conditions, livelihoods, gender equity, food security, social inclusion at the community and household level.
- How the effects in the sector would impact the production of and access to goods and services.
- Can existing vulnerabilities be exacerbated and overall risk increase?

5. **Recovery Needs and Strategy**

2 pages maximum + 2 tables

- Explain recovery needs identified and prioritization criteria.
- Insert a summary table.

Item	Damage*	Loss*	Brief Justification of Needs coming from the analysis of effects and impacts**	Needs in FJD (USD) in millions
Detailed list of damages identified (physical asset and infrastructure)				
Central Division				
Eastern Division				
Northern Division				
Western Division				
Detailed list of losses identified (forgone income, additional costs)				
Central Division				
Eastern Division				
Northern Division				
Western Division				
Other needs to manage human impact, BBB and other aspects				
Central Division				
Eastern Division				
Northern Division				
Western Division				
Total				

*Copy from the above table

****In this column, please provide a concise summary of justification of the needs based on the analysis of the effects and impacts of the crisis, describing it against relevant damages. Please provide a short text in the table or refer to the relevant paragraph of the report.**

- Explanation of the specific, prioritized and sequenced interventions to address the identified needs.

Present a summary of the intervention and sequence it across the timeline in the below table. Indicate its corresponding category and monetary value PKR million in the relevant columns.

Intervention/Activity	Short-term* (up to 12 months)	Intermediate* (up to 3 years)	Medium-term * (up to 5 years)	Priority¹² (rank 1-5)	Cost in FJD (USD) million
Ex. Establish temporary water supply pipelines.	X			1	FJD 9.2 million (USD 4.0 million)

** To be agreed with the Fiji Government, in consultation with the 5-year National Development Plan*

- Recommendations for recovery plans, implementation, and future analyses; potential sources of funding; partners; timeframes.

6. **Limitations**

(1 paragraph)

- Sector-specific limitations *(overall methodology and data limitations will be captured in the introduction of the report)*

****General guidance for the sector report:**

- Avoid using politically sensitive language that could be perceived as assigning responsibility for the disaster.
- For qualitative information contained in the reports, please reference the primary source.
- All outside sources should be referenced as footnotes (not endnotes or in-text citations).
- Please keep the suggested main headings, subheadings, and tables to ensure consistency across sectors. Instructions should be deleted after drafting the report.
- Costing should be done in the local currency and only converted to USD at the finalization of the report. (Exchange rate will be provided by the core team closer to the finalization of the report due to fluctuations).
- When writings costs:
 - » Please standardize numbers to one decimal place (ex. FJD 3.5 billion)
 - » Write FJD first then place a space before writing the number and (USD) and then place a space before writing the number inside the parenthesis e.g., FJD 9.2 million (USD 4.0 million)
 - » Use a dash between the two costs if you need to provide a range without a space
 - » Example: “FJD 6.7-7.8 billion”
- Font and size: Calibri, 11
- 1-inch margins, single spacing

