



FRANCES BAARD DISTRICT MUNICIPALITY



DISASTER MANAGEMENT PLAN FOR PHOKWANE LOCAL MUNICIPALITY



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ABBREVIATIONS

DM	Disaster Management
DLM	Dikgatlong Local Municipality
DMAF	Disaster Management Advisory Forum
DMP	Disaster Management Plan
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EIA	Environment Impact Assessment
EOC	Emergency Operating Center
FBDM	Frances Baard District Municipality
GIS	Geographic Information System
HAARP	High Frequency Active Auroral Research Program
HDI	Human Development Index
IDP	Integrated Development Plan
IDP	Integrated Development Program
ITC	Information & Communication Technology
KPA	Key Performance Area
LUPO	Land Use Planning Ordinance
MLM	Magareng Local Municipality
PAE	Public Awareness & Education
PCEWS	Public Control Early Warning System



PLM	Phokwane Local Municipality
SAPS	South Africa Policy Services
SEA	Strategic Environment Assessment
SDF	Spatial Development Framework
SPLM	Sol Plaatje Local Municipality

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TERMINOLOGY

Disasters are usually described as a result of the combination of conditions of vulnerability; insufficient capacity or measures to reduce or cope with the potential negative consequences; and exposure to a natural hazard. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social wellbeing, together with damage to property, destruction of assets, loss of services, social and economic disruption, and environmental degradation. Hence, the term 'natural disaster' is not entirely accurate, since the conditions that lead to the catastrophic impacts of a natural hazard are linked to the prevailing socio-economic conditions that are not natural, but rather, determined by human actions and decisions. The widely used United Nations Office for Disaster Risk Reduction (UNISDR) terminology thus defines 'disaster' as a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Disaster risk can be deemed as the potential disaster losses in lives, health status, livelihoods, assets and services that could occur to a particular community or a society in the future. For the purpose of this report, disasters are therefore understood as the outcome of conditions of risk.

Disaster risk governance refers to the way in which the public authorities, civil servants, media, private sector and civil society coordinate at the community, national and regional levels in order to manage and reduce disaster and climate related risks. This requires sufficient levels of capacity and resources are made available to prevent, prepare for, manage and recover from disasters. It also entails mechanisms, institutions and processes for citizens to articulate their interests, exercise their legal rights and obligations, and mediate their differences.

Disaster risk management (DRM) refers to the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. This term is an extension of the more general term 'risk management' to address the specific issue of disaster risks. DRM aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.

Disaster risk management (DRM) Law refers, for the purposes of this report, to a country's national law (or identified ensemble of laws) that establishes responsibilities, priorities and institutional frameworks specifically for DRM, regardless of the exact terminology used in the law's title, or its translation.

Disaster risk management system or arrangements refers to the legal, policy, administrative and institutional frameworks established within a country for coordinated and systematic DRM.

Disaster risk reduction (DRR) refers to the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.



Early warning system (EWS) refers to the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss

Emergency management also frequently referred to as 'disaster management', can be deemed as the organization and management of resources and responsibilities for addressing all aspects of emergencies, in particular, preparedness, response and initial recovery steps. The expression 'disaster management' is sometimes used instead of emergency management.

Exposure refers to the people or types of assets located in a particular hazard zone that are thereby subject to potential losses. Processes of human development and disaster risk are intimately related. Rapid economic and urban development can lead to a growing concentration of people and economic assets in areas that are prone to natural hazards, such as earthquakes, droughts, floods and storms. The risk increases if such exposure grows faster than countries are able to strengthen their risk-reducing capacities.

Natural hazards are naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis and volcanic activity), hydrological (avalanches and floods), climatological (extreme temperatures, drought and wild res), meteorological (cyclones and storms/wave surges) or biological (disease epidemics and insect/animal plagues). Climate change is increasing the frequency and magnitude of a range of climate related hazards.

Vulnerability is deemed as the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors.



DISASTER MANAGEMENT PLAN FOR PHOKWANE LOCAL MUNICIPALITY

1. INTRODUCTION

The main aim of the disaster management plan (DMP) is to identify all potential threats, hazards and risks within the municipal area of jurisdiction, that might, when it occurs, caused a disaster. As per definition, a disaster is when a calamitous event seriously disrupts the functioning of a community or society and causes widespread human, material, economic and / or environmental losses ***exceeding the ability of a community or society to cope using its own level of resources.***

However, it remains the primary responsibility of each line department to analyse these threats in depth and to address the risk in each sector plan of the municipality. Detailed analysis is a prerequisite to identify appropriate and sustainable risk reduction plans and projects, and is the responsibility of each line department. Hence, Disaster Management only fulfil a co-ordination role in disaster risk reduction and is not the responsible custodian to implement disaster risk reduction remedial works.

After all the potential hazards, threats and risks are identified, a disaster risk assessment is executed to *inter alia*, prioritise the identified risks. The prioritising of risks are deemed necessary to guide the municipality in the implementation of appropriate disaster risk reduction plans and projects. With these results, it become possible to align the DMP with the SDF and the IDP of the municipality. The alignment of the DMP with the SDF will contribute in the formulation of sustainable development objective, e.g. by the identification of areas suitable for development and areas not suitable for development (*by zoning type*). The alignment of the DMP with the IDP will ensure sufficient and appropriate allocation of funds to line department to implement disaster risk reduction plans and projects.



A comprehensive Disaster Management Framework (DMF) was compiled for FBMD. The following section summarises important disaster management policy issues for the FBMD.

POLICY CONSIDERATION FOR DISASTER MANAGEMENT

2. GLOBAL IMPACT

Drought affected more than one billion people between 1994 and 2013 – that is 25% of the global total.

Forty one percent of drought disasters were in Africa, indicating that lower-income countries are still being overwhelmed by drought despite effective early warnings being in place. While disasters have become more frequent during the past 20 years, the average number of people affected has fallen from one in 23 in 1994-2003 to one in 39 during 2004-2013. This is partly explained by population growth, but the numbers affected have also declined in absolute terms.

Death rates, on the other hand, increased over the same period, reaching an average of more than 99,700 deaths per year between 2004 and 2013. This partly reflects the huge loss of life in three mega-disasters (the 2004 Asian tsunami, Cyclone Nargis in 2008 and the 2010 Haitian earthquake). However, the trend remains upward even when these three events are excluded from the statistics.

On average, more than three times as many people died per disaster in low-income countries (332 deaths) than in high-income nations (105 deaths). A similar pattern is evident when low- and lower-middle-income countries are grouped together and compared to high- and upper-middle-income countries. Taken together, higher-income countries experienced 56% of disasters but lost 32% of lives, while lower-income countries experienced 44% of disasters but suffered 68% of deaths. This demonstrates that levels of economic development, rather than exposure to hazards per se, are major determinants of mortality.



It is both clear that lower income countries are much more vulnerable than developed countries on the one hand, but also that because of unregulated development practices and the lack of suitable and appropriate building regulations (in high disaster-prone areas) are still absent (The human cost of natural disasters, 2015: A global perspective).

In a nutshell, the human cost of natural disasters, 2015: a global perspective concluded;

- A continued vulnerability of communities to natural hazards.
- The data and analysis raise questions about the effectiveness of global disaster mitigation efforts. More work must be done to evaluate the real outcomes of disaster risk reduction (DRR) interventions on human lives and livelihoods.
- In view of the disproportionate burden of natural hazards in lower-income countries, including the huge disparity in death rates in richer and poorer countries, mitigation measures in less developed countries require significant improvement.
- Better flood control for poorer communities at high risk of recurrent flooding would be an important step in the right direction. Effective, low-cost solutions exist, including afforestation, floodplain zoning, building embankments, better warnings and restoration of wetlands. Such actions would bring development benefits too, since the data show that flooding is the main cause of disaster damage to schools, hospitals and clinics etc. in lower-income countries.
- The increase in the frequency of storms and other extreme weather events, better management, mitigation and deployment of storm warnings could save more lives in future.
- Reducing the size of drought-vulnerable populations should be a global priority over the next decade, given the effectiveness of early warnings and the vast numbers of people affected, particularly in Africa.
- Better research into how and why households and communities are affected by disasters is urgently needed so that responses are based on evidence, rather than assumptions. Without such micro-level research, future DRR and disaster prevention will not be effective.



3. LEGISLATION REQUIREMENTS

Effective law and regulation for disaster risk reduction: a multi-country report, 2014 at the World Conference on Disaster Reduction in Hyogo, Japan, in January 2005, sets out three strategic goals to support the reduction of disaster losses:

- The integration of disaster risk into development planning.
- The development and strengthening of institutions, mechanisms and capacities for building resilience.
- The incorporation of risk reduction approaches into emergency preparedness, response and recovery programmes.

It also identifies priorities for action:

- Ensure that DRR is a national and a local priority with a strong institutional basis for implementation.
- Identify, assess and monitor disaster risks and enhance early warning.
- Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
- Reduce the underlying risk factors.
- Strengthen disaster preparedness for effective response at all levels.

A clear first step to promoting stronger governance for disaster risk reduction (DRR) is improving relevant laws and regulations as well as strengthening their implementation and enforcement.



3.1 Laws for Disaster Risk Management that prioritizes DRR

When developing or revising a DRM law, consideration should be given to the **municipal risk profile**, existing risk governance capacity and national development context and how the law relates to and supports the implementation of other relevant sectoral laws. The municipality can tailor this approach to its natural hazard risk profile and disaster risk governance capacity. The typology groups DRM laws into four main types:

- Type 1 laws focus on preparedness and response;
- Type 2 laws have a broad DRM focus;
- Type 3 laws give DRR priority with a high level of detail and
- Type 4 laws give DRR priority with a low level of detail.

While DRM laws may be the primary instrument to address natural hazards in some municipalities contexts, in other contexts sectoral laws that address building, planning and environmental management may be contributing substantially to disaster risk governance, and therefore, reduce the amount of detail that may be needed within the municipal DRM law.

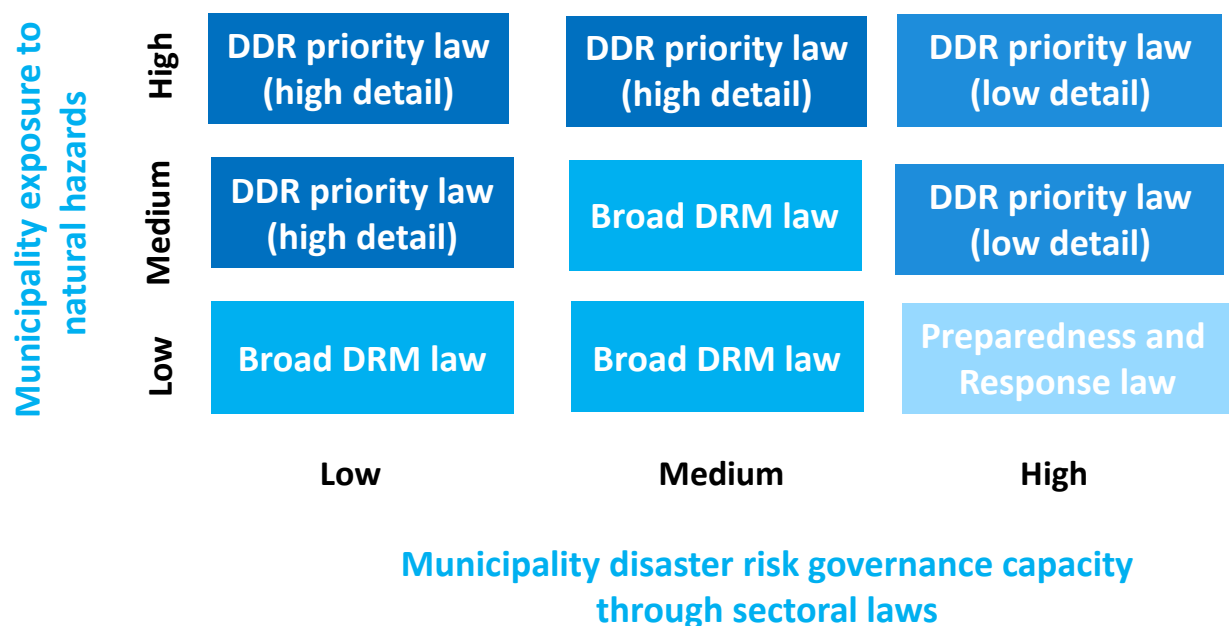


Figure 1: Matrix of DRM law typology and municipal context



3.1.1 Explanation of Typology

Type 1 – Preparedness and response law:

These laws focus on emergency response and elements of preparedness, early warning and recovery. These kinds of laws may be appropriate for municipalities that have a low level of risk and/or those that address disaster risk comprehensively through other sectoral laws and have high levels of implementation.

Type 2 – Broad DRM law:

This type of law covers prevention, preparedness, mitigation and response, and establishes institutions at the national level as well as some allocation of responsibilities at the provincial level. DRR is not a specific focus or priority in the law, and generally there are no references to financing DRR, risk mapping or DRR education. This could be appropriate if other sectoral laws are handling these issues.

Type 3 – DRR priority law (high detail):

These laws cover the same elements as a broad DRM law but give a higher priority to DRR by specifying clear local responsibilities for DRR, providing for cross-sectoral coordination, resourcing, training and education on DRR, as well as risk assessment and mapping.

Type 4 – DRR priority law (low detail):

This type of law is part of an ensemble of laws that are designed to link together to comprehensively address DRM and DRR (e.g. laws on specific hazards, on natural resource management, building and construction, and local governance). This law may play a co-ordination role in linking these other laws. Generally, they will be found in municipalities with high governance capacity.



The following guides DRR in FBMD area of jurisdiction;

- Setting out principles and priorities that guide your country's approach to risk reduction

Disaster risk reduction requires that responsibilities be shared by all spheres of governments and relevant national authorities, sectors and stakeholders, as appropriate to their national circumstances and systems of governance;

Managing the risk of disasters is aimed at protecting persons and their property, health, livelihoods and productive assets, as well as cultural and environmental assets, while promoting and protecting all human rights, including the right to development.

- Establishing links to legislation and institutions related to climate change adaptation
- Ensuring coordination with key sectoral laws
- Measuring success and implementation

Disaster risk reduction requires that responsibilities be shared by National, Provincial and District Government and relevant national authorities, sectors and stakeholders, as appropriate to their national circumstances and systems of governance;

Disaster risk reduction and management depends on coordination mechanisms within and across sectors and with relevant stakeholders at all levels, and it requires the full engagement of all State institutions of an executive and legislative nature at national and local levels;

While the enabling, guiding and co-ordinating role of National and Provincial Governments remain essential, it is necessary to empower local authorities and local communities to reduce disaster risk, including through resources, incentives and decision-making responsibilities, as appropriate;



3.2 Laws clearly establish roles and responsibilities related to risk reduction for all relevant institutions from national to the local level

To be effective, laws must clearly assign roles and responsibilities to specific ministries and levels of government for their implementation. Mandating departments, agencies, committees and other institutions to carry out specific tasks related to risk reduction ensures that ambitions or principles that are set out within legislation are realized, as well as promotes accountability and transparency.

- Establishing a national inter-ministerial/multi-sectoral committee that meets frequently enough to be effective
- Assigning a national focal point agency for disaster risk reduction with sufficient institutional authority to exercise effective leadership

Most platforms for DRR is the main instrument for the cross-sectoral coordination of DRR policies and programmes. It is a forum for technical cooperation as well as for strategic leadership of DRR.

However, these platforms in many cases still operates and includes stakeholders predominately responsible for emergency services as if under the old Civil Protection System. Henceforth, stronger leadership at all spheres of government are deemed necessary to include all authorities to ensure sustainable development.

- Promoting cooperation and information exchange between relevant ministries and levels of government with the national focal point agency
- Consistently assigning institutions the necessary authority and resources to carry out their mandates and responsibilities
- Clearly assigning responsibilities between different ministries and levels of government and between the local municipality, the district and province as well as between all line departments in the municipality.



3.3 Sectoral laws include provisions to reduce existing risks and prevent the creation of new risks

No single law can fully address DRR. Sectoral laws – especially those for development planning, building, land use, environmental protection, resource management, climate change and education (*whether at national, provincial or local levels*) – also need to include provisions to reduce risk, make people safer and protect their assets. Sectoral laws are especially important because they can reduce exposure and underlying vulnerability, particularly by preventing the creation of new risks.

Encourage the establishment of necessary mechanisms and incentives to ensure high levels of compliance with the existing safety- enhancing provisions of sectoral laws and regulations, including those addressing land use and urban planning, building codes, environmental and resource management and health and safety standards, and update them, where needed, to ensure an adequate focus on disaster risk management;

Strengthen, as appropriate, disaster-resilient public and private investments, particularly through structural, non-structural and functional disaster risk prevention and reduction measures in critical facilities, in particular schools and hospitals and physical infrastructures; building better from the start to withstand hazards through proper design and construction, including the use of the principles of universal design and the standardization of building materials; retrofitting and rebuilding; nurturing a culture of maintenance; and taking into account economic, social, structural, technological and environmental impact assessments.

- Ensuring sufficient financial resources are allocated for implementation of the DRR mandates set out in sectoral legislation



3.3.1 Special considerations for different sectors

Environment

There is a strong link between the environment and disasters. Degraded environments can increase the risk of disasters. For example, deforested slopes can cause landslides and reclaimed wetlands can exacerbate urban flooding. Natural hazards can also significantly damage the natural environment, which in turn increases local vulnerability to future hazards. Increasingly, there is recognition that investing in the sustainable use and management of ecosystems can reduce disaster risk and increase resilience. Although laws on environmental management are generally related to the protection of the natural environment, they have considerable potential to support DRR and can be leveraged to engage the environmental sector and secure the environmental expertise needed to address the risk of disasters.

Addressing natural hazards and climate change

To effectively integrate DRR, it is important that environmental management laws explicitly refer to managing natural hazards (including climate change-related risks) and promote coordination with DRM systems and institutions. It requires the consideration of the prevention of and response to disasters in a system of integral planning; encourages the sustainable development of natural resources; and requires climate change trajectories to be considered when planning and zoning land use. The Environmental Management Act for instances can tasks the Minister for Environment with preparing guidelines for the management of environmental emergencies in relation to “natural and climate change related disaster such as floods, cyclones, droughts and major pest infestations or other intrusions of alien species of fauna and flora [and] fires”.

Strengthen the sustainable use and management of ecosystems and implement integrated environmental and natural resource management approaches that incorporate disaster risk reduction.



Including DRR criteria in Environmental Impact Assessments for planned development (taking into account a changing climate)

Many countries now require environmental impact assessments (EIA) to be undertaken prior to proceeding with major development projects, and in some countries or regions strategic environmental assessments (SEA) may also be required before implementing certain programmes or plans that may impact the environment. In many cases, however, these assessments do not specifically include criteria related to the impact that development or specific programmes may have on the rise of natural hazard risks.

EIA's (encompassing EIA's of projects and SEA's of sectors and programmes) can be expanded to incorporate natural hazard risks so that both public and private investments (including in post-disaster reconstruction contexts) consider disaster risks and encourage action to mitigate those risks in an environmentally sustainable manner. Integrating disaster risk in EIA processes may include the following:

Identifying the potential environmental impacts of proposed development (e.g. projects, programmes or policies) and assessing how environmental impacts potentially exacerbate existing or create disaster risks;

Identifying and assessing the multiple hazards that could potentially impact on proposed development investments, including potential climate change impacts;

Identifying environmental mitigation options that also contribute to reducing disaster and climate change-related risks.

Including such requirements can result in safer development practices and prevent the creation of new risks.



Adopting ecosystem approaches to DRR

Ecosystem-based approaches for DRR (also referred to as 'Eco-DRR') seek to manage the environment (through sustainable management, conservation and restoration of ecosystems) in such a way that it also builds the resilience of communities. Ecosystems often serve as 'natural infrastructure' with important functions that influence all three dimensions of the disaster risk equation. This can happen by: regulating hazards (e.g. healthy forests can reduce the incidence of landslides and avalanches); acting as natural buffers and reducing people's exposure to hazards (e.g. mangroves, coral reefs and sea grasses protect coastal areas from storm surge impacts); and reducing local vulnerability to hazard impacts through the provision of key services (food, water, shelter, fuel) and livelihoods.

Ecosystem-based approaches for DRR have gained widespread attention and acceptance internationally as a 'no regret' approach. To encourage the management and protection of different ecosystems in a way that also reduces the impact of disasters, environmental laws can propose the management of certain ecosystems (e.g. mountain forests, wetlands, river basins, mangroves, coral reefs and sand dunes) and natural infrastructure as a means of reducing risks from natural hazards. Note that such an approach may not only be set out in environmental laws, but also natural resource management, DRM and land use planning laws as well as other relevant policies on integrated environmental and resource management.

3.3.2 Land use planning, urban development and building

Development planning laws are essential for achieving better DRM, as they have the best potential to reduce the exposure and vulnerability of populations and assets to hazards and prevent the creation of new disaster risk through urban development. Having an integrated system in which land use planning decisions and building codes are based on risk mapping can greatly reduce risks. Some countries have building code regimes that integrate construction and spatial planning, and others take a further step by integrating physical planning with that of broader development planning.



Promoting coordination with disaster risk management institutions and mechanisms

Land use planning regulations are particularly important, as they can prevent construction or limit the type of land use in areas exposed to natural hazards (such as floodplains, coastal areas, unstable or contaminated land, or areas of especially high seismic risk). Responsibility for land use and development planning is often distributed between different levels of government, and is not necessarily governed by a single law, so it might be necessary to review several laws and regulations at both the national and subnational level, including those regulating the zoning of coastal areas. To avoid poor planning and unsustainable development decisions, effective land use planning regulations should include specific criteria related to natural hazards. When undertaking an analysis, consider existing implementation challenges and how they could be addressed through dedicated resources, training and awareness raising initiatives.

Updating building codes and land use planning regulations and ensuring that priority is given to critical infrastructure such as schools, hospitals and other public buildings and structures

If implemented effectively, a system of building regulation that is tailored to relevant hazards can greatly reduce risks from natural hazards. Revise or develop new building codes, “with the aim of making them more applicable within the local context” might be appropriate.

It is important to check that building codes are updated according to new building technologies, as well as relevant hazard information, especially in light of any recent disasters. It is rare that building codes refer specifically to DRR, and it may, therefore, be necessary to look closely at the purpose and the content of the codes to ascertain whether disaster risk issues are considered and determine whether more explicit reference may be necessary.



The implementation of building codes remains a major challenge for a municipality, especially low- and middle- income municipalities. As mentioned above, in most cases, responsibility for building code enforcement is delegated to local governments, but often without the necessary resources or capacity to allow for full implementation. The following steps may be considered:

- Strengthen government capacity to enforce the codes and provide training to relevant authorities.
- Check whether building codes reflect customary building techniques and take into account local capacity and resources availability.
- Ensure that particular attention is given to certain types of public buildings, including schools, hospitals and other public buildings as well as large commercial developments where significant numbers of people gather.
- Undertake public education and awareness-raising on the importance of building code compliance for public safety.
- Introduce and ensure implementation of enforceable legal sanctions for a lack of compliance, as appropriate.

Establishing incentives or legal sanctions, where appropriate, in cases of non-compliance leading to unsafe buildings or developments

To promote better accountability and ensure a minimum standard of public safety, incentives and legal sanctions should be included within laws and regulations on building and construction.

Improving the safety of people living in informal settlements, consistent with their human rights

Residents of informal settlements are especially vulnerable, not only to natural hazards, but to a range of health and safety risks. It is estimated that by 2050, 66 percent of the world's population will be urban, and in many countries rapid urbanization has already outpaced the urban planning and development capacity of national or city administrations.



This gives rise to highly vulnerable and risk-blind informal settlements susceptible to a range of natural hazards.

3.4 Establish clear procedures and responsibilities for conducting risk assessments and ensure risk information is considered in development processes

A clear and current understanding of specific hazards is indispensable, both to government authorities as well as to the private sector, communities and individuals. A comprehensive risk assessment provides the foundation for risk-informed development and enables the development of effective measures to prevent and reduce disaster risks. As recognised in this Policy Framework, laws, policies and practices “should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment.” Ensuring that there is accurate baseline data on risk in each locality, and that this information is used to guide decision-making about planning and construction, can have an enormous impact on the safety and sustainability of livelihoods, homes and infrastructure.

Promote the collection, analysis, management and use of relevant data and practical information and ensure its dissemination, taking into account the needs of different categories of users, as appropriate;

Encourage the use of and strengthening of baselines and periodically assess disaster risks, vulnerability, capacity, exposure, hazard characteristics and their possible sequential effects;

Make non-sensitive hazard-exposure, vulnerability, risk, disaster and loss-disaggregated information freely available and accessible, as appropriate;

Promote the mainstreaming of disaster risk assessments into land-use policy development and implementation;



Promote the mainstreaming of disaster risk assessment, mapping and management into rural development planning

Encourage the use of and strengthening of baselines and periodically assess disaster risks, vulnerability, capacity, exposure, hazard characteristics and their possible sequential effects;

Make non-sensitive hazard-exposure, vulnerability, risk, disaster and loss-disaggregated information freely available and accessible, as appropriate;

Promote the mainstreaming of disaster risk assessments into land-use policy development and implementation;

Promote the mainstreaming of disaster risk assessment, mapping and management into rural development planning

Requiring risk information to be considered in development planning, budgetary allocations and construction

To reduce underlying risk, development planning must be informed by comprehensive risk mapping and assessments. Laws and regulations can require the consideration of risk information in investment decisions concerning development planning and construction to prevent the creation of new risks and to better manage existing risks. Risk information could also be used to initiate the retrofitting of buildings (especially for essential infrastructure, like schools and hospitals) to withstand the assessed hazard levels, drafting new land use planning guidelines or regulations, and designing financial protection measures.



3.5 Establish clear procedures and responsibilities for Early Warning

Early warning is one of the most crucial functions of any DRM system, given its life-saving impact. This is recognised internationally as one of the seven targets to “substantially increase the availability of and access to multi-hazard EWS and disaster risk information and assessments to people by 2030.” To ensure that accurate information reaches people in time to save lives, it is important that procedures are clear and roles and responsibilities of all those involved are well understood, including by those who are at the receiving end of the information.

Invest in, develop, maintain and strengthen people-centred multi-hazard, multi-sectoral forecasting and early warning systems, disaster risk and emergency communications mechanisms, social technologies and hazard-monitoring telecommunications systems; develop such systems through a participatory process; tailor them to the needs of users, including social and cultural requirements, in particular gender; promote the application of simple and low-cost early warning equipment and facilities; and broaden release channels for natural disaster early warning information.

- Assigning responsibilities for all steps of the early warning process from assessing the hazard, to making decisions to issue warnings, to initiating early action
- Establishing roles for technical ministries as well as communities, local authorities, scientific institutions, private media companies and civil society organizations in early warning systems
- Ensuring EWS exist for the most frequent and serious hazards



3.6 Laws require education, training and awareness-raising to promote a whole-of-society approach to DRR

To be resilient, communities must be informed about and engaged in reducing their own risks. Laws and regulations can be important for responsibilities and requiring public awareness- raising and training initiatives. More specifically, and as set out below, legislation can: establish or promote special training facilities and education through various means for public sector workers and professionals; mandate training on disaster risk reduction and response in school curricula; and require disaster preparedness drills in high-risk areas.

- Mandating training on DRR in the school curricula
- Promoting training for public officials and relevant professionals on DRR
- Including specific provisions on promoting public awareness and understanding of DRR

Promote national strategies to strengthen public education and awareness in disaster risk reduction, including disaster risk information and knowledge, through campaigns, social media and community mobilization, taking into account specific audiences and their needs;

Civil society, volunteers, organized voluntary work organizations and community-based organizations to participate, in collaboration with public institutions, to contribute to and support public awareness, a culture of prevention and education on disaster risk.



4. LEGISLATION GUIDELINES FOR THE IMPLEMENTATION OF THE DMP

The following guidelines from SA Laws and legislations guide the implementation of DM at all spheres of government.

Level 1 Disaster Risk Management Plan

A Level 1 Disaster Risk Management Plan applies to national or provincial organs of state and municipal entities that have not previously developed a coherent disaster risk management plan.

- Establishing institutional arrangements for disaster risk management.
- Putting in place contingency plans for responding to known priority threats as identified in the initial stages of the disaster risk assessment.
- Identifying key governmental and other stakeholders and Develop the capability to generate a Level 2 Disaster Risk Management Plan.

Level 2 Disaster Risk Management Plan

A Level 2 Disaster Risk Management Plan applies to national, provincial and municipal organs of state that have established the foundation institutional arrangements, and are building the essential supportive capabilities needed to carry out comprehensive disaster risk management activities.

- Establishing processes for a comprehensive disaster risk assessment.
- Identifying and establishing formal consultative mechanisms for development of disaster risk reduction projects and
- Introducing a supportive information management and communication system and emergency communications capabilities.

Level 3 Disaster Risk Management Plan

A Level 3 Disaster Risk Management Plan applies to national, provincial and municipal organs of state that have established both the foundation institutional arrangements for disaster risk management and essential supportive capabilities.



- Specify clear institutional arrangements for co-ordinating and aligning the plan with other governmental initiatives and plans of institutional role players
- It must also show evidence of informed disaster risk assessment and ongoing disaster risk monitoring capabilities as well as relevant developmental measures that reduce the vulnerability of disaster-prone areas, communities and households.

The proposed implementation period for the above-mentioned Level 1, 2 and 3 is:

- Level 1 – two years
- Level 2 – three years
- Level 3 - four years

4.1 National KPA's

The National Disaster Management Framework identified four KPA's and three enablers, namely;

- Integrated institutional capacity for disaster risk management.
- Disaster risk assessment.
- Disaster risk reduction.
- Response and recovery.

The framework also identifies three enablers that support the four KPA's.

- Information management and communication.
- Education, training, public awareness and research.
- Funding arrangements for disaster risk management.

The following objectives were identified for each KPA and Enabler for FBMD and its local municipalities.



KPA I: Institutional Capacity Building for Disaster Management.		
No	Objective	Term
Objective 1:	Establish effective institutional arrangements (<i>the disaster management structure and organisation</i>) for the development and approval of an integrated disaster management policy.	Short to Medium
Objective 2:	Employ appropriate and qualified personnel as identified and approved by the municipal disaster management structure and organogram.	Short to Medium
Objective 3	Establish a Disaster Management Advisory Forums (DMAF).	Short to Medium
Objective 4:	Identify all role players (custodians) in the municipal area of jurisdiction to be members of the DMAF.	Short
Objective 5:	Establish, train and maintain of a Disaster Management Volunteer Contingent.	Medium / Long
Objective 6:	Develop a comprehensive Disaster Management Information and Communication System (DMICS).	Long
Objective 7:	Compile appropriate disaster management public awareness messages.	Medium / Long
Objective 8:	Implementation of appropriate public awareness and education programs for effective disaster risk reduction.	Medium / Long



Objective 9:	Determine the primary and secondary roles and responsibilities of each line department in the municipal area of jurisdiction.	Short
Objective 10:	Ensure that all sectoral laws and by-laws include provisions to reduce existing risks and prevent the creation of new risks.	Short

KPA II: Disaster Risk Assessment		
No	Objective	Term
Objective 1:	Identify all potential hazards and threats in the municipal area of jurisdiction using indigenous and scientific knowledge by analysing the internal and external environment.	Short
Objective 2:	Execute a disaster hazard and vulnerability assessment (<i>including all physical, economic, social and environmental factors</i>) to determine the vulnerability of communities for natural and human-induced risks.	Short
Objective 3:	Execute a disaster risk assessment for all natural and human-induced incidents to prioritise disaster risks for the municipality.	Short
Objective 4:	Align the disaster risk assessment results with the IDP capital budgeting process to ensure the allocation of sufficient funds for disaster risk reduction measures and plans.	Short / Medium



Objective 5:	Align each identified disaster risk with the identified line department of the municipality and or appropriate district and national department for appropriate risk reduction implementation.	Short / Medium
Objective 6:	Align and integrate results of each sector plan with the DMP of the municipality to ensure a sustainable, holistic, integrated approach for disaster management. Using Scenario Development approach to gather for any possible event.	Medium
Objective 7:	Align and integrate results of the DMP with the SDF of the municipality and facilitate and co-ordinate the compilation of sustainable development practices for the municipality to ensure community resilience.	Medium
Objective 8:	Liaise with district and provincial departments for the implementation of appropriate disaster and human-induced risk reduction programs.	Short / Long
Objective 9:	Regularly review and update the disaster risk assessment of the municipality.	Medium / Long



KPA III: Disaster Risk Reduction		
No	Objective	Term
Objective 1:	Liaise with each line department to ensure that the empirical results of the DMP are integrated into sector plans.	Short
Objective 2:	Liaise with the IDP manager to ensure that disaster risk reduction projects are registered within each sector plan to reduce the vulnerability of communities.	Short
Objective 3:	Ensure that the highest threats and risks for the municipality are addressed first without neglecting the other potential threats and risks.	Short
Objective 4:	Align and link the roles and responsibilities of each line department with the disaster risk reduction plan.	Short / Medium
Objective 5:	Ensure that the municipal master plan clearly addresses risk reduction remedial works in the municipal area of jurisdiction.	Short / Medium
Objective 6:	Develop and implement appropriate incentives for departments, business, commerce, agriculture, household (<i>amongst other</i>) who complied and co-operate in risk reduction and develop and implement sanctions and penalties for those who might contribute to the increase of the vulnerability of communities.	Medium
Objective 7:	Ensure that appropriate enforcement laws, by-laws and legislations are registered and approved to enforce disaster risk reduction according to the disaster risk profile of the municipality.	Medium



Objective 8:	Appoint a dedicated person to monitor, facilitate and implement risk reduction plans for the municipality.	Short
Objective 9:	Implement natural and human induced disaster risk reduction plan.	Medium / Long



KPA IV: Disaster Responses & Recovery		
No	Objective	Term
Objective 1:	Liaise with all emergency service custodians to draft a disaster response plan for the FBDM which will ensure business continuity while managing the crisis. The main aim of this plan is to ensure, <i>inter alia</i> , public safety, limitation of damage protection of the vulnerable and efficient use of life-saving resources.	Short
Objective 2	Draft and maintain a comprehensive resource database with all the role players in the FBDM area of jurisdiction. Liaison with the District and Provincial Disaster Management Division will be deemed necessary for effective disaster response initiatives.	Short
Objective 3	Ensure that all hierarchical-, geographical-, organisational- and functional divisions are catering for during the compilation process of the disaster response plan (<i>Reference: DMPF of FBDM</i>).	Short / Medium
Objective 4	Planning, drafting and implementing an early warning system for pro-active dissemination of information to communities.	Medium
Objective 5	Special considerations to take into account for <i>fundamental service</i> in the private sector when drafting the emergency plan as much of critical infrastructure is run by private-sector operators. Industrial firms also need plans, in order to cope with <i>technological failures</i> and their consequences as well as commercial companies to ensure <i>business continuity</i> .	Short / Medium



Objective 6	Drafting of special emergency plans for veterinary, prisoner, educational, airports, hospitals and health systems.	Short / Medium
Objective 7	Develop, update and testing of effective and efficient response and recovery plans (<i>SOP's and contingency plans</i>) for all identified hazards and risks.	Short / Medium
Objective 8	Drafting of a special emergency transportation plan for evacuation of mass population and / or movement of people and goods during a crisis and its aftermath.	Short / Medium
Objective 9	Drafting a pharmaceutical emergency plan to ensure continuity of medication for patients who depend on medical drugs.	Short / Medium
Objective 10	Drafting of the Disaster Recovery Plan for FBDM with special considerations on the rebuilding of critical infrastructure (<i>e.g. food distribution and banking</i>) of national importance and local significance.	Short / Long
Objective 11	Drafting of an intermediate transitional shelter plan in the case where mass population left homeless because of a disastrous event.	Short / Medium



Enabler 1: Public Awareness, Education, Training and Research		
No	Objective	Term
Objective 1:	Drafting of appropriate messages to train, educate vulnerable communities through Campaigns, Participatory Learning, Informal Education and Formal school-based interventions.	Short to Medium
Objective 2	To continuously execute public awareness campaigns to promote a culture of risk avoidance among stakeholders.	Medium to Long
Objective 3	To ensure positive media coverage and publicity to increase public awareness and understanding of disaster management.	Short
Objective 4	To develop appropriate educational and training programs for disaster management to be implemented into regular training programs.	Short / Medium



Enabler 2: Monitoring, Evaluation and Improvement		
No	Objective	Term
Objective 1:	Performance audits, self-assessments and peer reviews.	Short to Long
Objective 2	Mechanisms required for monitoring incidents and significant events, disaster review and reporting.	Short to Medium
Objective 3	Guidelines for rehearsals, simulations, exercises and drills to evaluate the effectiveness of disaster management planning.	Medium / Long
Objective 4	Highlights the resources required for effective monitoring, evaluation and improvements.	Short / Medium



Enabler 3: Monitoring, Evaluation and Improvement		
No	Objective	Term
Objective 1:	Performance audits, self-assessments and peer reviews.	Short to Long
Objective 2	Mechanisms required for monitoring incidents and significant events, disaster review and reporting.	Short to Medium
Objective 3	Guidelines for rehearsals, simulations, exercises and drills to evaluate the effectiveness of disaster management planning.	Medium / Long
Objective 4	Highlights the resources required for effective monitoring, evaluation and improvements.	Short / Medium



DISASTER RISK ASSESSMENT

5. DISASTER RISK ASSESSMENT GUIDELINES

Disaster Risk Reduction (DRR) can be described as *“systematic efforts to analyse and manage the causal factors of disasters including through reduced exposure to hazards, lessened vulnerability of people and property, wiser management of land and the environment and improved preparedness for adverse events.”*

Disaster Risk Reduction consists of the following three components:

- Risk Analyses that identify options for
- Risk Prevention/ Mitigation and
- Disaster Preparedness.

Disaster Risk Prevention or Mitigation includes activities to prevent or mitigate the risk by reducing – if possible - the hazard or – more commonly – vulnerability. This can be achieved through political, legal, administrative, planning and infrastructural measures (*i.e. regulating land use; managing river basins; strengthening social structures for prevention activities*).

Disaster Preparedness seeks to reduce the loss of life and damages in case an event occurs (*i.e. by strengthening self-help capacities, introducing early warning systems, training and exercises*).

An important principle of DRR is that it needs to involve multiple relevant sectors (*health, education, agriculture etc.*), the private sector and civil society. Disaster Risk Reduction is a cross cutting responsibility and not the sole job of Civil Protection or Ministries of Emergency Situations.



5.1 Disaster Risk Analysis

A Disaster Risk Analysis is a comparative analysis of the nature and extent of risks linked to different kinds of hazards and vulnerable conditions that could harm people, assets, livelihoods, infrastructure and services in a given locality. The result of risk assessment is an evaluation of the likelihood and magnitude of potential losses as well as an understanding of why these losses occur and what impact they have. Common results of risk assessments (besides the risk analysis report) are hazard and risk maps, risk matrices that compare and rank risks from different hazards, scenarios and prioritized action-plans for DRR (this will be further elaborated in the guide).

Disaster Risk Reduction aims to make populations safer; and disaster risk analysis is a critical step in DRR. Disaster risk analyses show where, how and what kind of risks are of highest priority within a local government area, so that local government staff and stakeholders can plan targeted and effective disaster risk reduction activities. Without understanding the highest risks faced by a population, and their capacity to cope with these risks, it is not possible to make effective plans and development decisions that promote the safety of the population. Therefore, the results of risk analyses should be a fundamental reference point for local government development and planning, policy and resource allocation.

It is important to see Disaster Risk Analysis as an opportunity to raise citizens' awareness of disaster risks but also to establish a dialogue about their priority concerns. Ideally a risk analysis offers opportunities for vulnerable groups to participate and communicate their experience of disasters risks and related issues that affect them in order to establish viable and relevant solutions. This includes the need to engage with those who will not only be most affected by future events but also participate in the making of that future i.e. children and young people.

Hazards and even more so vulnerability change over time. Therefore, risk analysis is not a one-off exercise but an ongoing process that needs to feed into decision and policy-making. This process requires the participation of different sectors and parts of society to result in a shared understanding of what the risks are and agreed priorities for risk reduction. Though it is challenging risk analysis can help to develop better coordination between different sectors such as health, education, child protection or social services, emergency services and water and



irrigation. The active commitment and leadership of local governments is important to maintain momentum and support all stakeholders throughout the process, as well as to implement recommendations from the analysis.

Disaster Risk Analysis should be prioritized in local government areas that have a history of frequent and destructive disaster episodes. Otherwise it is unlikely that sufficient commitment to the process and follow-up can be generated. It is best to time risk assessments so conclusions and action points can be incorporated into local plans (common development and/or sector-specific plans and programming documents).

Figure 2 outlays the Disaster Risk Reduction (DRR) methodology.

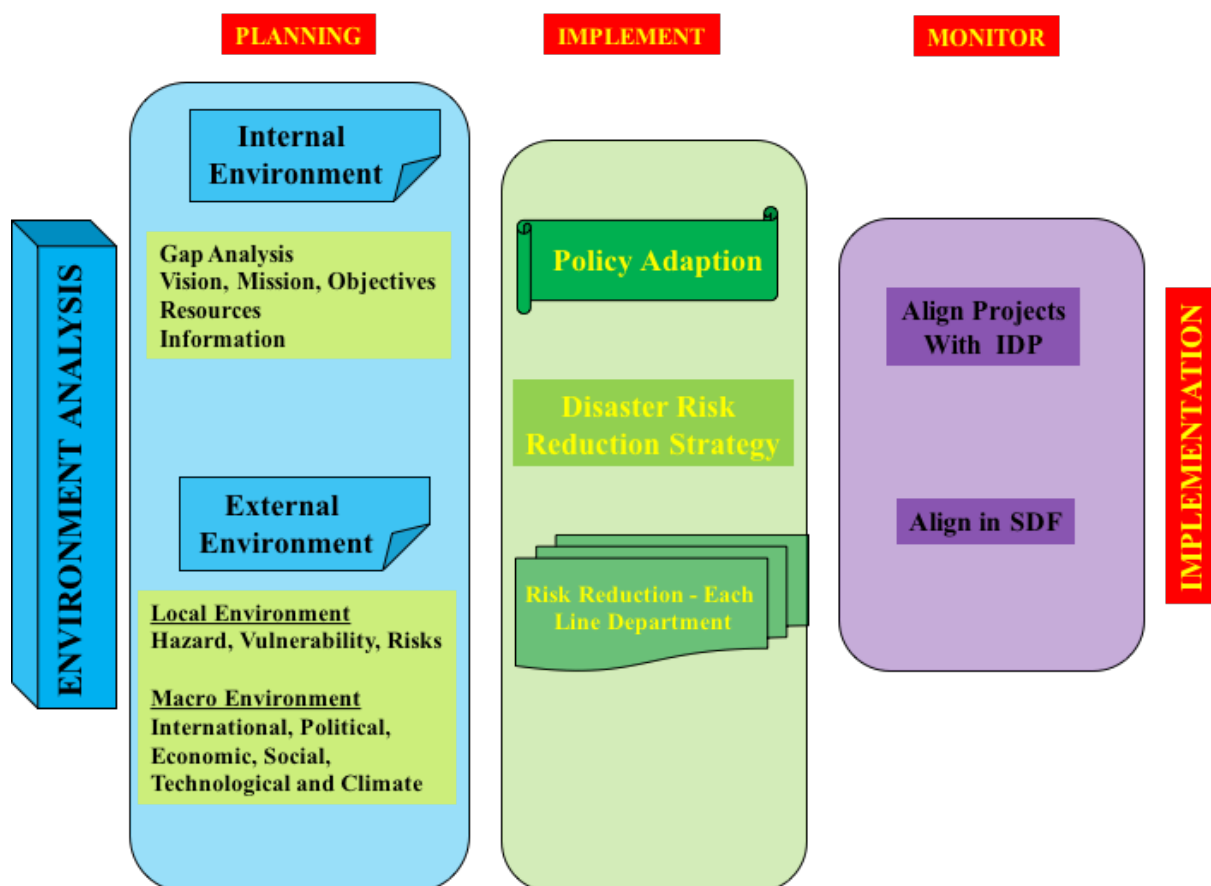


Figure 2: Disaster Risk Reduction Methodology



5.2 Gap Analyses

The Gap-Analysis is the point of departure to evaluate the internal environment of the municipal area of jurisdiction. The Gap-Analysis includes, but is not limited to, the evaluation of the Key Performance Area (KPA) and Enablers as prescribed and required by the National Disaster Management Act. The outcome of this analysis will provide useful information to a municipality on its effectiveness and preparedness for disasters. It all reflects the status within the municipality.

The external environment consists out of the local environment (*that is outside the building and human resources, but inside of the municipal area of jurisdiction*) and the macro environment (*that is outside the municipal area of jurisdiction*). The local environment is analysed by the execution of the hazard, vulnerability and risk assessment. Municipalities must take into account what is happening in the political, economic, social, technological, climate and international arena to fully draft an effective and efficient DRR plan. Taking cognisance of both environments will give municipalities a better understanding of these influences on their risks to ensure sustainable development.

5.3 Local Environment

Geo-Database

A good understanding and description of the study area is preferable before proper planning can be done, such as;

- Geographic information
 - Rivers
 - Dams
 - Airports
 - Railway lines
 - Major routes
 - Bridges
 - Human settlements



- Administrative authorities
- Hospitals
- Clinics
- Schools
- • Demographic information
 - Living patterns (residential and industrial areas)
 - Population distribution in the area
 - Language spoken
 - List of organizations that can be of assistance such as;
 - SANDF
 - SAPS
 - Fire Brigade Services
 - Ambulance Services
 - NGO's
 - Volunteers
 - Community Structures

Instead of only giving a description of the area, this framework rather calls for municipalities to develop their own geo-database. In most case, the Department of Town and Regional Planning already has most of this information and can make it available to Disaster Management. The main sources of data are:

- Municipalities;
- Surveys and mapping;
- Stats SA;
- Demarcation;
- Local service providers;
- Data vendors and
- The community (indigenous knowledge).



Contents of such a database can include:

- Topographic data
- Infrastructure data
- Census data
- Function data
 - Police stations;
 - Hospitals, clinics and other health institutions;
 - Emergency medical services;
 - School, church and public buildings and other facilities that could be used
 - Fire-fighting services; and
 - Airports, airstrips, harbours, seaports and railway stations;
 - Relevant international relief agencies;
 - Emergency shelters or hospitals in the event of a disaster;
 - Research and training facilities for disaster management disciplines
- Hazard data
- Disaster Risk data
- Vulnerable communities and infrastructure data

After the acquisition of relevant data it is cleaned and validated and verified. A geo-database is created that can be used in Disaster Risk Assessments. To ensure the optimum use of disaster related data in a municipality, a work with a dataflow is created. This work and dataflow are based on the data needs of Disaster Management. Data flow in conducting Disaster Risk Assessment can be divided in two main activities. The first one is project driven, where projects are undertaken to execute a hazard and risk assessment. Secondly in-house data flow can be seen as day to day tasks of Disaster Management. These tasks include update of Disaster Management related data and usage of data to perform specific analysis or mapmaking. The propose project will compile both these data flow diagrams (Figure 3). Composition of the diagram will depend on the following aspects:

- Deliverables of assessment;



- Available data;
- Processes;
- Data sources;
- Quality and status of available data;
- Data capturing needs;
- Etc.

The framework of project data flow diagram is shown in Figure 3.

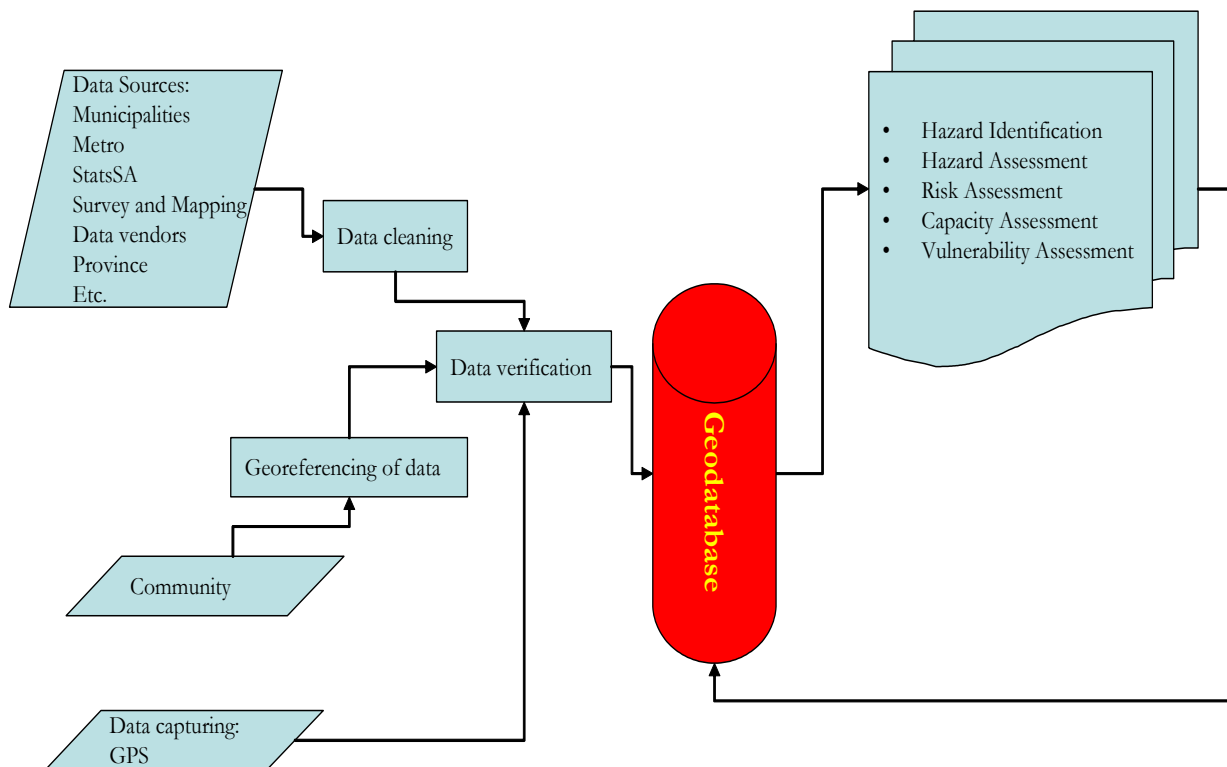


Figure 3: Disaster Management project data flow diagram

5.3.1 Hazard Identification

Various methodologies exist today and this Framework only provides guidelines for the execution of the risk and vulnerability assessment and is not prescriptive in which particular methodology to use.



Hazard Classification

Classification and characterisation of primary hazards as well as secondary hazards that might arise as a result of the primary hazards. Following are some examples:

- Climatic hazards – tropical cyclones, floods, fires, drought
- Environmental hazards – environmental pollution, oil spills, pest infestation
- Geological hazards – earthquakes, landslides, dolomite areas etc.
- Epidemics
- Industrial / technological hazards
- Social disruption
- Civil strife

5.3.2 Hazard Assessment

As communities themselves are often a vital source of information for understanding hazards, vulnerability, capacity, and exposure of persons and assets in a particular locality, this Framework calls for municipalities to ensure the use of traditional, indigenous and local knowledge and practices to complement risk assessment processes. Henceforth it is highly recommended to identify all the potential hazards using indigenous knowledge.

However, an indigenous knowledge procedure alone will leave the hazards assessment incomplete. Therefore, a scientific hazard assessment will be deemed necessary to fully analyse the local environment of the municipality. The geographic information system (GIS) is a powerful tool to visualize, question, analyse and interpret data to understand relationships, patterns and trends. GIS is becoming essential to understanding what is happening and what will happen in geographic space. Once we understand, we can prescribe action. GIS are very useful in disaster management planning processes to analyse the local environment and geographically display the location of hazards, vulnerable communities and risk areas. The information is stored in the municipal geo-database and can be used for the execution of the scientific hazard, risk and vulnerability analysis.



During this first step, it is important to portrait all possible hazards, threats and or risks that may and / or could occur. Hence, the following questions are crucial when identifying the pure risks, which the area of jurisdiction could be exposed to;

- What can go wrong?
- If it were to go wrong, what would be the consequences?
- Are we willing to live with these consequences?
- How likely is it to occur?
- Are we willing to live with this level of risk?
- Can we reduce the level of risk?
- Is the Risk reduction the level of risk?
- Is the risk reduction worth the money we must spend?

During this phase it involves;

- Using experience from the past,
- Much be systematic in nature,
- Should involve the participation of a wide breadth of relevant experience. This will help to build a sense of ownership not only for hazard identification, but also for the proposed solutions.
- It should develop an implementation plan with the elements prioritised according to a relative risk ranking.

However, experience from the past is only one dimension of the hazard identification process. Hence, appropriate computer models and GIS-techniques are used to predict all possible hazards and threats that may or could imposed in the area of jurisdiction. Integrating these analyses (*scientific approach*) with indigenous knowledge it is then possible to identify all potential hazards and risk at community level.

Not only is it possible to indicate the location of all the potential hazards, but it become possible to create a hazard profile map for the area of jurisdiction. This map laid down the foundation for the vulnerability analysis.



5.3.3 Vulnerability Assessment

The vulnerability assessment predominately relies on the information available in the municipal geo-database. The more information is stored and available in the geo-database, the better vulnerability assessment can be executed. Using GIS-techniques it become possible to identify all communities, properties and critical facilities at risk.

The vulnerability of communities and its capacity can also be addressed on a socio-economic- and institutional resource level. The socio-economic level of communities could influence their vulnerability to disasters, while access to institutions with disaster mitigating or prevention resources could lower this vulnerability. Easy access to institutions or good spatial distribution of emergency services will have no effect on communities' vulnerability if these facilities are not well equipped to deal with potential hazards.

One of the elements of vulnerability of a community is the capacity to deal with the impact of a disaster. Capacity of a community can be measured or depend on institutional, individual and/or social elements. Institutional capacity depends on the location and status of:

- Key installations and other critical lifeline infrastructure;
- Electricity supply and communications systems including alternate sources in the event of a breakdown;
- Water supplies;
- Access routes;
- The availability of stocks of emergency supplies such as water, food and blankets;
- Emergency and essential services and their capacity to contribute to disaster response and recovery activities;
- Location of possible relief centres and, where available, resources that are available at those centres;
- Etc.

A vulnerability profile map laid down the foundation of the risk assessment. From these analyses it is possible to classify the vulnerability factors (Figure 4).

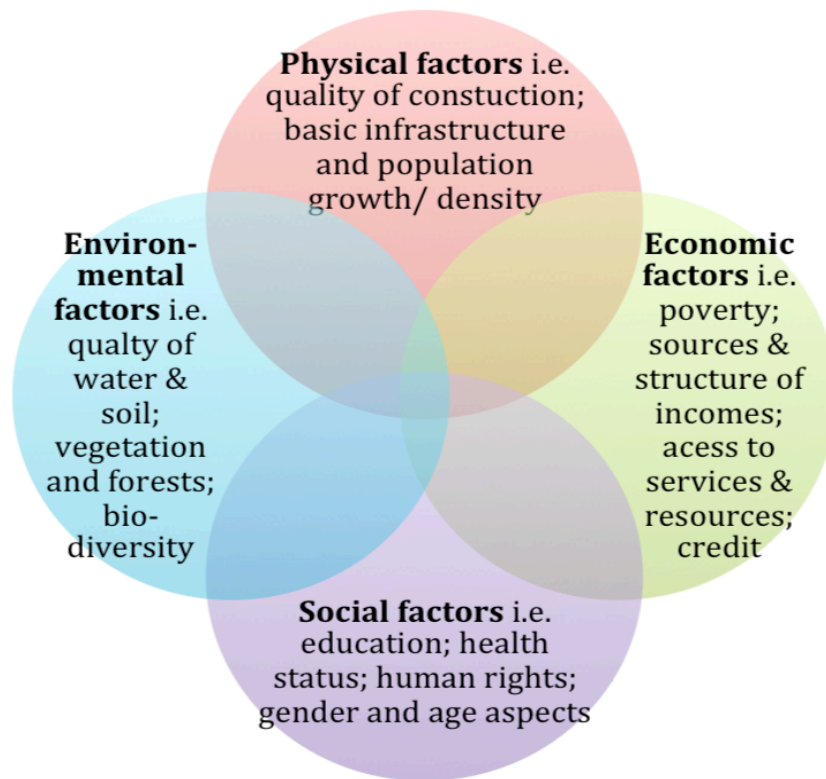


Figure 4: Classification of vulnerability factors

How these factors interact to influence the vulnerability of a population (group) is highly contextual and related to a given political, social and economic reality. Therefore, analysis needs to come up with specific indicators that help to further pinpoint and characterize vulnerability. Thinking through concrete hazard scenarios can help to identify some “obvious” indicators, other situations will require the involvement of technical experts and/ or participatory and qualitative research in hazard-prone locations and communities. The following list contains examples of indicators for measuring vulnerabilities to floods.



5.3.4 Risk Assessment

It becomes possible to execute a risk assessment when the probability of occurrence is added to each hazard. The following questions are important;

- Where do the risks to the business come from?
- How big are these risks?
- What are the major contributors?
- What are these risks sensitive to, and therefore how can they be changed?
- What level of risk does the company consider intolerable, and what level is considered negligible or trivial?
- From these, what is worth doing to reduce risk?

Methodologies offend neglect to add the probability of occurrences. For example, a one-in-twenty year flood is offend viewed to only occurs once in twenty years. But this is far from the truth. It has a 5 percent change to occur in any given year. But this probability of occurrence change dramatically when viewed for the next 10-, 20- or 50 years. The same flood (of the same magnitude) has a 40% chance to occur in the next 10 years, 64% chance to occur in the next 20 years and a 92% chance to occur in the next 50 years. This might change the municipality's view when discovered that the same potential risk (of originally 5% to occur in any given year) has now a 40% chance to occur in the next 20 years.

Additional information such as the history, vulnerability of communities, vulnerability of property, the maximum threat and the probability of occurrences might be useful to determine the threshold value of such a risk. Ranking the threshold values (descending order) the highest threat can be identified for the municipality.

Not only are these threshold values useful, but a disaster risk profile map can be generating using GIS to visually display the information on a map. This map laid down the foundation to assist municipalities in the implementation of DRR plans.



DISASTER RISK REDUCTION

6. DISASTER RISK REDUCTION GUIDELINES

As this Framework calls municipalities to integrate disaster management into sustainable development initiatives, the next step is to acknowledge these identified hazards and risk within the line-departments of the municipality. The reduction of all potential disaster risks are predominately the responsibility of each line department. Henceforth, it requires the integration and alignment of all potential threats within the IDP processes of the municipality.

Not only does this integrates Disaster Management within sustainable development initiatives, but also ensure the funding of risk reduction programmes within the existed municipal structures.

6.1 Sustainable Development Policy

Next is to adapt the municipal policies with a specific emphasize on sustainable development. The alignment and integration of the DRR plan with the municipal SDF is deemed necessary for this purpose. Areas suitable for specific land-use types and development must accommodates the risk profile of the municipality. Therefore, areas that are not suitable for specific development nodes must clearly be defined.

6.2 Community Resilience

This Framework calls municipalities to enhance community resilience.

Community resilience is or the sustained ability of a community to withstand and recover from adversity (e.g., economic stress, influenza pandemic, man-made or natural disasters).



Main Definition

Community resilience entails the ongoing and developing capacity of the community to account for its vulnerabilities and develop capabilities that aid that community in;

- *preventing, withstanding, and mitigating the stress of a health incident;*
- *recovering in a way that restores the community to a state of self-sufficiency and at least the same level of health and social functioning after a health incident; and*
- *using knowledge from a past response to strengthen the community's ability to withstand the next health incident*

Key Components

Key components or “building blocks” of community resilience that affect both a community's pre-event vulnerability to disaster and its adaptive capacity to recover include

- the physical and psychological health of the population;
- social and economic well-being;
- individual, family, and community knowledge and attitudes regarding self-reliance and self-help;
- effective risk communication;
- level of social integration of government and nongovernmental organizations in planning, response, and recovery; and
- the social connectedness of community members.

In order to build community resilience, a community must develop capabilities in the following areas:

- active engagement of community stakeholders in health event planning and personal preparedness,
- development of social networks,
- creation of health-promoting opportunities to improve the physical and psychological health of the community (as well as to address disparities in health across subgroups),



- plans and programs that address and support the functional needs of at-risk individuals (including children),
- institution of plans to respond effectively to the post-disaster physical and psychological health needs of community members, and
- rebuilding plans for health and social systems that can be activated immediately.

The definition emphasizes the following concepts, which focus group participants suggested would be evident in a resilient community:

- Engagement at the community level, including a sense of cohesiveness and neighbourhood involvement or integration
- Partnership among organizations, including integrated pre-event planning, exercises, and agreements
- Sustained local leadership supported by partnership with national and provincial government
- Effective and culturally relevant education about risks
- Optimal community health and access to quality health services
- Integration of preparedness and wellness
- Rapid restoration of services and social networks
- Individual-level preparedness and self-sufficiency
- Targeted strategies that empower and engage vulnerable populations
- Financial resiliency of families and businesses, and efficient leveraging of resources for recovery.

Proposed levers are designed to strengthen the five core components (shown in rectangular boxes), which are correlated with community resilience in the specific context of enhancing health security or public health preparedness. The components are the main domains or factors associated with community resilience, such as the health of the population. The levers are the means of reaching the components, such as improving a population's access to health services. The levers are highlighted in boldface type below:



- **Wellness** and **access** contribute to the development of the social and economic well-being of a community and the physical and psychological health of the population.
- Specific to the disaster experience, **education** can be used to improve effective risk communication, **engagements** and **self-sufficiency** are needed to build social connectedness, and partnership helps ensure that government and non-governmental organizations (NGS)'s) are integrated and involved in resilience-building and disaster planning.
- **Quality** and **efficiency** are ongoing levers that cut across all levers and core components of community resilience.

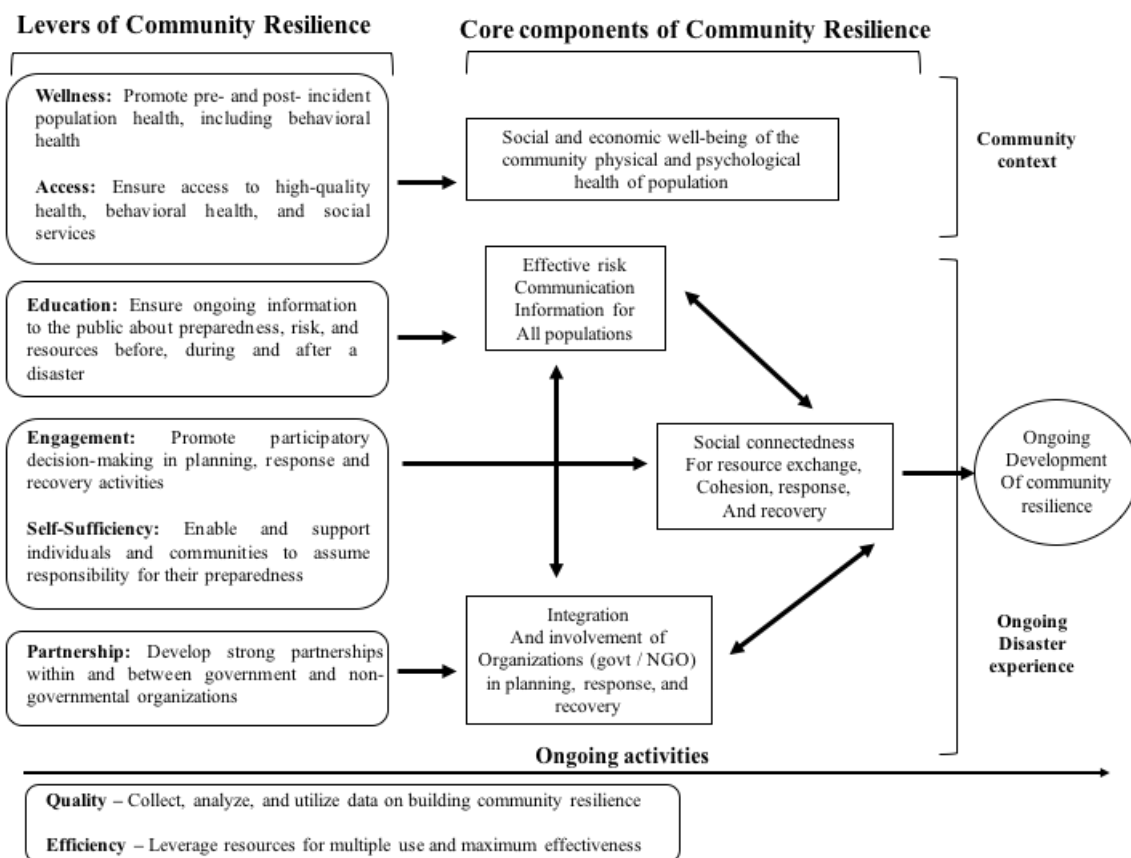


Figure 5: Levers and Core Components of Community Resilience



6.3 Macro Environment

The Framework calls municipalities to take cognises of aspects happening in the macro environment. The macro environment are those things outside of the municipal area of jurisdiction, e.g. the political, economic, social, technological, climate and international arena.

Neglecting to analyse this environment may lead to an incomplete picture of the true threats and risks for a municipality and to its communities at risk. For example, in the technological, climate, political and international arena, Global Research first published a secret weapon used for weather modification (electromagnetic warfare) under the heading of “Weather Warfare” on August 2010. The European Union called the project a global concern and passed a resolution calling for more information on its health and environmental risks.

HAARP (High Frequency Active Auroral Research Program) is a little-known, yet critically important U.S. military defence program, which has generated quite a bit of controversy over the years in certain circles. Though denied by HAARP officials, some respected researchers allege that secret electromagnetic warfare capabilities of HAARP are designed to forward the US military’s stated goal of achieving full-spectrum dominance by the year 2020. Others go so far as to claim that HAARP can and has been used for weather modification, to cause earthquakes and tsunamis, to disrupt global communications systems, and more.

“Who control the weather control the world” Paul Chehade

The methods include the enhancing of storms and the diverting of vapour rivers in the Earth's atmosphere to produce targeted droughts or floods.

Scientist Dr. Nicholas Begich-actively involved in the public campaign against HAARP-describes **HAARP** as:

"A super-powerful radio wave-beaming technology that lifts areas of the ionosphere (upper layer of the atmosphere) by focusing a beam and heating those areas. Electromagnetic waves then bounce back onto earth and penetrate everything-living and dead."

Dr. Rosalie Bertell depicts HAARP as "a gigantic heater that can cause major disruption in the ionosphere, creating not just holes, but long incisions in the protective layer that keeps deadly radiation from bombarding the planet."

Such a development in our international environment, using specialised technology to influence global weather patterns can have devastating results, increasing the vulnerability of countries and communities.



“Is it a co-incidence that 41% of drought disasters were in Africa, indicating that lower-income countries are still being overwhelmed by drought?”

CERN is another international European Council for Nuclear Research Centre in Switzerland. Few are aware of what is happening behind the scenes at CERN. At the entrance of CERN stands the statue of Shiva – **“the goddess of destruction”**. In a nutshell many believe that the only way to bring order is first to bring destruction. There is a movement currently very active on planet earth that pushes the agenda of an overpopulated planet and the only way to solve the problem is to reduce the total number of humans living on earth. This, of course is far from the truth. Scientists at Cern are investigating matter (*matter is the foundation of everything the Universe is made up from*) and now also found dark matter (*anti-matter which is very unstable and uncertain*) in the Universe. One grain of anti-matter is the equivalent of four atomic bombs dropped on Hiroshima. Stephen Hawking, an international well-known nuclear scientist, and an atheist announced: *“Activities at Cern, could pose create dangers to our planet. The god particle found (dark matter) by Cern could destroy the Universe. Do they know what they are doing? You are about to open pan door’s box and once the box is open you cannot put what is coming out back into the box”*. Hawking, an atheist who does not believe in the spiritual world believes that scientists at Cern is trying to unleash the gates of hell.

The reason CERN is mentioned is because of the potential threat and risk it might cause to all the inhabitants of the earth. Just like the Coved 19, Coronavirus almost brought all activities on the planet to a standstill, likewise will activities at CERN impacted our planet.

Henceforth, let all spheres of Government take cognizance of the fact that vulnerability of communities is no longer influence only by activities within the area of jurisdiction, but is now even more influence by international activities. Our local, district and provincial governments cannot even cope with normal local disaster, let alone the handling and coping with such international events.



DISASTER EMERGENCY PLANNING FOR PREPAREDNESS, RESPONSE AND RECOVERY

7. EMERGENCY PLANNING FOR PREPAREDNESS, RESPONSE AND RECOVERY GUIDELINES

Emergency and disaster planning involve a coordinated, co-operative process of preparing to match urgent needs with available resources.

The phases are research, writing, dissemination, testing, and updating. Hence, an emergency plan needs to be a living document that is periodically adapted to changing circumstances and that provides a guide to the protocols, procedures, and division of responsibilities in emergency response. Emergency planning is an exploratory process that provides generic procedures for managing unforeseen impacts and should use carefully constructed scenarios to anticipate the needs that will be generated by foreseeable hazards when they strike. Plans need to be developed for specific sectors, such as education, health, industry, and commerce. They also need to exist in a nested hierarchy that extends from the local emergency response (the most fundamental level), through the regional tiers of government, to the national and international levels. Failure to plan can be construed as negligence because it would involve failing to anticipate needs that cannot be responded to adequately by improvisation during an emergency.

7.1 Emergency Planning

Emergency planning can be defined as the process of preparing systematically for future contingencies, including major incidents and disasters. The plan is usually a document, shared between participants and stakeholders that specifies tasks and responsibilities adopted in the multi-agency response to the emergency. It is a blueprint for managing events and, as such, should be responsive to management needs. It should specify the lineaments of action, collaboration, command, and communication during a civil contingency such as a disaster or major event; in other words, it is the framework for emergency response. The maintenance of



public safety, limitation of damage, protection of the vulnerable, and efficient use of life-saving resources are some of the goals of the plan. Although the end product is a document, emergency planning is more a process than an outcome, especially as the plan itself will need to be updated over time as circumstances change.

An emergency plan must, therefore, be adaptable to both anticipated and unexpected hazards. The primary resource is information, and hence everything possible should be done to ensure that flows of vital data and communications are unrestricted and properly focussed on essential needs. Emergency management, as supported by prior and on-going planning, should ensure that organizations can work together effectively under unfamiliar circumstances, possibly including organizations that have no formal relations under normal, non-emergency circumstances. The plan should ensure that every participant in the response to an emergency has a role, and that all anticipated tasks are covered such that the risk of hiatuses or disputes about responsibilities is minimized.

7.2 Multi-Agency Planning

One source of complexity in emergency planning is the need to integrate several dimensions into the programmed emergency response. *Hierarchical divisions* refer to the tiers of government—from national, through regional, to local. *Geographical divisions* indicate the spatial jurisdictions to which plans refer, and possibly also to questions of mutual assistance. *Organizational divisions* refer to the different agencies that participate in emergency responses, such as the “blue light” services (police, fire, and ambulance), technical groups, and volunteer organizations. Lastly, *functional divisions* indicate the different fields involved, such as government, health care, public order, public works, economy and employment, finance, and the private sector (Figure 6). The emergency plan is one contribution to the process of articulating a system of response to civil contingencies, in which an optimum balance is sought between integrating these forces and allowing them a degree of autonomy and freedom of action.

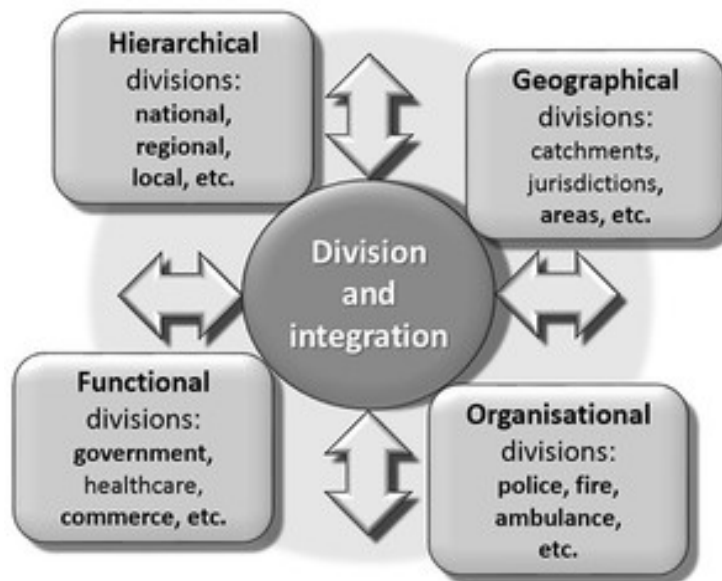


Figure 6: The different dimensions of division and integration in emergency planning and management

7.3 Planning and Warning Processes

Whether natural or anthropogenic, hazards vary considerably in their predictability and the amount of lead time, if any, for preparations to take place. Nevertheless, warning and associated responses are two vital elements of most emergency plans. Short-term warning must be distinguished from the longer-term predictability of hazards. Earthquakes, for instance, are mostly predictable in terms of the basic tenets of magnitude, frequency, and location, but not with regard to impending shocks in a short time window, such as 48 hours. In contrast, with adequate monitoring using Doppler radar, warnings can be issued for tornadoes with lead times of 20–120 minutes, and remote sensing together with digital modelling can give a reliable picture of a hurricane track many hours before the storm makes landfall.

Warnings have three essential components:

- scientific and technical,
- administrative, and
- social (Figure 7)

The absence or ineffectiveness of any of them renders the warning system inoperable. Scientific information on an impending hazard must be transformed into a message to be acted



upon, and a decision must be taken to warn affected people, who must then hear and react appropriately to the warning. The emergency plan should determine how to transform information on hazards to advice or orders on how to react. It should prescribe the means of disseminating the message and monitoring the social reaction to it. In practical terms, evacuation or sheltering is usually the most appropriate reaction to warning and the best way of moving people out of harm's way. However, the means and the routes to evacuate people must be available (or there must be appropriate, safe locations for in situ or vertical evacuation). Horizontal evacuation may require reception centers with staff, bedding, methods of procuring, preparing, and distributing food, and so on.

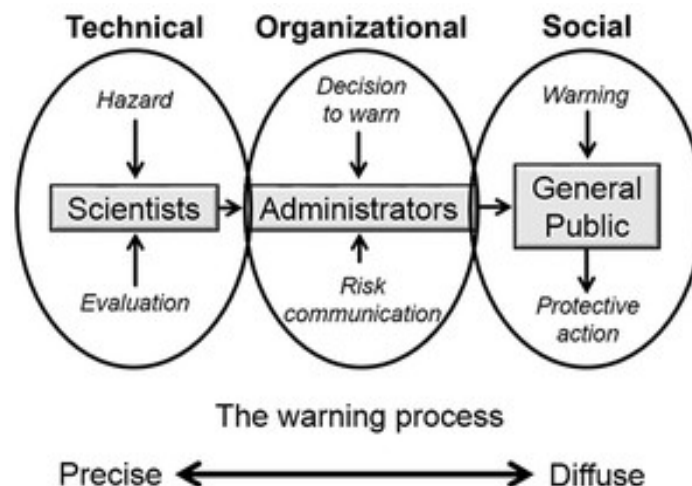


Figure 7: The components of the warning process

7.4 The Role of Information and Communications Technology

Modern emergency responses are heavily reliant on information and communications technology (ICT). Many algorithms have been written to assist emergency operations, for example, by providing an “expert system” that aids decision making, or by helping record decisions as they are made. Emergency plans should reflect these innovations and the opportunities they bring for sharing information and developing a synoptic picture of a rapidly evolving situation on the ground. Plans can include or refer to protocols for messaging and communications, and thus help clarify and standardize them.



The emergency plan should either prescribe or describe the structure of command and management to be utilized in the case of a disaster or major incident. Modern information technology has tended to flatten the chain of command and has given rise to a more collaborative form of management, which lessens the reliance on militaristic principles of “command and control.” Nevertheless, there will need to be a web of formal relationships between different organizations and units that participate in the response to disaster. The focal point of many of these is the emergency operations center (EOC), which is usually also the “natural home” for an emergency plan, or in other words, the place where it is most appropriate to draw up and maintain such an instrument. The EOC needs to be a center of communications and management, one that has functional autonomy (e.g., its own electrical generator and fuel stocks).

In a fully functional civil protection system, emergency resource hubs such as EOCs usually operate as a nested hierarchy. They will function within the compass of plans made at different levels of government and by different jurisdictions. It follows that the emergency plans themselves will need to ensure interoperability and a rational division of responsibilities, so that all tasks can be covered in emergencies of different sizes. Once again, this involves comparative reading of plans and, preferably, some national guidelines for ensuring compatibility.

7.5 Specialized Emergency Planning

A further issue is the need for emergency planning in different sectors. Municipalities might consider to oblige the providers of fundamental services in the **private sector** to draw up emergency plans. This is necessary, as much of the nation’s critical infrastructure is run by private-sector operators. Industrial firms also need plans, so that they can cope with technological failures and their consequences, and commercial companies need to ensure business continuity. Emergency plans are needed in both **hospitals and the health systems** of which they form a part. Hospital plans should state the preparations needed for internal and external emergencies. The former refers to contingencies such as fire, structural collapse, or contamination, and the latter mainly deals with the need to cope with mass casualty influxes.



In addition, public transport services need emergency plans to guarantee the movement of people and goods during a crisis and its aftermath.

For example, the plans for an airport should be integrated with those of the city and region in which it is situated. Finally, there is an increasing realization that emergency plans are needed to protect cultural heritage, which includes a huge variety of sites and artefacts, many of which have highly specialized conservation requirements. Loss of cultural heritage in disasters such as floods and earthquakes can deal a catastrophic blow to the intellectual and artistic life of a country by obliterating or damaging an irreplaceable legacy.

Among specialized emergency plans, it is worth singling out those required for **educational institutions**. The collapse of thousands of schools in earthquakes in Pakistan (2005) and China (2008), and the consequential loss of thousands of young lives, underlines the importance of providing a safe education to pupils and students. This is a moral requirement, as well as one that all parents would support. Despite this, emergency planning for schools tends to be neglected and underrated. It is not merely a question of evacuation. Plans need to assess hazards and design strategies to manage situations safely. As in other forms of emergency planning, scenarios are needed. In one exemplary case, a school has developed different strategies to manage the response to floods and earthquakes, both of which threaten it. As teachers are *in loco parentis* for their young charges, there is a requirement to ensure that school students are looked after in safety throughout an emergency. Schools and other educational institutions have been the target of natural hazards such as earthquakes, tornadoes, landslides, floods, and snowstorms; terrorism, such as marauding gunmen; and structural collapse and fire. When many young lives are lost the sense of moral inadequacy can be universal, but not enough has been done to ensure that emergency planning for schools is transformed into universal practical measures to protect children and young adults. The art of emergency planning involves “anticipating the unexpected.” For example, one important aspect that is often overlooked is **veterinary planning**. This has three main categories:

- domestic,
- farm, and



- wild animals.

Many people will not evacuate in the face of a major threat unless they can take their pets with them, and hence, provision needs to be made to accommodate domestic animals. In pastoral areas, farm economies are dependent on the care and welfare of animals, which can be trapped and drowned by floods, frozen by blizzards, affected by epizootic diseases, or deprived of feedstock. Planning to manage wild animals mainly refers to threats to the human population posed by ecological disruption in disasters due, for example, to the migration of dangerous reptiles or the possible spread of rabies.

Another form of planning that is roundly neglected is that associated with ***prison populations***. In floods, storms, and earthquakes, these individuals have been either confined to dangerous localities or released indiscriminately into the community. Prisoners have human rights, including the right to custodial safety, but to release hardened criminals into society may pose risks to the general population.

Finally, during the difficult circumstances engendered by disaster, pharmaceutical emergency planning is needed in order to ensure continuity of ***medication*** for patients who depend on medical drugs.

7.6 Using the Plan in an Emergency

One ingredient of most emergency plans is a stipulation of the alert and call-up procedures for personnel. These need to be integrated with the potential phases of warning, which at their simplest are hazard watch (impact is possible or likely) and hazard warning (impact is highly likely or certain). A part of the plan may be dedicated to the preparations to be made before impact if time is likely to be available to carry them out. Examples include putting up mobile flood defences, marshalling and readying vehicles and equipment, and testing and readying the means of field communication. The impact phase of a disaster is usually a period, more or less brief, characterized by dynamic evolution and acute shortage of information.

One of the first needs is for an assessment that determines whether to move into emergency mode. The declaration of a state of emergency allows the formal abandonment of normal working procedures and the immediate adoption of those that pertain strictly to the disaster.



Hospital beds will be cleared, leave will be cancelled, personnel will move to predetermined locations, lines of communication will be opened, and so on. The emergency phase may continue for hours or days, and in exceptional cases for weeks. However, it should end with a formal declaration of “stand-down,” as prescribed in the plan, which releases personnel for leave and ordinary duties.

7.7 Testing and Revising the Plan

In most parts of the world, major incidents and disasters are, thankfully, rare, although they may be an ever-present threat. The emergency plan therefore needs to be tested under hypothetical conditions. Exercises and drills can be divided into table-top, command post, and field-based simulations. The last category is clearly the most onerous, and it may require up to six months of meticulous planning. Generally, none of these methods is capable of testing the whole plan, and so elements of it must be selected for verification by simulation. One common element is the ability of different organizations to work together under specific, unfamiliar circumstances; for example, the ability of different medical response organizations to set up and run a field hospital together.

Exercises need to be designed with clear, well formulated objectives, and the progress of the simulation needs to be carefully monitored so that any need for improvements can be detected and communicated to participants in post-exercise debriefings and reports. All of this needs to be done in an atmosphere of constructive support, and certainly not recrimination, as the aim is not to examine but to help participants improve their performance during future emergencies. Simulations need to be treated as learning processes, from which it may be possible to derive improvements to the plan. One hopes that in real emergencies it will also be possible to learn lessons and improve the emergency plan on the basis of real experience. One such lesson is that personal familiarity with other participants in emergency operations greatly improves the ability to work together. This underlines the value of emergency simulations and drills.

The emergency plan should be a living document. In fact, there is nothing worse than the “paper plan syndrome”—or its modern digital equivalent—in which the plan is formulated and relegated to a desk drawer (or a hard drive) without being used or updated. Such plans can do more harm



than good when they are eventually put to the test by a crisis. As time wears on, both small and large changes will occur. Hence the plan should include provisions, not only for disseminating it and training its users, but also for a process of constant updating, with checks at regular intervals, perhaps every six months.

7.8 Planning the Recovery from Disaster

The so-called “disaster cycle” refers to the phases of resilience building, preparation, emergency response, recovery, and reconstruction. A cycle is used because many disasters are recurrent, although not all are truly cyclical. Clearly, emergency and disaster planning refer primarily to the response phase. However, they have some relevance to all the other phases as well. Emergency planning is largely practiced during the risk mitigation, or resilience-building, phase—the calm periods between major adverse events. It must address the preparation phase as well as the response phase, as there is a need to make preparations systematic, especially where there is enough prior warning of impact for this to be accomplished successfully. While recovery planning may be regarded as a separate process from emergency planning, the two go together in that the phases of recovery offer an opportunity to improve general emergency planning and readiness for the next impact.

In most sudden impact disasters, there is no reason why recovery planning should not begin the day after the event. It is important to note that time is socially necessary in recovery. Consultation must take place, and alternative strategies must be investigated. The aim should not be to “bounce back,” but to “bounce forward” to a more resilient society that is able to face up to future disasters by a better combination of resistance and adaptation than that which existed before the current impact. Recovery from a major disaster can take decades, and during that time socio-economic conditions will change, and so probably will environmental and hazard conditions. A disaster characterized by death, injury, psychological impairment, destruction, damage, and loss of economic activities, assets, and employment will engender a complex aftermath. In this there is much potential for wrong decisions, unless objectives are carefully set, procedures are clearly identified, and there is a consensus about how the process should take place.



Major disasters such as large floods, cyclonic storms, and earthquakes may not only take a large toll of casualties but may also destroy a great deal of housing stock and business premises. This will stimulate a process of providing shelter, which may involve temporary and transitional solutions to the housing problem before permanent reconstruction of building stock can be achieved. In this process, there is, or rather there should be, a social contract that indicates that survivors will endure the privation of temporary or transitional housing providing it is for a finite and not excessive period of time.

7.9 Planning for Critical Infrastructure and Supply Chains

One of the most complex and challenging aspects for recovery planners is the rebuilding of critical infrastructure. Critical infrastructure (which also includes sectors such as food distribution and banking) can be divided broadly into that of national importance and that of purely local significance. In many cases, resilience in networks is a function of being able to find different routes through the network. However, blockages can be critical, and infrastructure may be peculiarly susceptible to cascading disasters. In these, the consequences of one failure are the cause of others, in a sort of “domino effect.”

Supply chains are essential to humanitarian operations and emergency responses. Emergency planning for them has two aspects. The first is an element of business continuity. It seeks alternative ways to ensure supplies of goods or services, in order to keep productivity from falling as a result of interruption of normal business. It thus depends on redundancy, which is potentially an expensive quality, as it may require the duplication of assets. This requires planners to determine which assets are critical, and where the destruction or failure of assets may have a critical effect on the whole production cycle. The second aspect of supply chain planning involves ensuring efficiency in humanitarian supply, such that the forces on the ground are not left bereft of the equipment, goods, and manpower that are needed to tackle the emergency effectively.



7.10 Reconstruction Planning

Planning to manage the reconstruction of housing involves some difficult choices about who should build what and where. It is important to avoid excessive price rises in the market for building materials. It is also essential to involve local people, the beneficiaries in the process of designing, constructing, and adapting permanent housing. In some situations, the best housing is built by its users, while in others it is not possible to learn the necessary skills and so contractors must be used, but the designs should respond directly to the users' needs.

An important matter in reconstruction planning is the extent to which transitional shelter should be provided. If the terrain studies, site urbanization, preparation, and building processes are likely to take years, and if funding for them is short, then it may be necessary to put people in temporary accommodation, usually consisting of prefabs or so-called "barrack houses." The space allotted per family varies from 10 to 40 square meters.

Recovery and reconstruction planning should aim to revive the local area while at the same time making it safer against future disasters. Revival means rebuilding basic facilities, such as housing, infrastructure, and amenities, but it also means ensuring that livelihoods and the local economy are rebuilt. Experience suggests that this is easiest for settlements that are well connected politically and geographically, and hardest for those that are politically, spatially and economically marginalized. There is a welfare function in recovery from disaster, and this begs the question of what welfare should involve. At its worst, copious but ill-thought-out assistance to a disaster area can bring the population into a state of aid dependency that is bound to end in negative consequences, as the assistance is unlikely to be perpetual. Reviving the local economy can instead create self-sufficiency and tax revenues that help the area revive itself.

7.11 Other Aspects of Recovery and Reconstruction Planning

The fundamental purpose of welfare is to support people who lack the ability and resources to provide themselves with a minimum acceptable standard of living. Disaster throws this issue into high relief by differentially affecting the poor and needy more than the wealthy. Welfare should not mean largesse, however attractive this may seem to politicians when they remember



that disaster victims are also voters. Instead, scarce resources should be utilized to provide a safety net for the most vulnerable people in society, and thus to mitigate the differential effect of disaster.

From these reflections, it should be apparent that there will be parallel processes of planning that have different weights and salience at different points in the cycle of recurrent disasters (Figure 8). To ensure a holistic response to the threat of disaster, recovery, and reconstruction, planning should be linked to on-going emergency planning initiatives and to business continuity planning. Urban and regional planning should have links to all of these processes because they are all about reducing the risk to development and all about the “hazardousness of place.

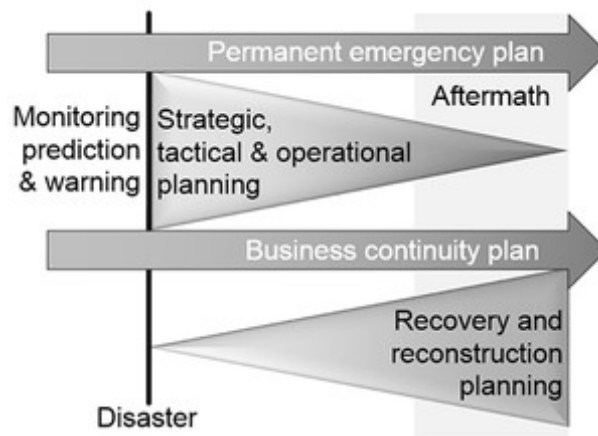


Figure 8: Parallel forms of planning in the sequence of response to and recovery from disasters



PUBLIC AWARENESS AND EDUCATION

8. PUBLIC AWARENESS AND EDUCATION GUIDELINES

From experience, it became clearer that disaster prevention and mitigation programs without successfully educating the members of vulnerable communities are inadequate and unsuccessful.

From an engineering and an economic point of view, the solution to DRR is quite easy, but complexity is added to the problem when and where humans are exposed to the risk. The social aspects of the human race over rights simple solutions and municipalities have to deal with these more complex issues in the DRR programs. Appropriate public awareness and education (PAE) programs is therefore a necessity.

This Framework calls therefore municipalities to formulate and to implement PAE and path the way with the following four key approaches;

- Campaigns
- Participatory Learning
- Informal Education
- Formal school-based interventions

8.1 Campaigns

The focus of campaigns is to provide uniform, large-scale impact with standard messages. There are many examples of large-scale national and international public awareness campaigns that have led to massive social change. Examples include childhood immunization, the wearing of seat belts in cars, and smoking restrictions. Campaigns comprise a set of activities that may include:

- publications, including billboards, posters, newspaper or magazine coverage, information cards, flyers, bookmarks and brochures



- curricula, modules and presentations, including slide presentations and oral presentations
- e-learning
- performing and cultural arts
- games and competition
- audio and video materials
- web pages and activities
- social media and telecommunications.

8.2 Participatory Learning

People are especially motivated by approaches in which they themselves participate in a solution, and especially when they believe it is their own idea. The focus of participatory learning is to engage people in discovery and problem solving for disaster risk reduction. At the heart of all of these activities is the community's own experience of empowerment. This involves using language, stories, songs and traditions to strengthen the emerging culture of prevention. This is typically accomplished through tools such as:

- action-oriented research such as vulnerability and capacity assessment
- disaster management planning
- implementing risk reduction measures
- monitoring and improving on plans through drills and simulations.

These four elements of participatory learning can be applied at three levels:

- The organizational level – headquarters, branches, schools, businesses, workplaces, homes
- The community level – being scaled up to reach villages, towns, cities, school systems, and regions
- The population level – being expanded to incorporate entire urban populations, by taking advantage of internet-based tools and social media.



Parallel tools specifically for use with children, and for marginalized populations can be valuable as well. Specific tools within this approach include:

- publications such as booklets
- curricula, modules and presentations
- participatory activities such as transect walk, risk and asset mapping, seasonal calendar, group discussion, drills, simulations and table top exercises
- audio and video materials, including videos, audio clips and songs or other music
- web pages and activities such as workspaces
- social media and telephone-based initiatives, such as text messaging and polling.

8.3 Informal Education

The focus of informal education is taking advantage of brief moments and encounters to stimulate thinking and engage people in discovery of actions and behaviours to increase safety and resilience. Informal education in communities and schools is the most flexible of all approaches with respect to setting, audience and timeframe. Specific tools that can be used for informal education include:

- **Publications** – posters, guidelines, flyers, brochures, booklets, activity books, paper models, comic books, story books, colouring books, assembly kits and teacher resources
- **Curricula, modules and presentations** – teacher briefings and community training
- **E-learning** – self-study curricula
- **Performing and cultural arts** – plays, dances, poems, songs, street theatre, puppet theatre
- **Games and competitions** – card games, board games, cooperative, activities role play, drawing competitions, writing competitions, tournaments, radio quizzes
- **Audio and video materials** – short videos, radio programmes, television programmes
- **Web pages and activities** – web sites, online games, online quizzes
- **Social media and telecommunications** – SMS, early warning.



8.4 Formal school-base interventions

The focus of formal school-based interventions covers two areas: school disaster management and disaster risk reduction in school curricula. These are considered to be formal because accountability and responsibility for school safety and curricula belong exclusively to education authorities, so they require support for long-term planning and capacity building. Whether there is one such authority, many, or seemingly none, the same issues of caution remain. Unless efforts are being officially and systematically piloted or tested, inconsistency may undermine rather than support the goal. No matter how schools are organized, where possible a proper approach should begin with a group of interested NGOs and intergovernmental organizations that approach school authorities in a spirit of collaboration, in order to offer support and identify a single focal point within the system. Expecting schools to contend separately, with multiple uncoordinated projects and programmes, places a burden on school authorities and is ultimately unproductive. The goal is not to run a parallel system, but to support and help develop capacity within existing public education systems. The team should also approach and involve national disaster management authorities.

EARLY WARNING

9. EARLY WARNING GUIDELINES

Early warning is a major element of disaster risk reduction.

It prevents loss of life and reduces the economic and material impact of disasters. To be effective, early warning systems need to actively involve the communities at risk, facilitate public education and awareness of risks, effectively disseminate messages and warnings and ensure there is constant state of preparedness.



9.1 Key Elements

A brief section on the four elements of early warning: risk knowledge; technical monitoring and warning service; communication and dissemination of warnings; and community response capability is included to emphasize the major components that comprise an effective people-centred early warning system, and why each is important. In addition to the four elements, a number of cross-cutting issues that are critical to the development and sustainability of effective early warning systems have been outlined. These include effective governance and institutional arrangements, a multi-hazard approach to early warning, involvement of local communities and consideration of gender perspective and cultural diversity. An explanation of the main actors involved in early warning activities, and their roles and responsibilities, is included to provide some context and further background to the list of key actors presented at the beginning of each of the checklists.

9.1.1 This Framework call the municipality for a people-centred early warning system (PCEWS)

The objective of people-centred early warning systems is to empower individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner to reduce the possibility of personal injury, loss of life and damage to property and the environment. A complete and effective early warning system comprises four inter-related elements, spanning knowledge of hazards and vulnerabilities through to preparedness and capacity to respond. Best practice early warning systems also have strong inter-linkages and effective communication channels between all of the elements.

9.1.2 Risk Knowledge

Risks arise from the combination of hazards and vulnerabilities at a particular location. Assessments of risk require systematic collection and analysis of data and should consider the dynamic nature of hazards and vulnerabilities that arise from processes such as urbanization, rural land-use change, environmental degradation and climate change. Risk assessments and maps help to motivate people, prioritise early warning system needs and guide preparations for disaster prevention and responses.



9.1.3 Monitoring and Warning Service

Warning services lie at the core of the system. There must be a sound scientific basis for predicting and forecasting hazards and a reliable forecasting and warning system that operates 24 hours a day. Continuous monitoring of hazard parameters and precursors is essential to generate accurate warnings in a timely fashion. Warning services for different hazards should be coordinated where possible to gain the benefit of shared institutional, procedural and communication networks.

9.1.4 Dissemination and Communication

Warnings must reach those at risk. Clear messages containing simple, useful information are critical to enable proper responses that will help safeguard lives and livelihoods. Regional, national and community level communication systems must be pre-identified and appropriate authoritative voices established. The use of multiple communication channels is necessary to ensure as many people as possible are warned, to avoid failure of any one channel, and to reinforce the warning message.

9.1.5 Response Capability

It is essential that communities understand their risks; respect the warning service and know how to react. Education and preparedness programmes play a key role. It is also essential that disaster management plans are in place, well-practiced and tested. The community should be well informed on options for safe behaviour, available escape routes, and how best to avoid damage and loss to property.

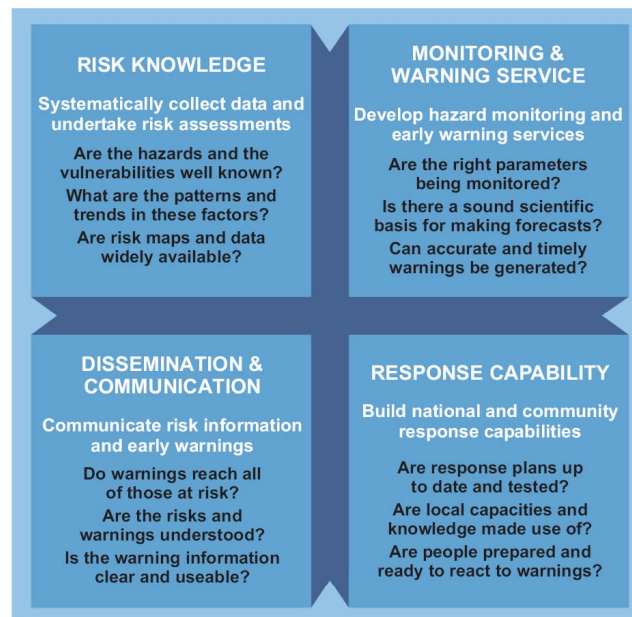


Figure 9: Four Elements of People-centred Early Warning Systems

9.2 Cross-cutting Issues

There are a range of overarching issues that should be taken into account when designing and maintaining effective early warning systems.

9.2.1 Effective Governance and Institutional Arrangements

Well-developed governance and institutional arrangements support the successful development and sustainability of sound early warning systems. They are the foundations upon which the previously outlined four elements of early warning are built, strengthened and maintained.

Good governance is encouraged by robust legal and regulatory frameworks and supported by long-term political commitment and effective institutional arrangements. Effective governance arrangements should encourage local decision-making and participation which are supported by broader administrative and resource capabilities at the national or regional level.

Vertical and horizontal communication and coordination between early warning stakeholders should also be established.



9.2.2 A Multi-Hazard Approach

Where possible, early warning systems should link all hazard-based systems. Economies of scale, sustainability and efficiency can be enhanced if systems and operational activities are established and maintained within a multi- purpose framework that considers all hazards and end user needs.

Multi-hazard early warning systems will also be activated more often than a single-hazard warning system, and therefore should provide better functionality and reliability for dangerous high intensity events, such as tsunamis, that occur infrequently. Multi-hazard systems also help the public better understand the range of risks they face and reinforce desired preparedness actions and warning response behaviours.

9.2.3 Involvement of Local Communities

People-centred early warning systems rely on the direct participation of those most likely to be exposed to hazards. Without the involvement of local authorities and communities at risk, government and institutional interventions and responses to hazard events are likely to be inadequate.

A local, 'bottom-up' approach to early warning, with the active participation of local communities, enables a multi-dimensional response to problems and needs. In this way, local communities, civic groups and traditional structures can contribute to the reduction of vulnerability and to the strengthening of local capacities.

9.2.4 Consideration of Gender Perspectives and Cultural Diversity

In developing early warning systems it is essential to recognize that different groups have different vulnerabilities according to culture , gender or other characteristics that influence their capacity to effectively prepare for, prevent and respond to disasters. Women and men often play different roles in society and have different access to information in disaster situations. In



addition, the elderly, disabled and socio-economically disadvantaged are often more vulnerable.

Information, institutional arrangements and warning communication systems should be tailored to meet the needs of every group in every vulnerable community.

9.3 Key Actors

Developing and implementing an effective early warning system requires the contribution and coordination of a diverse range of individuals and groups. The following list provides a brief explanation of the types of organizations and groups that should be involved in early warning systems and their functions and responsibilities.

Communities, particularly those most vulnerable, are fundamental to people-centred early warning systems. They should be actively involved in all aspects of the establishment and operation of early warning systems; be aware of the hazards and potential impacts to which they are exposed; and be able to take actions to minimize the threat of loss or damage.

Local governments, like communities and individuals, are at the centre of effective early warning systems. They should be empowered by national governments, have considerable knowledge of the hazards to which their communities are exposed and be actively involved in the design and maintenance of early warning systems. They must understand advisory information received and be able to advise, instruct and engage the local population in a manner that increases public safety and reduces the possible loss of resources on which the community depends.

National governments are responsible for high-level policies and frameworks that facilitate early warning and for the technical systems that predict and issue national hazard warnings. National governments should interact with regional and international governments and agencies to strengthen early warning capacities and ensure that warnings and related responses are directed towards the most vulnerable populations. The provision of support to



local communities and governments to develop operational capabilities is also an essential function.

Regional institutions and organizations play a role in providing specialized knowledge and advice which supports national efforts to develop and sustain early warning in countries that share a common geographical environment. In addition, they encourage linkages with international organizations and facilitate effective early warning practices among adjacent countries.

International bodies can provide international coordination, standardization, and support for national early warning activities and foster the exchange of data and knowledge between individual countries and regions. Support may include the provision of advisory information, technical assistance, and policy and organizational support necessary to aid the development and operational capabilities of national authorities or agencies.

Non-governmental organisations play a role in raising awareness among individuals, communities and organizations involved in early warning, particularly at the community level. They can also assist with implementing early warning systems and in preparing communities for natural disasters. In addition, they can play an important advocacy role to help ensure that early warning stays on the agenda of government policy makers.

The private sector has a diverse role to play in early warning, including developing early warning capabilities in their own organizations. The media plays a vital role in improving the disaster consciousness of the general population and disseminating early warnings. The private sector also has a large untapped potential to help provide skilled services in form of technical manpower, know-how or donations (in-kind and cash) of goods or services.

The science and academic community has a critical role in providing specialized scientific and technical input to assist governments and communities in developing early warning systems. Their expertise is central to analysing natural hazard risks facing communities,



supporting the design of scientific and systematic monitoring and warning services, supporting data exchange, translating scientific or technical information into comprehensible messages, and to the dissemination of understandable warnings to those at risk.

9.4 Key Elements

The following are key elements for a successful PCEWS;

9.4.1 Risk Knowledge

Aim: Establish a systematic, standardized process to collect, assess and share data, maps and trends on hazards and vulnerabilities.

Key Actors

International, national and local disaster management agencies; meteorological and hydrological organizations; geophysical experts; social scientists; engineers; land use and urban planners; researchers and academics; organizations and community representatives involved in disaster management

9.4.2 Monitoring and Warning Service

Aim: Establish an effective hazard monitoring and warning service with a sound scientific and technological basis.

Key Actors

International, national and local disaster management agencies; meteorological and hydrological organizations; geophysical experts; social scientists; engineers; land use and urban planners; researchers and academics; organizations and community representatives involved in disaster management



9.4.3 Dissemination and Communication

Aim: Develop communication and dissemination systems to ensure people and communities are warned in advance of impending natural hazard events and facilitate national and regional coordination and information exchange

Key Actors

International, national and local disaster management agencies; national meteorological and hydrological services; military and civil authorities; media organizations (print, television, radio and on-line); businesses in vulnerable sectors (e.g. tourism, aged care facilities, marine vessels); community-based and grassroots organizations

9.4.4 Response Capability

Aim: Strengthen the ability of communities to respond to natural disasters through enhanced education of natural hazard risks, community participation and disaster preparedness

Key Actors

Community-based and grassroots organizations; schools; universities; informal education sector; media (print, radio, television, on-line); technical agencies with specialised knowledge of hazards; international; national and local disaster management agencies; regional disaster management agencies

9.4.5 Governance and Institutional arrangements

Aim: Develop institutional, legislative and policy frameworks that support the implementation and maintenance of effective early warning systems

Key Actors

Political leaders; policy makers (e.g. environment, development and planning departments); international, national and local disaster management agencies; meteorological and hydrological organizations; researchers and academics; non-government organizations



DISASTER RISK ASSESSMENT FOR FBDM AND ITS LOCAL MUNICIPALITIES

With these policy guidelines laid down as the foundation for Disaster Management, the next step is to determine the risk profile for the FBMD area of jurisdiction.

10. HAZARD IDENTIFICATION

10.1 Methodology

Potential hazards has been identified by first using indigenous knowledge, where after a scientific approach was executed. These results of the two approaches were combined to finalise all potential hazard for the FBMD. Hazard types can be divided into three main categories, namely natural, environmental and human induced.

Natural hazards refer to climate (*heavy rain, high winds, lightning, hail ect*), hydrological (*floods & droughts*) and coastal / marine hazards (*Storm damage, Toxic algal blooms, sea level rising & climate change*). Seismic activities, earthquake and rock falls are all classified as geological natural hazards and veld fires, epidemics and diseases as biological natural hazards.

Environmental hazards consist out of air (*pollution*), vegetation (*agricultural practices*), water and soil hazards.

Hazards caused by power plants, bridges, mines, roads, hazmat are all **human induced** hazards.

During a workshop at FBMD it was decided and agreed to add also **socio-economic status** of communities under human induced hazards. The level of municipal services contributes to the vulnerability status of communities and hence it will also be analysed, evaluated and discussed. These hazard types are outlaid in Figure 10.

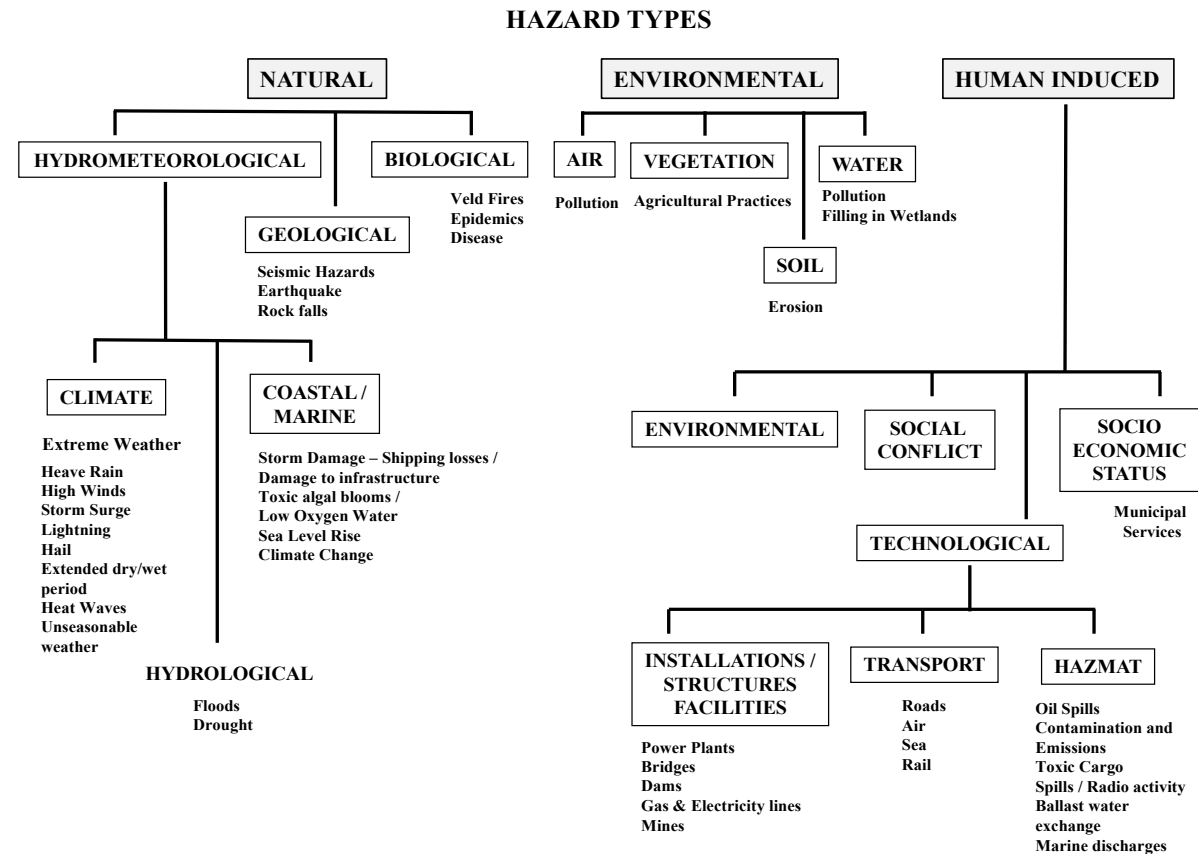


Figure 10: Hazard Classification



10.2 Hazard identified for Phokwane

10.2.1 Indigenous Knowledge

During the 2010 survey the following potential hazards were identified for FBDM (these results included all four local municipalities, namely Sol Plaatje, Dikgatlong, Magareng and Phokwane) using indigenous knowledge. This list will be verified and updated during the first workshops to be held with the local municipalities:

- *Soil Erosion*
- *Road Accident*
- *Storms – Wind and Rain*
- *Floods*
- *Electrical Sub Stations*
- *Hazmat*
- *Unstable ground because of mining activities*
- *Air Pollution*
- *Environmental degradation*
- *Threat of environmental degradation - Big Hole*
- *Insufficient dumping site (Health hazard)*
- *Insufficient sewage systems (Health hazard)*
- *Storm water hazard*
- *Old Transformers used by Eskom (Chemicals in transformers)*
- *Insufficient infrastructure in Informal Settlements*
- *Veld Fire*
- *Crime*
- *Potential risk at the ammunition depo*
- *Potential dam failure*
- *Social Conflict (Taxi ranks)*
- *Epidemics (TB, HIV/Aids, Cholera)*



- *Industrial gasses – spray painting from backyards*
- *Overloading of vehicles on roads*
- *Flamingo Pan*
- *Drought*
- *Ottis Kopje mine*
- *Property in flood line (Ritchie)*
- *Lightning*
- *Lightning damage*
- *Petrol stations (no area for overflow of spillages – hydrocarbons)*
- *Training of personnel at petrol stations (e.g. using cell phones at petrol pumps)*
- *PT Tower in Flying strips*
- *Special events*
- *Eskom Power lines (Wooding poles)*
- *Condition of roads*
- *Insufficient access road to settlements*
- *Trees in street*

The following general remarks came from the community participation 2020 workshops at Phokwane Local Municipality;

- *It seems if Pampierstad is the most vulnerable community in the Phokwane local municipality area of jurisdiction. During the workshop, the Traffic Department confirmed that they do not have any jurisdiction in Pampierstad and that Pampierstad in terms of Traffic regulations falls under the North West Province. Having various functions under two Provincial Governments is not only confusing but leave this community more vulnerable than the rest.*
- *As in all other local municipalities, the communities of Phokwane are very vulnerable in term of poor sewerage management. Raw sewerage in open fields in Valspan was mentioned for the municipality's immediate attention.*



- *Communities revolt over poor basic service delivery, e.g. electricity, clean drinkable water and sanitation services. Many cases were raised where poor sanitation management (raw sewerage being released in open fields), holding a health risk for members of some communities.*
- *Poor service delivery has a major secondary effect on society as a whole, as disgruntled members revolt and led to burning of tires to express their dissatisfaction. As experience lately, these burning of tires led to the lightning of veld fires with devastated economic impacts on the Agricultural Sector. It also contributes to an increase in criminal activities in most communities that are already very vulnerable.*
- *Water channels in Phokwane have a drowning risk for members of the community in Phokwane.*
- *Waste Management.*
- *Crime rates are increasing in the FBDM area of jurisdiction as outlaid by SAPS. The SAPS confirmed that house burglaries increased in Magareng, Dikgatlong, Phokwane and in the Sol Plaatje area of jurisdiction.*
- *Lack of sufficient resources to management day-to-day activities – led alone resources available to management a disaster, e.g.;*
 - *Insufficient Ambulances and Ambulance Services.*
 - *Insufficient firefighting equipment and trained personnel.*
 - *Insufficient equipment in hospitals and mobile clinics.*
- *Members of the community was very concern regarding the increase of veld fire problems without or any support from FBDM. It seems if a Fire Fighting Vehicle is available at FBDM, but without any personal to operate it.*
 - *It was decided that Fire Fighting and Disaster Management of FBDM will arrange a meeting with the community, especially the farming community to find solution for this problem.*
- *Lack of storm water management systems, major and minor systems.*
- *Increase in veld fires.*



- As unemployment rates are at the increase, poverty increase which also led to an increase of more criminal activities.
- Poor roads and access to communities increase the vulnerability of communities; e.g. Fire & Ambulance service cannot have access to house and or members at fire and health risk.
- An increase in alien vegetation, especially in Pampierstad.
- Deforestation.
- Overgrazing of agriculture land.
- Lack of community awareness of potential risks.
- Request that Municipal by-laws to be reviewed.
- Blocking of drainage systems – some cases it's cause is natural and in other cases it is because of vandalistic of nature.

Communities are concern that reviewed plans are not implemented as proposed and members of the community express their concerns to hold Municipalities accountable for poor management practices.

10.2.2 Scientific Analysis

The following hazards were identified using a scientific analysis

- *Extreme Weather Conditions*
- *Heavy Rain*
- *High Winds*
- *Floods*
- *Drought*
- *Seismic Hazards*
- *Veld fires*
- *Epidemics*
- *Disease*
- *Plants*



- *Pollution – Environment, Water and /Air*
- *Environment degradation -*
 - Agricultural practices, Wine Industry
 - Disappearing of Wetlands
 - Erosion
 - Exotic Plantations

Human Induced/Technological/Installations

- Power Plants
- Fuel depots
- Large Industry
- Gas and Electricity
- Dams
- Bridges
- Mines
- Sewage Works
- Roads
- Air
- Rail

In order to fully report on the potential hazards and vulnerability of communities it is deemed necessary first to analyse and to report on the socio-economic status of communities in the Phokwane area of jurisdiction.



11. SOCIO-ECONOMIC STATUS OF COMMUNITIES

Notwithstanding the fact that these factors (*socio-economic status*) cannot necessarily be classified as potential hazards, it most definitely contributes to the vulnerability of people. Henceforth, these elements were added to the above-mentioned list to execute the vulnerability assessment.

The primary goal of this report is only to report on the results and will later in the final draft report be discussed in detail. It is not the intention to fully analyse all the socio-economic factors, nor to execute an in depth socio-economic analyses, but rather to give an overview of some critical factor itself, which contribute to the vulnerability status of communities in the FBDM area of jurisdiction.

11.1 POPULATION

There was no change in the population groups between the 2011 Census date and the 2016 Field survey results.



Figure 11: Population group in the FDBM area of jurisdiction, Census 2016

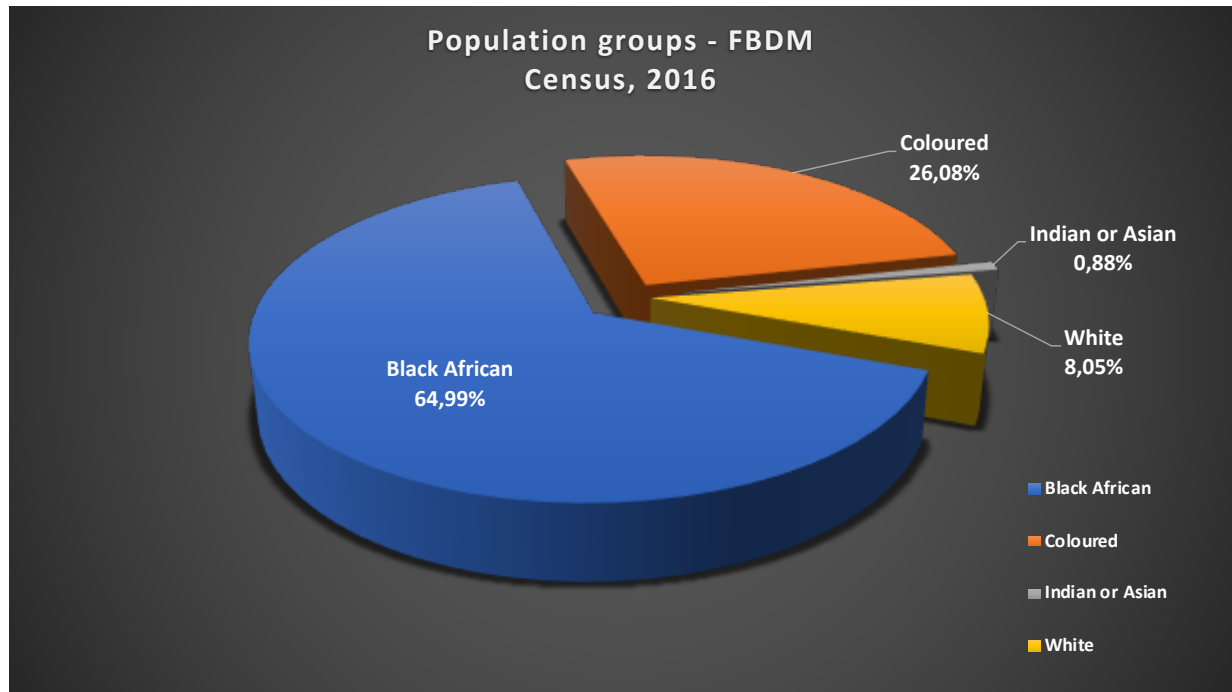
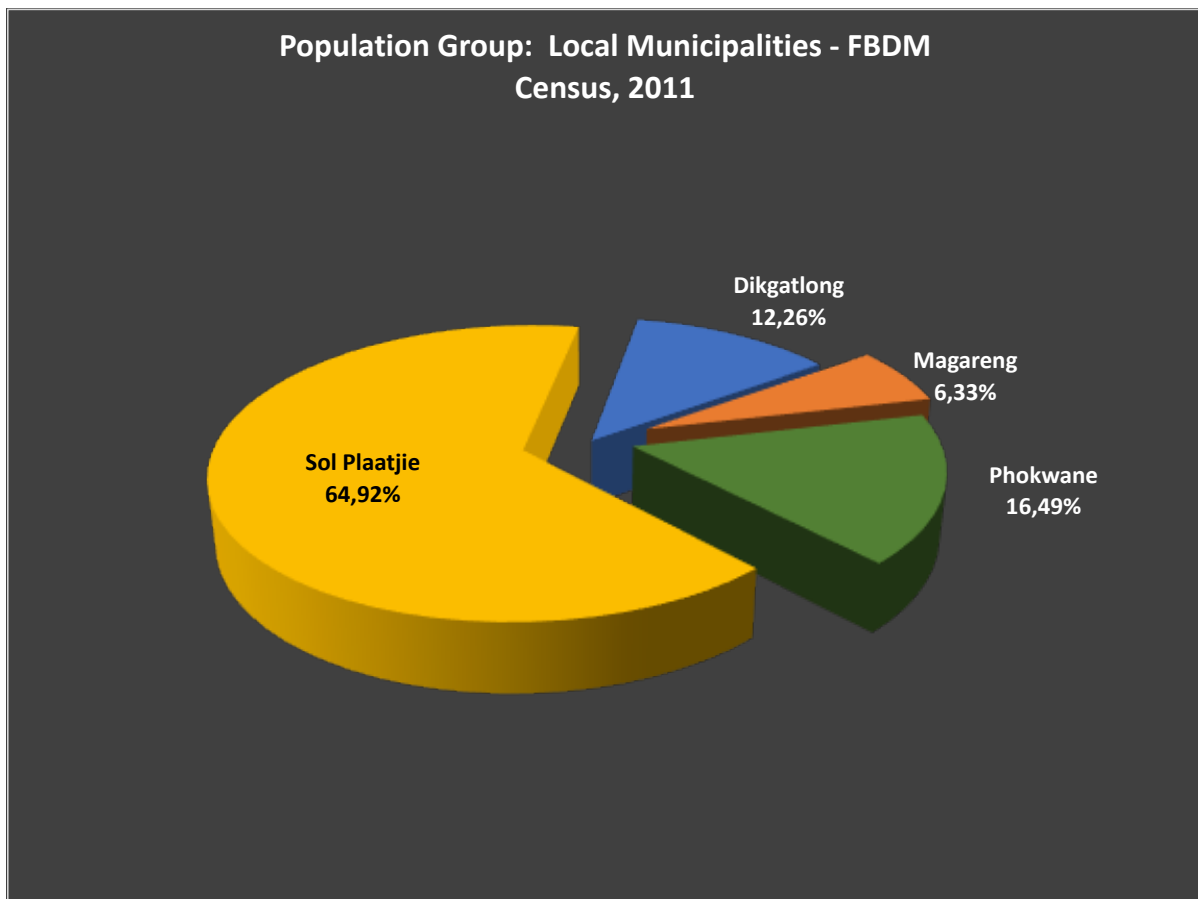


Figure 12 displays the population groups between local municipalities in the FDBM area of jurisdiction.



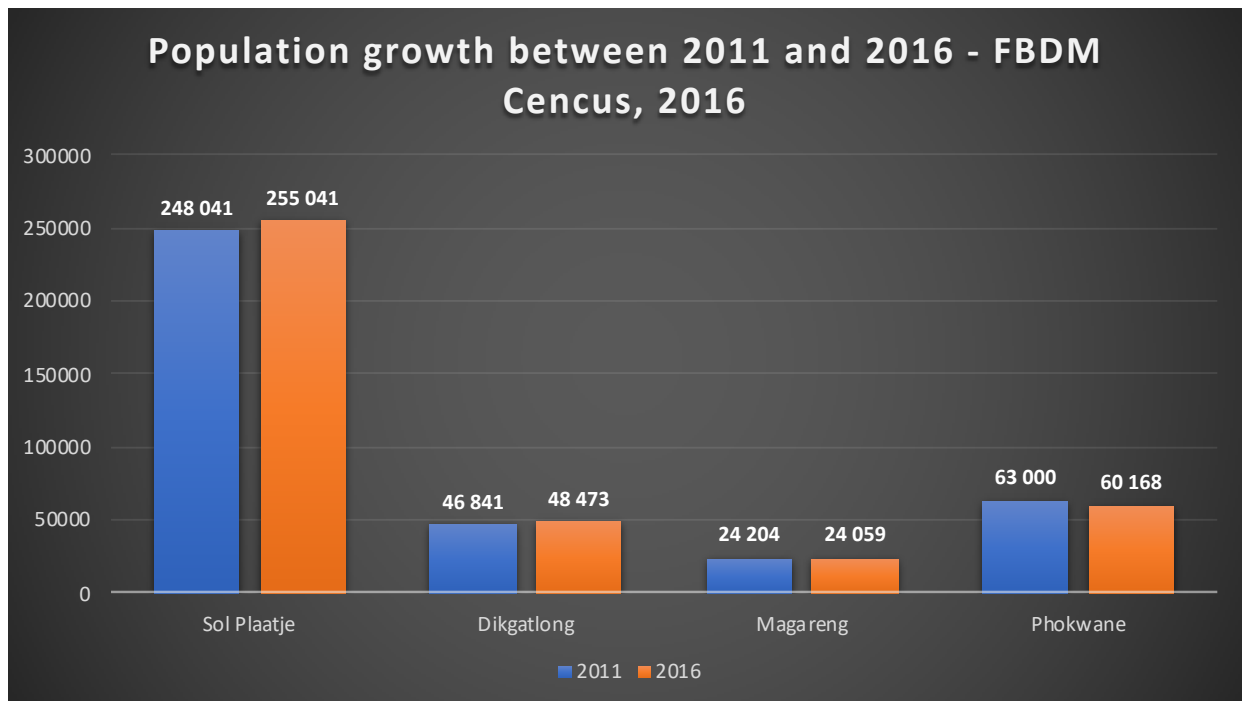
Figure 12: Distribution of the population groups in local municipalities of FBDM are of jurisdiction



Magareng (0,3%) and Phokwane (2,3%) local municipality indicates a decrease in population growth while FBDM (1,39%) and Dikgatlong (1,71%) has an increase in population growth from 2011 to 2016.



Figure 13: Population growth in the local municipalities from 2011 to 2016 in the FBDM area of jurisdiction



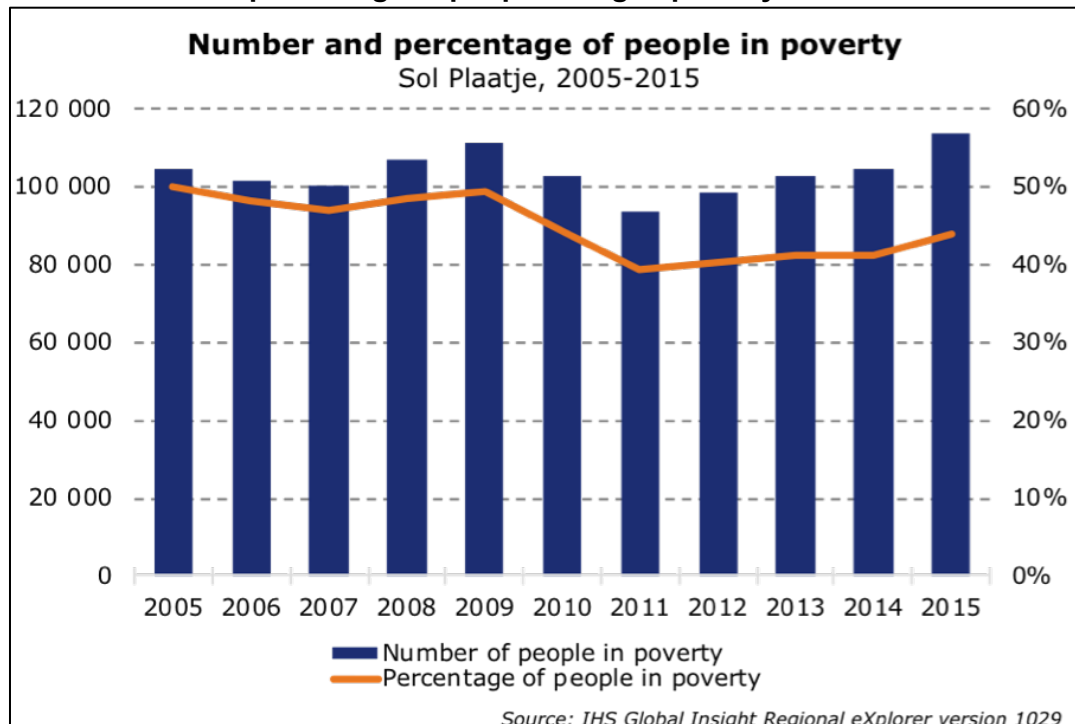
These figures are important for the Department of Infrastructure of FBDM in order to meet the needs of community's basic service delivery.

11.2 POVERTY

Analysing the number of people living in poverty, it appears as if poverty from 2005 to 2015 increased in FBDM area of jurisdiction. In 2015, there were 114 000 people living in poverty, using the upper poverty line definition, across FBDM - this is 8.94% higher than the 105 000 in 2005. The percentage of people living in poverty has decreased from 50.06% in 2005 to 43.76% in 2015, which indicates a decrease of 6.3 percentage points.



Figure 14: Number and percentage of people living in poverty - FBDM: 2005-2015

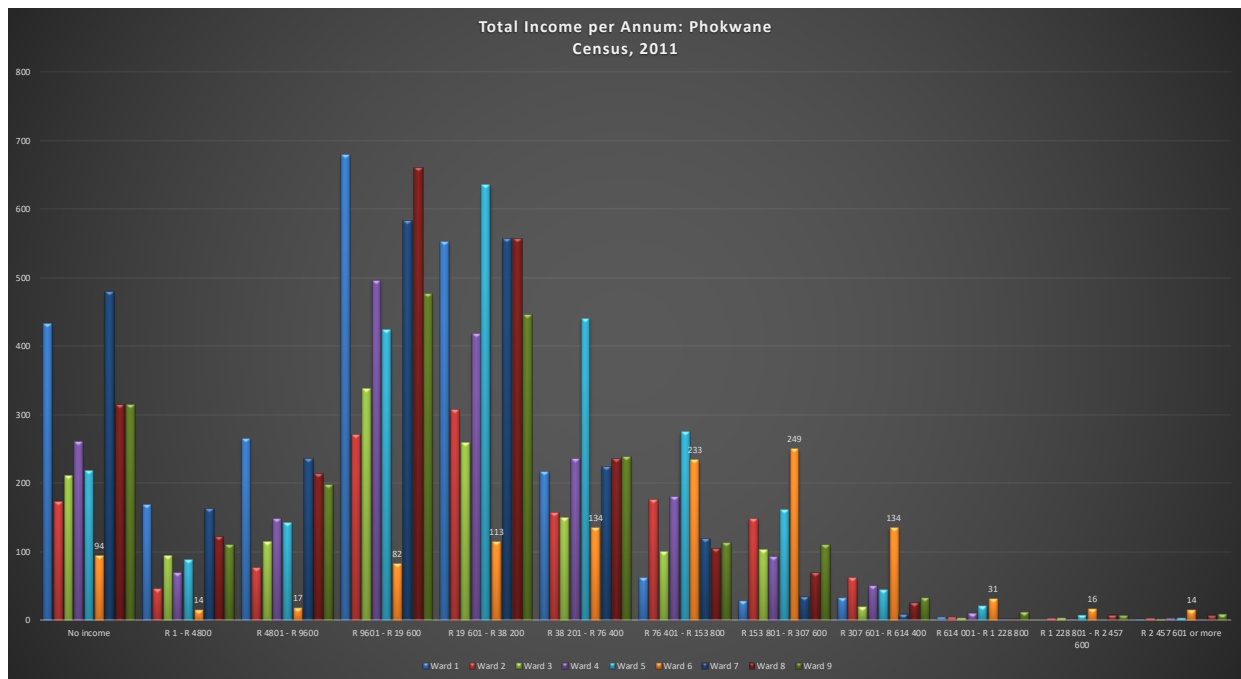


11.2.1 Total Income per Annum

On ward level, for the three local municipalities in the FBDM area of jurisdiction the total income per household per annum almost follows the same distribution, which is between R9600 tots R38 200 per annum. However, there are still a significant number of people living with less than R19 600 per annum (which is less than the absolute poverty line) and even having no income.



Figure 15 Total Income per Annum: Magareng: 2016 Field Survey Census



11.2.2 Total Employment

In the Northern Cape Province, the total employment rate of 2, 28% is higher than the National employment rate of 2.07% from 2005 to 2015. However, the total employment rate in the FBDM, excluding FBDM is far below the Northern Cape and National employment rate.

This gives FBDM an indication that poverty is higher in these local municipalities in comparison with other municipalities in the Northern Cape. An indicator for the Planning and Development Department to draft appropriate and more sustainable LED programs for FBDM.



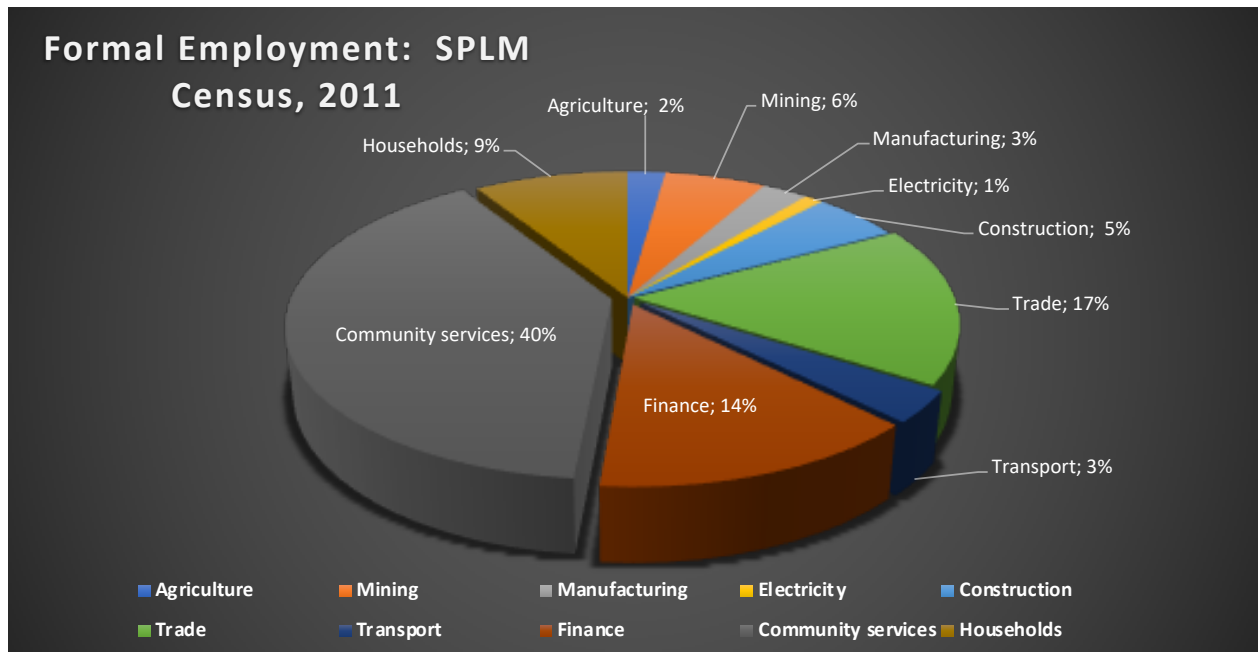
Table 1: Total Employment in Sol Plaatje, Francis Baard, Northern Cape and National: 2005 – 2015

Year	Sol Plaatje	Frances Baard	Northern Cape	National Total
2005	54,500	79,700	252,000	12,500,000
2006	56,200	81,600	260,000	13,000,000
2007	58,700	84,200	272,000	13,500,000
2008	61,700	87,500	285,000	14,100,000
2009	60,800	85,100	281,000	14,000,000
2010	58,300	80,600	273,000	13,600,000
2011	59,200	81,100	278,000	13,800,000
2012	61,900	83,400	289,000	14,000,000
2013	65,700	87,700	302,000	14,500,000
2014	68,400	90,700	313,000	15,100,000
2015	68,200	90,700	316,000	15,400,000

Source: IHS Global Insight Regional eXplorer version 1029

Analysing formal employment only in FBDM, it appears as if Community Services is responsible for 40% of the total employment (2011 Census).

Figure 16: Formal Employment in FBDM: 2005-2015





11.2.3 Unemployment

The unemployed includes all persons between 15 and 65 who are currently not working, but who are actively looking for work. It therefore excludes people who are not actively seeking work (referred to as discouraged work seekers). The choice of definition for what constitutes being unemployed has a large impact on the final estimates for all measured labour force variables. The following definition was adopted by the Thirteenth International Conference of Labour Statisticians (Geneva, 1982): The "unemployed" comprise all persons above a specified age who during the reference period were:

- "Without work", i.e. not in paid employment or self-employment;
- "Currently available for work", i.e. were available for paid employment or self-employment during the reference period; and
- "Seeking work", i.e. had taken specific steps in a specified reference period to seek paid employment or self-employment. The specific steps may include registration at a public or private employment exchange; application to employers; checking at worksites, farms, factory gates, market or other assembly places; placing or answering newspaper advertisements; seeking assistance of friends or relatives; looking for land.

Table 2: Unemployment (official definition) for Frances Baard, Sol Plaatje, Northern Cape and National Total: 2005 - 2015

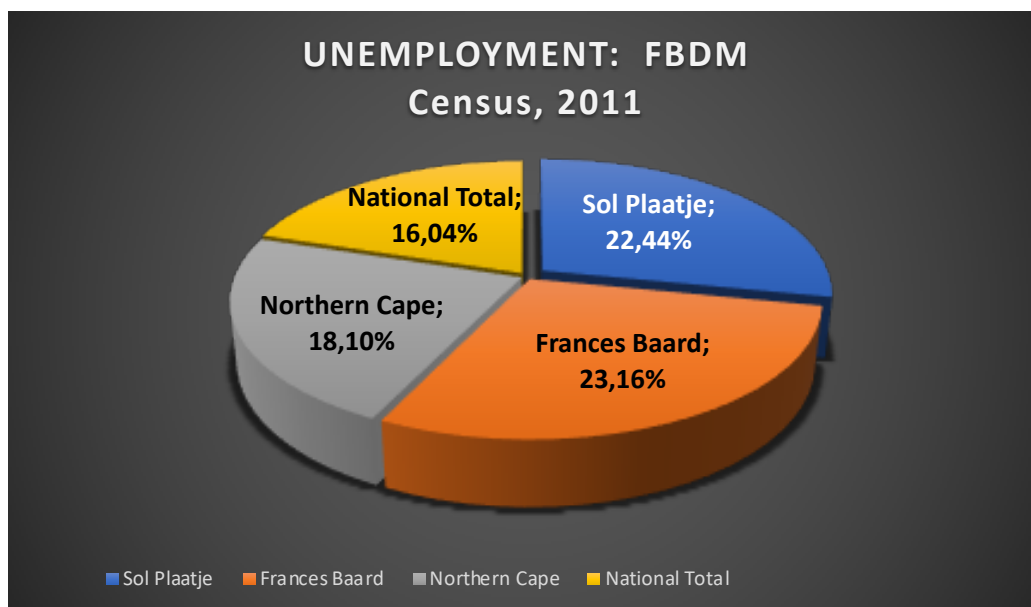
Year	Sol Plaatje	Frances Baard	Northern Cape	National Total	Sol Plaatje as % of district municipality	Sol Plaatje as % of province	Sol Plaatje as % of national
2005	30,300	46,200	116,000	4,550,000	65.6%	26.0%	0.67%
2006	30,300	46,100	117,000	4,510,000	65.6%	26.0%	0.67%
2007	29,200	44,400	112,000	4,460,000	65.7%	26.0%	0.65%
2008	27,300	41,300	104,000	4,350,000	66.0%	26.3%	0.63%
2009	27,000	40,600	101,000	4,370,000	66.4%	26.6%	0.62%
2010	27,700	41,500	103,000	4,490,000	66.8%	26.9%	0.62%
2011	29,100	43,500	107,000	4,570,000	67.0%	27.1%	0.64%
2012	31,400	47,500	114,000	4,690,000	66.1%	27.7%	0.67%
2013	33,200	50,900	122,000	4,850,000	65.3%	27.2%	0.68%
2014	34,800	54,000	131,000	5,060,000	64.5%	26.6%	0.69%
2015	37,100	56,900	137,000	5,280,000	65.3%	27.2%	0.70%
Average Annual growth							
2005-2015	2.06%	2.11%	1.63%	1.50%			

Source: IHS Global Insight Regional eXplorer version 1029



In 2015, there were a total increase from 46 200 to 56 900 people unemployed in FBDM area of jurisdiction, that is a 10.4% increase in comparison with a 10% increase of unemployment in FBDM, which is higher than the total unemployment rate of the Northern Cape (8,3%). According to Census, 2011 the total unemployment rate in the Northern Cape Province is 18%, which is higher than the total National unemployment rate. Both FBDM (23%) and FBDM (22, 5%) is above the National unemployment rate.

Figure 17: Total unemployment in the FBDM area of jurisdiction, Census 2011



11.2.4 HIV+ and AIDS Estimates

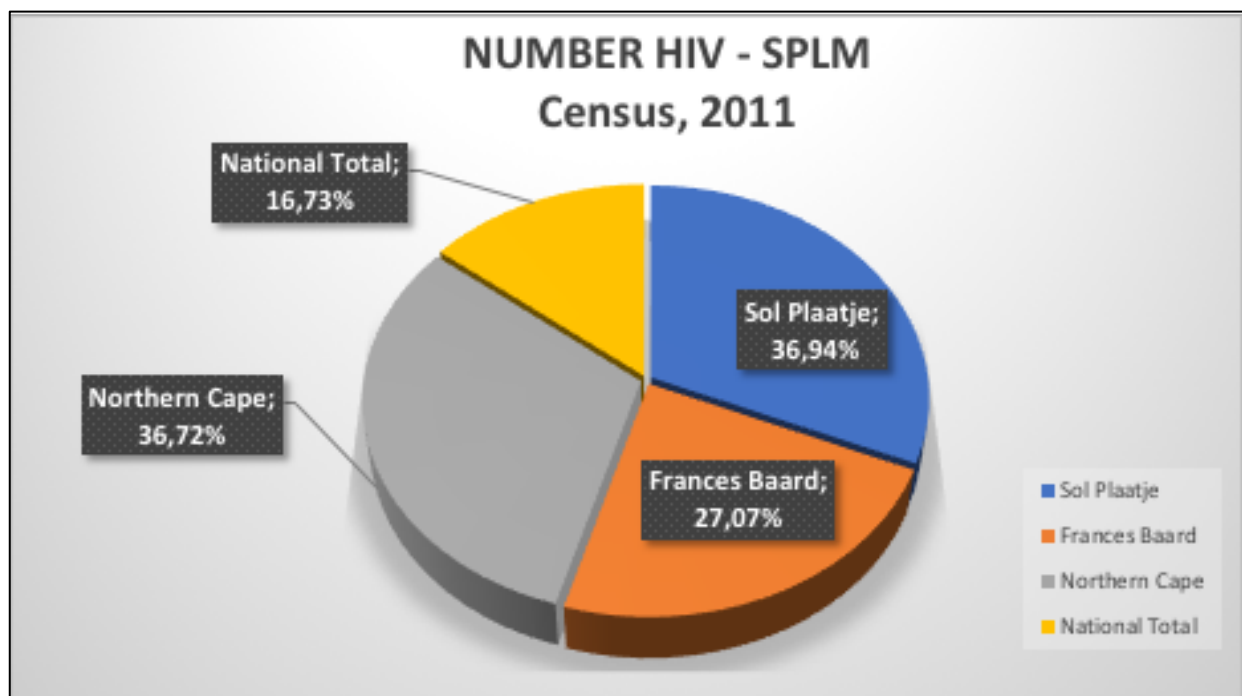
HIV+ and AIDS estimates are defined as follows:

The HIV+ estimates are calculated by using the prevalence rates from the HIV/AIDS model built by the Actuarial Society of Southern Africa (ASSA-2008). These rates are used as base rates on a provincial level. IHS slightly adjusted the provincial ASSA-2008 data to more accurately reflect the national HIV Prevalence rate per population group as used in the national demographic models. The ASSA model in turn uses the prevalence rates from various primary data sets, in particular the HIV/AIDS surveys conducted by the Department of Health and the Antenatal clinic surveys. Their rates are further adjusted



for over-reporting and then smoothed. HIV in the Northern Cape (37%) is much higher than the National total (17%). Both FBDM (27%) and FBDM (37%) is far above the National total HIV rate (Figure 18).

Figure 18: Number of HIV in the Northern Cape, FBDM and SPLM area of jurisdiction, Census 2011

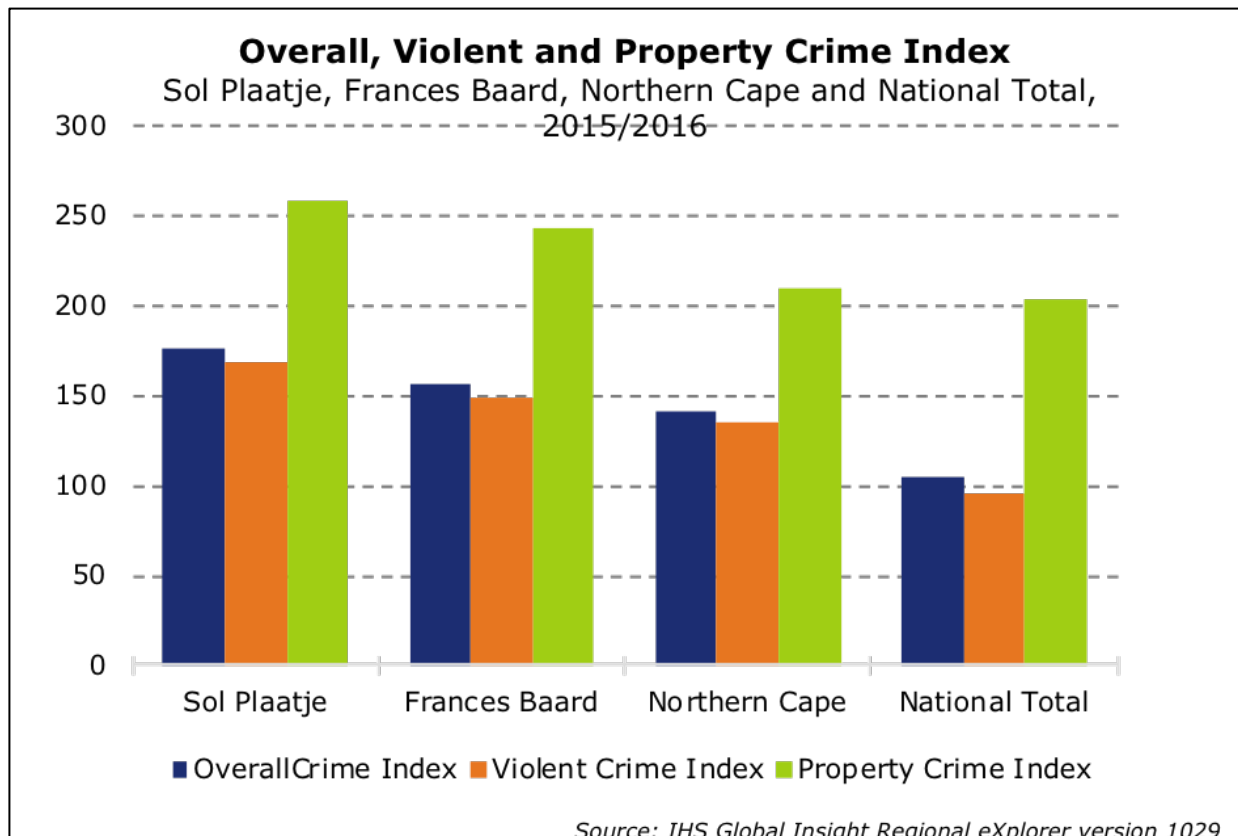


11.2.5 Crime

As illustrated in Figure 12 it is evident that property crime is a major problem for all the regions relative to violent crime. It is evident that the property crime is a major problem for all the regions relative to rest crime indices.



Figure 19: IHS Crime Index - calendar years (weighted avg / 100,000 people) - Frances Baard, Sol Plaatje, Northern Cape and National Total, 2015/2016 [Index value]

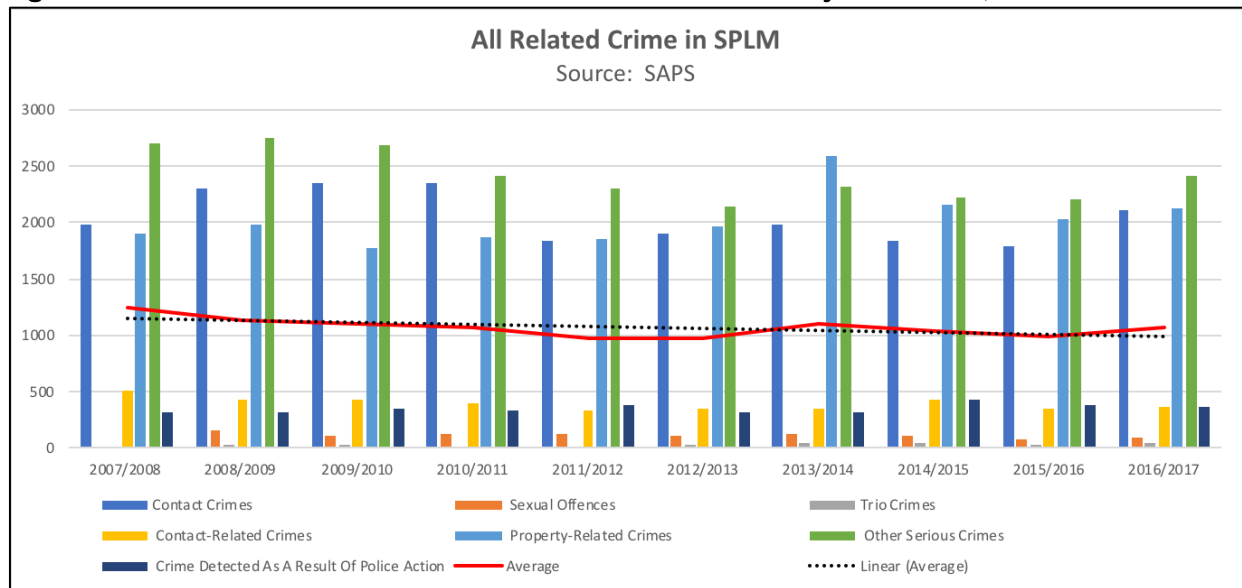


There are many ways to analysis statistics and sometimes be information can be misleading. Evaluating the all crime related statistics from the SAPS from 2007 to 2017; the following general remarks are applicable;

- When comparing the April 2016 – March 2017 with the April 2008 – March 2009 results, most crimes decreased, accept for Trio crimes (14%), Property-related (58%), and Crime detected as a result of police action (11%) increased.
- When comparing the same results only between the last two years, all crimes increased, accept for Crime detected as a result of police action decreased with almost 8%.



Figure 20: All Crime Related Statistics in the FBDM area of jurisdiction, 2007-2017



On average (Figure 20), it seems a slight decrease in all crimes, which increased after March 2012. A linear trend line indicates a slightly decrease in crime in the FBDM area of jurisdiction. But when looking at each individual crime category, the following general remarks can be concluded from Table 3 when analysing the percentage change the last two years (2015/16 to 2016/17);

- Murder increased with 92% and robbery at residential premises increased with 100%.
- Common robbery (55%) and sexual assault (58%) also increased significantly.
- Robbery of cash in transit decreased with 100% and theft of motor vehicle and motorcycle decrease significantly (37%).
- Most crime detected as a result of police actions decreased (illegal possession of firearms and ammunition (50%), drug-related crime (19, 5%), sexual offences detected as a result of Police action (86%). In this category, driving under the influence of alcohol or drugs increased with 17%.



Table 3: Percentage change in the individual crime categories in the FBDM area of jurisdiction: 2016/16 – 2016/17

CRIME CATEGORY	% Change 16/17 vs 16/17
CONTACT CRIMES (CRIMES AGAINST THE PERSON)	
Murder	91,7%
Sexual Offences	14,6%
Attempted murder	-6,8%
Assault with the intent to inflict grievous bodily harm	6,1%
Common assault	4,1%
Common robbery	55,2%
Robbery with aggravating circumstances	25,3%
Contact Crimes	18,0%
SEXUAL OFFENCES	
Rape	5,7%
Sexual Assault	58,3%
Attempted sexual offences	-7,7%
Contact sexual offences	75,0%
Sexual Offences	14,6%
SUBCATEGORIES OF AGGRAVATED ROBBERY	
Carjacking	-80,0%
Truck hijacking	0 Cases
Robbery of cash in transit	-100,0%
Bank robbery	0 Cases
Robbery at residential premises	100,0%
Robbery at non-residential premises	11,1%
Trio Crimes	5,6%
Subcategories Of Aggravated Robbery	2,7%
CONTACT-RELATED CRIMES	
Arson	9,1%
Malicious damage to property	2,9%
Contact-Related Crimes	3,1%
PROPERTY-RELATED CRIMES	
Burglary at non-residential premises	1,8%
Burglary at residential premises	11,5%
Theft of motor vehicle and motorcycle	-36,7%
Theft out of or from motor vehicle	5,6%
Stock-theft	0,0%
Property-Related Crimes	5,0%
OTHER SERIOUS CRIMES	
All theft not mentioned elsewhere	9,9%
Commercial crime	4,3%
Shoplifting	14,0%
Other Serious Crimes	9,6%
17 Community-Reported Serious Crimes	10,1%
CRIME DETECTED AS A RESULT OF POLICE ACTION	
Illegal possession of firearms and ammunition	-50,0%
Drug-related crime	-19,4%
Driving under the influence of alcohol or drugs	16,9%
Sexual Offences detected as a result of Police Action	-85,7%
Crime Detected As A Result Of Police Action	-8,0%



11.2.6 Household Infrastructure

Drawing on the household infrastructure data of a region is of essential value in economic planning and social development. Assessing household infrastructure involves the measurement of four indicators:

- Access to dwelling units
- Access to proper sanitation
- Access to running water
- Access to refuse removal
- Access to electricity

A household is considered "serviced" if it has access to all four of these basic services. If not, the household is considered to be part of the backlog. The way access to a given service is defined (and how to accurately measure that specific Definition over time) gives rise to some distinct problems. IHS has therefore developed a unique model to capture the number of households and their level of access to the four basic services.

A household is defined as a group of persons who live together and provide themselves jointly with food and/or other essentials for living, or a single person who lives alone. The next few sections offer an overview of the household infrastructure of the FBDM according to the 2011 Census data.

11.2.7 Household Dwelling by Type

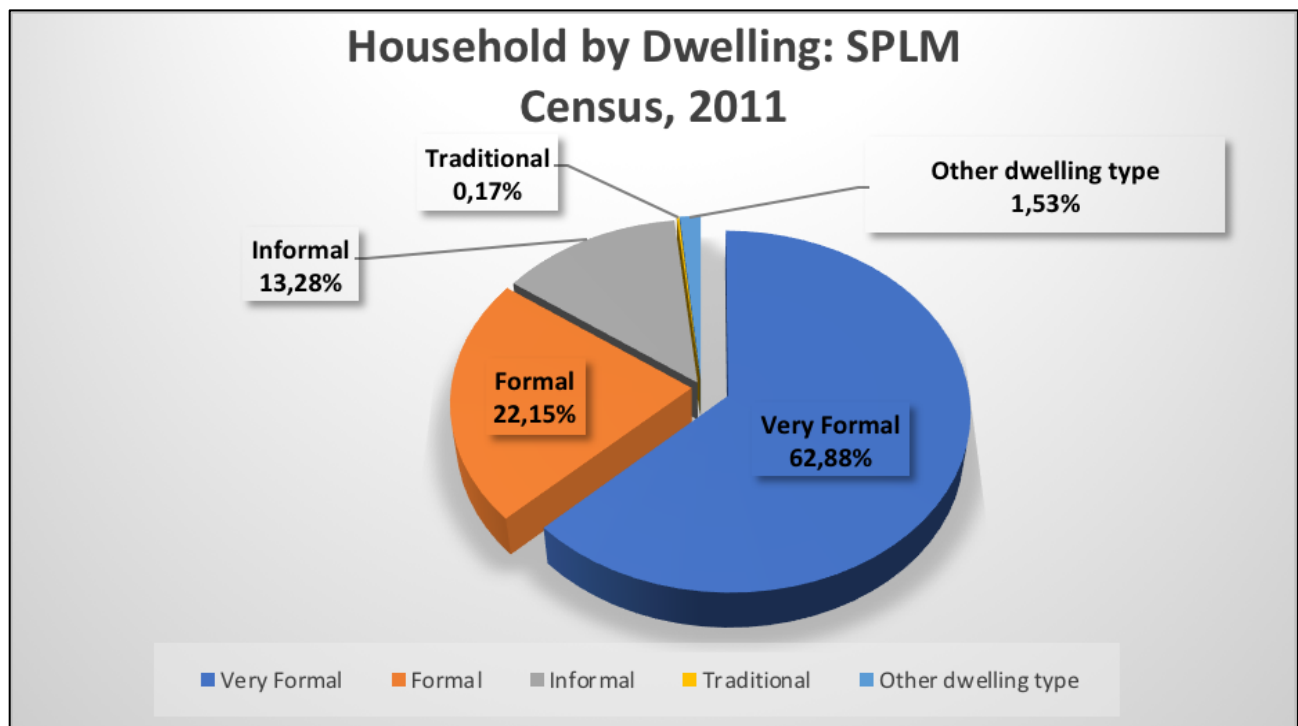
Using the StatsSA definition of a household and a dwelling unit, households can be categorised according to type of dwelling. The categories are:

- **Very formal dwellings** - structures built according to approved plans, e.g. houses on a separate stand, flats or apartments, townhouses, rooms in backyards that also have running water and flush toilets within the dwelling. .
- **Formal dwellings** - structures built according to approved plans, i.e. house on a separate stand, flat or apartment, townhouse, room in backyard, rooms or flat let elsewhere etc., but without running water or without a flush toilet within the dwelling.



- **Informal dwellings** - shacks or shanties in informal settlements, serviced stands, or proclaimed townships, as well as shacks in the backyards of other dwelling types.
- **Traditional dwellings** - structures made of clay, mud, reeds, or other locally available material.
- **Other dwelling units** - tents, ships, caravans, etc.

Figure 21: Households by dwelling unit type in the FBDM area of jurisdiction, Census 2011 [Percentage]



11.2.8 Household by Sanitation Type

Sanitation can be divided into specific types of sanitation to which a household has access. We use the following categories:

- **No toilet** - No access to any of the toilet systems explained below.
- **Bucket system** - A top structure with a seat over a bucket. The bucket is periodically removed and the contents disposed of. (Note: this system is widely



used but poses health risks to the collectors. Most authorities are actively attempting to discontinue the use of these buckets in their local regions).

- **Pit toilet** - A top structure over a pit.
- **Ventilation improved pit** - A pit toilet but with a fly screen and vented by a pipe. Depending on soil conditions, the pit may be lined.
- **Flush toilet** - Waste is flushed into an enclosed tank, thus preventing the waste to flow into the surrounding environment. The tanks need to be emptied or the contents pumped elsewhere.
- The following two graphs indicate the situation in the FBDM area of jurisdiction regarding the type of sanitation facility. There is still a significant amount of households without any sanitation facility in all four local municipalities (Figure 16).

Figure 22: Type of sanitation facility in the FBDM area of jurisdiction, Census 2016

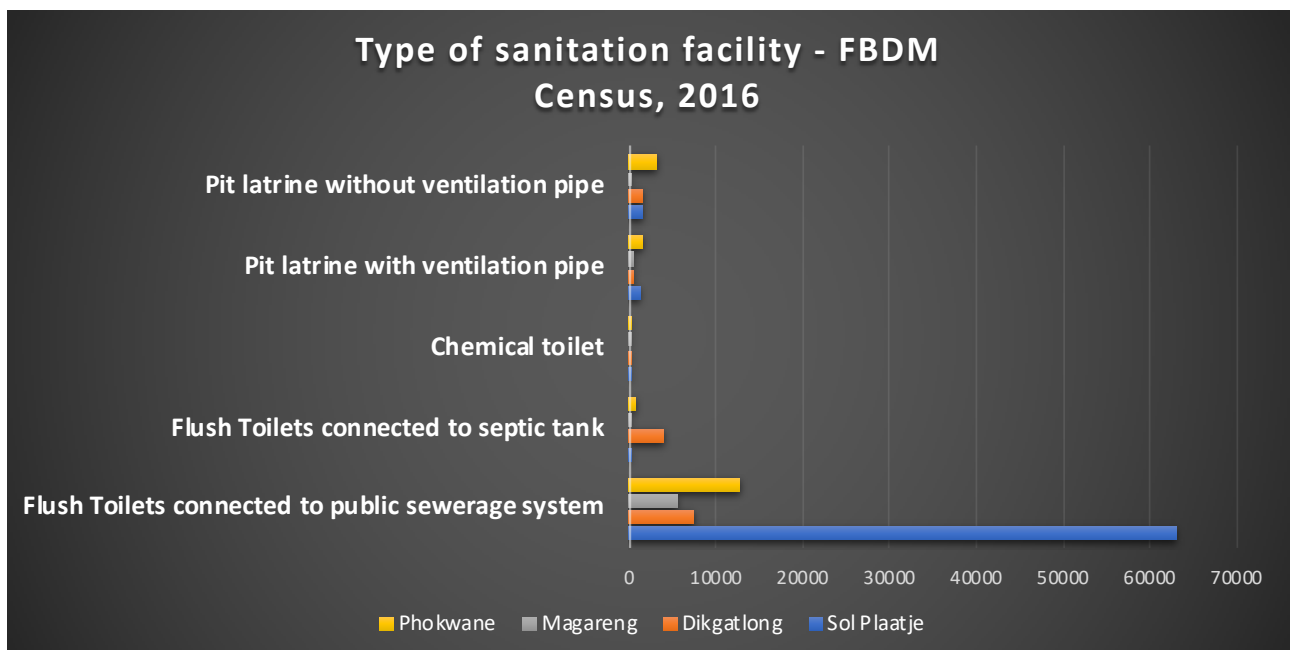
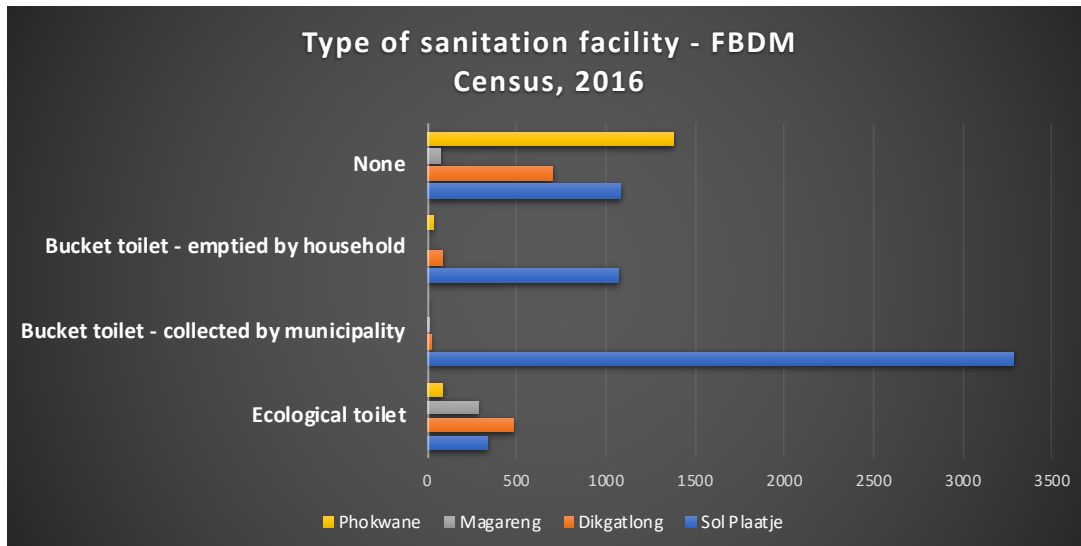


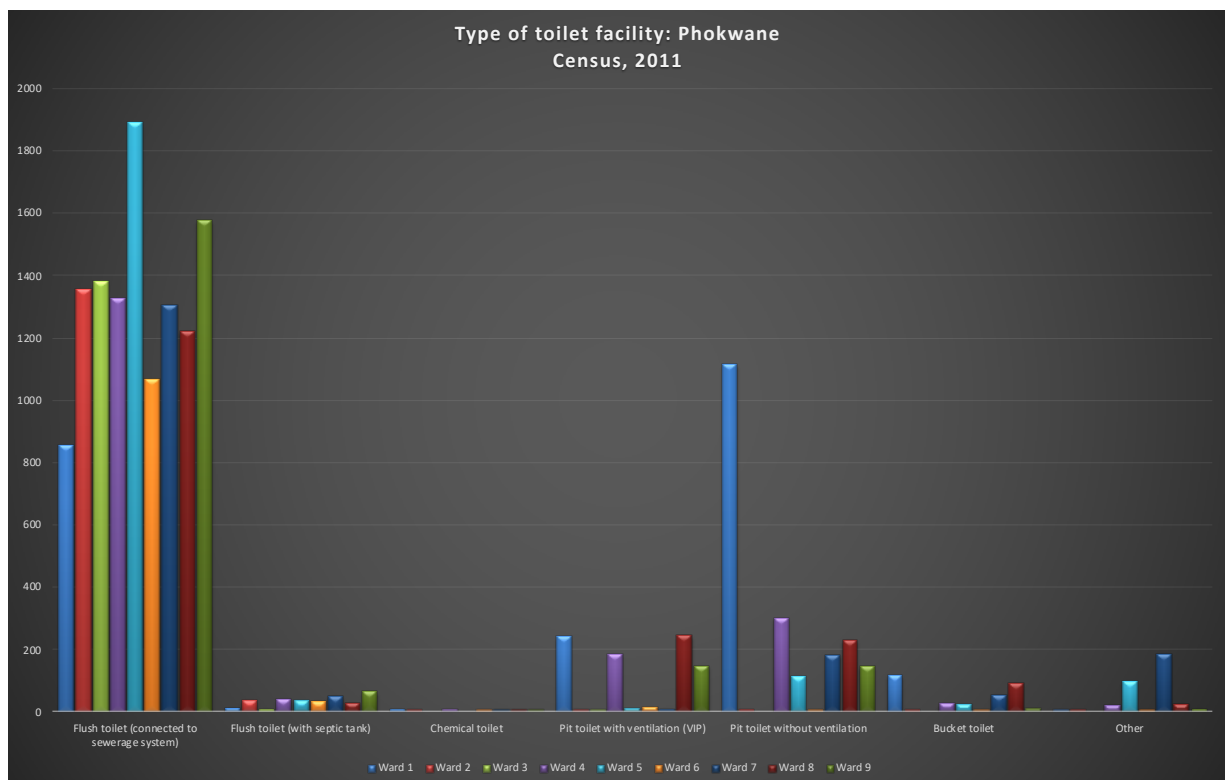


Figure 23::Type of sanitation facility in the FBDM area of jurisdiction, Census 2016



The following three graphs indicates sanitation facilities in the three local municipal area of jurisdiction.

Figure 24: Type of sanitation facility in the Phokwane area of jurisdiction, Census 2011





11.2.9 Household by Access to Water

A household is categorised according to its main access to water, as follows: Regional/local water scheme, Borehole and spring, Water tank, Dam/pool/stagnant water, River/stream and other main access to water methods. No formal piped water includes households that obtain water via water carriers and tankers, rainwater, boreholes, dams, rivers and springs.

Figure 25: Source of drinking water in the FBDM area of jurisdiction, Census 2016

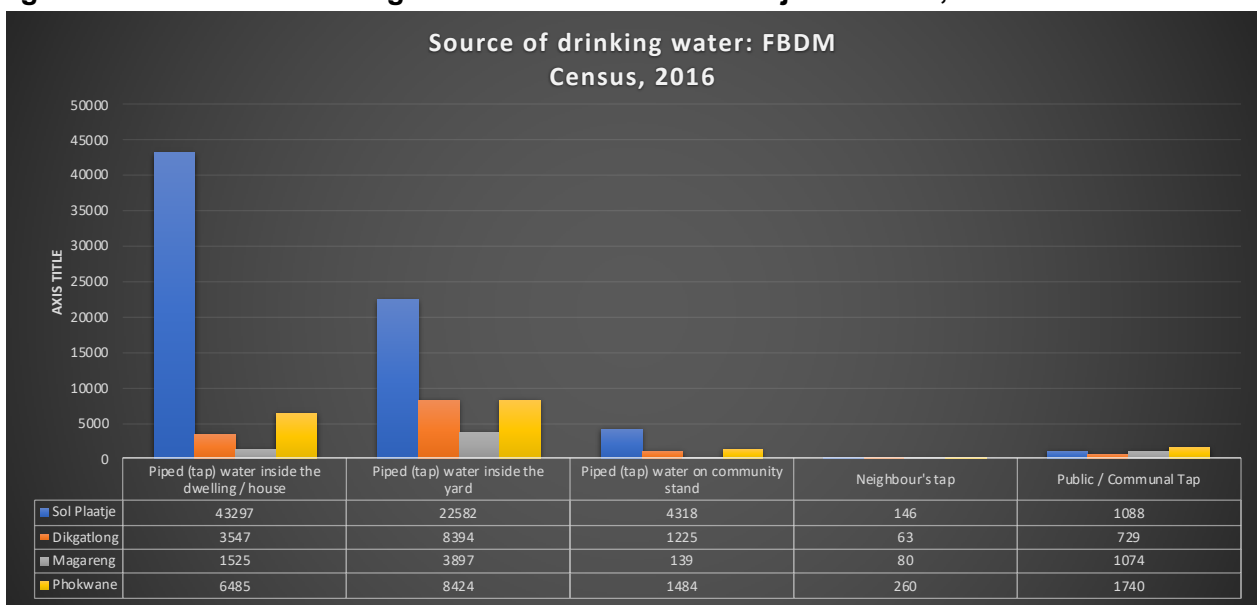
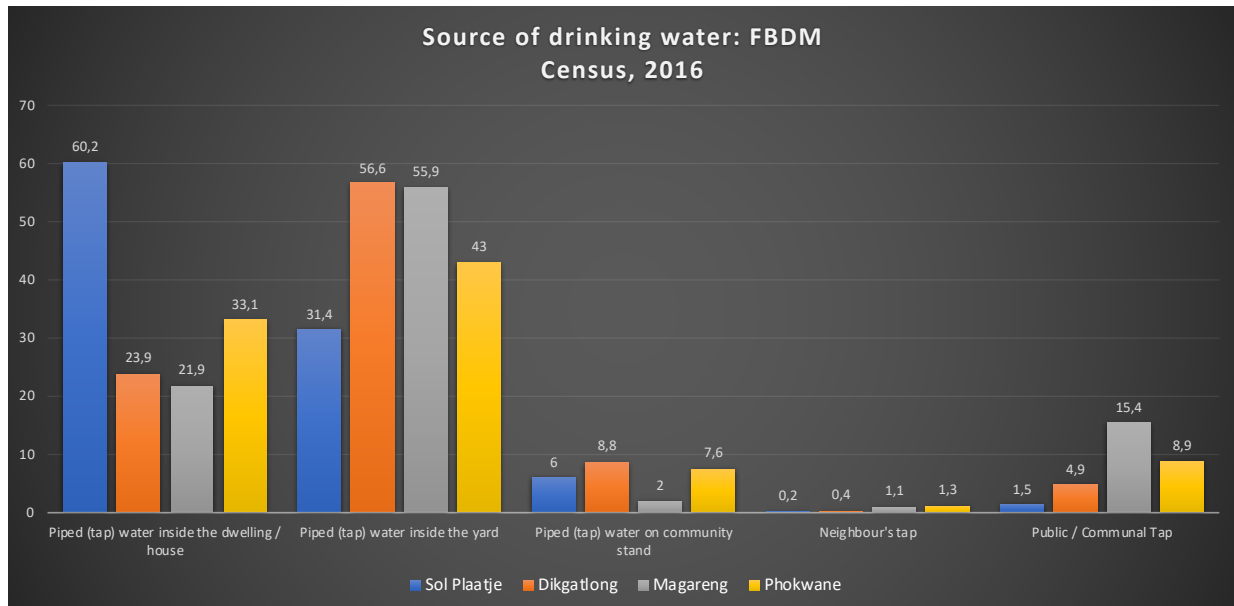


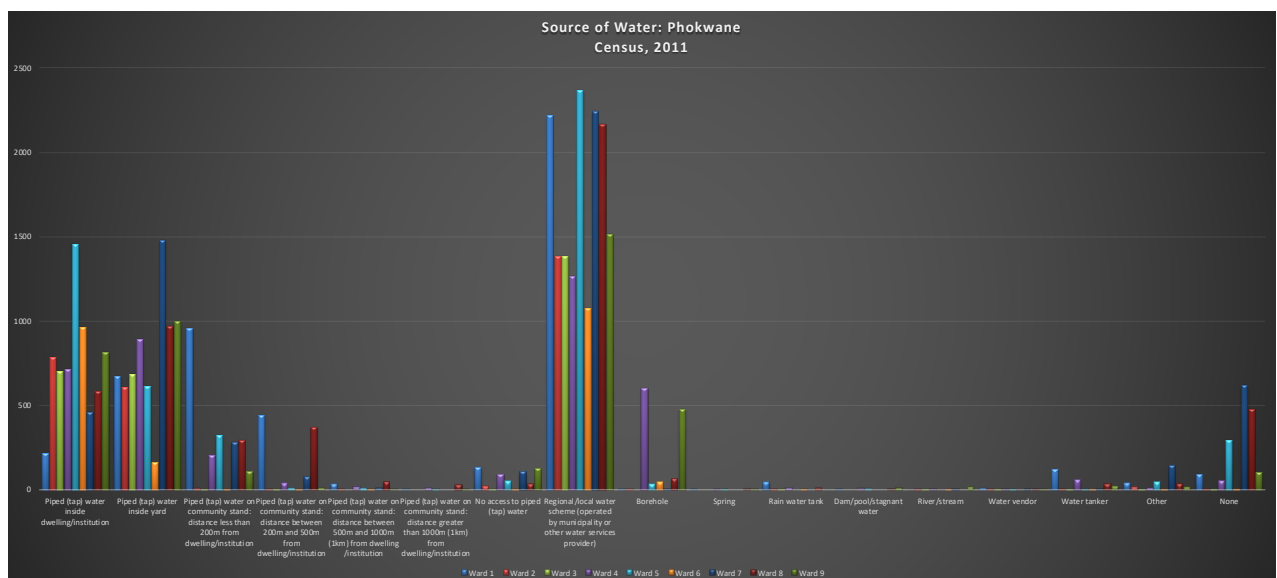


Figure 26: Source of drinking water in the FBDM area of jurisdiction, Census 2016



As for sanitation facilities, in all three local municipalities (**Error! Reference source not found.**, Figure 28, Figure 29) there are significant households without any water source according to the 2011 Census data. Various wards in the Dikgatlong area of jurisdiction use water from dams, pool, river, streams and water vendor and water tanks.

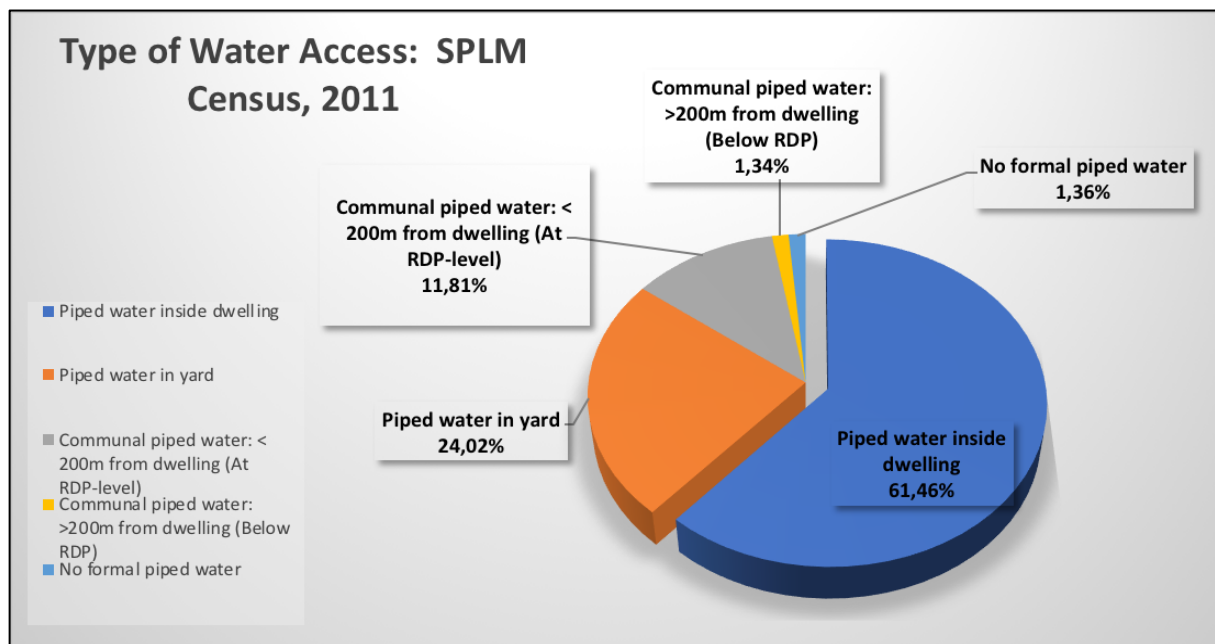
Figure 27: Source of Water on Ward level in the Phokwane area of jurisdiction, Census 2011





Almost 98% of the communities in FBDM make use of the regional water service authority or provider. The remaining 2% are using borehole, rainwater tanks, and even water from springs, dams, rivers and streams.

Figure 28: Type of water access in the FBDM area of jurisdiction, Census 2011, [Percentage]

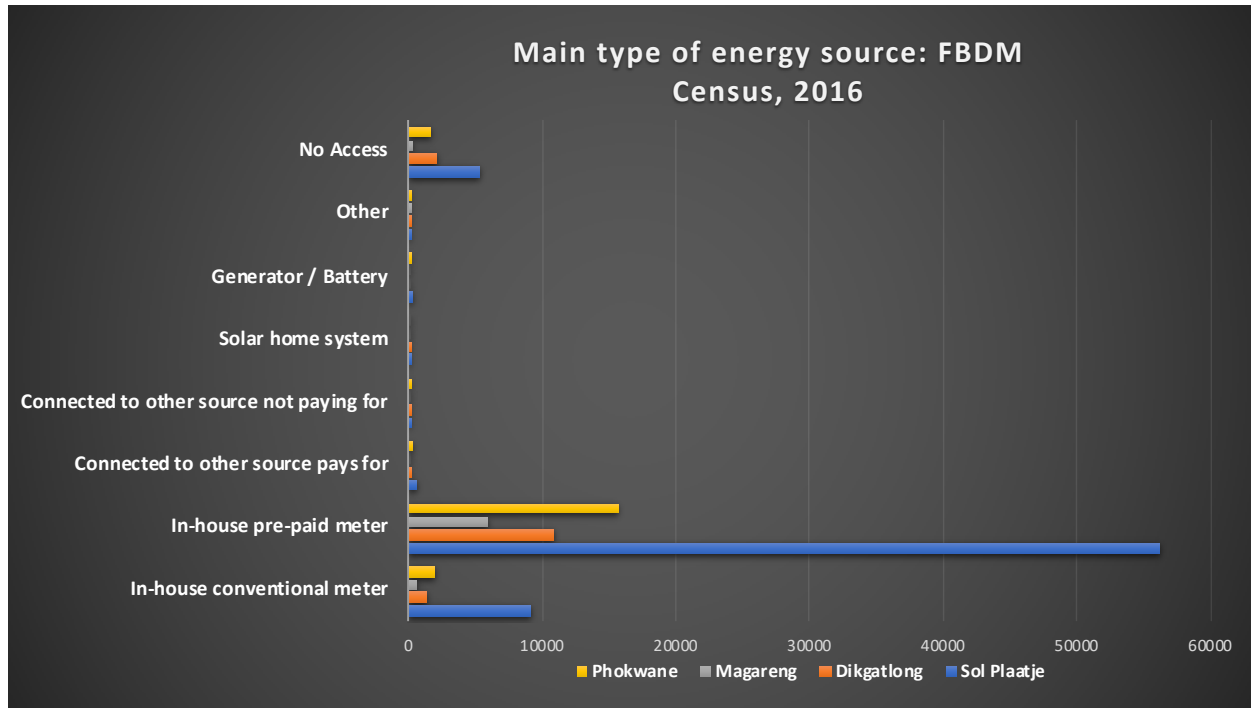


11.2.10 Source of Energy

There are still significant amounts of households in all four local municipalities without any source of energy according to the 2016 Field Survey Census data.



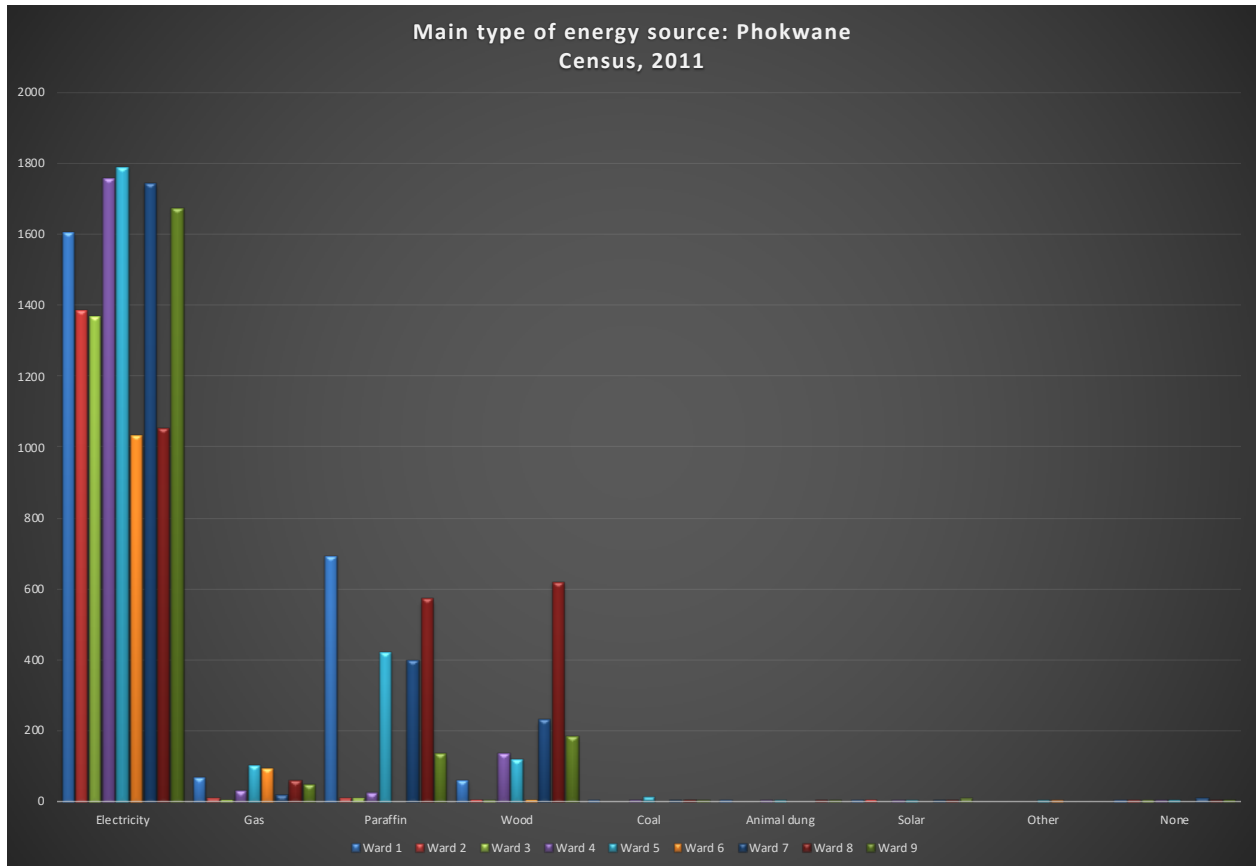
Figure 29: Main source of energy in the FBDM area of jurisdiction, Census 2016



At ward level, all three local municipalities are still exposed to use wood as energy source.



Figure 30: Main source of energy in the Phokwane area of jurisdiction, Census 2011



In the FBDM, households are using electricity for cooking, for heating, and for lighting. Household using solar power are included as part of households with an electrical connection. According to the 2011 Census data, only 3% of electricity is used for lighting only. If this is true, it means that the main demand for electricity is for commercial and industrial use. Almost 11% of household in the FBDM area of jurisdiction do not use electricity (*or does not have access to electricity*).



11.2.11 Households by Refuse Disposal

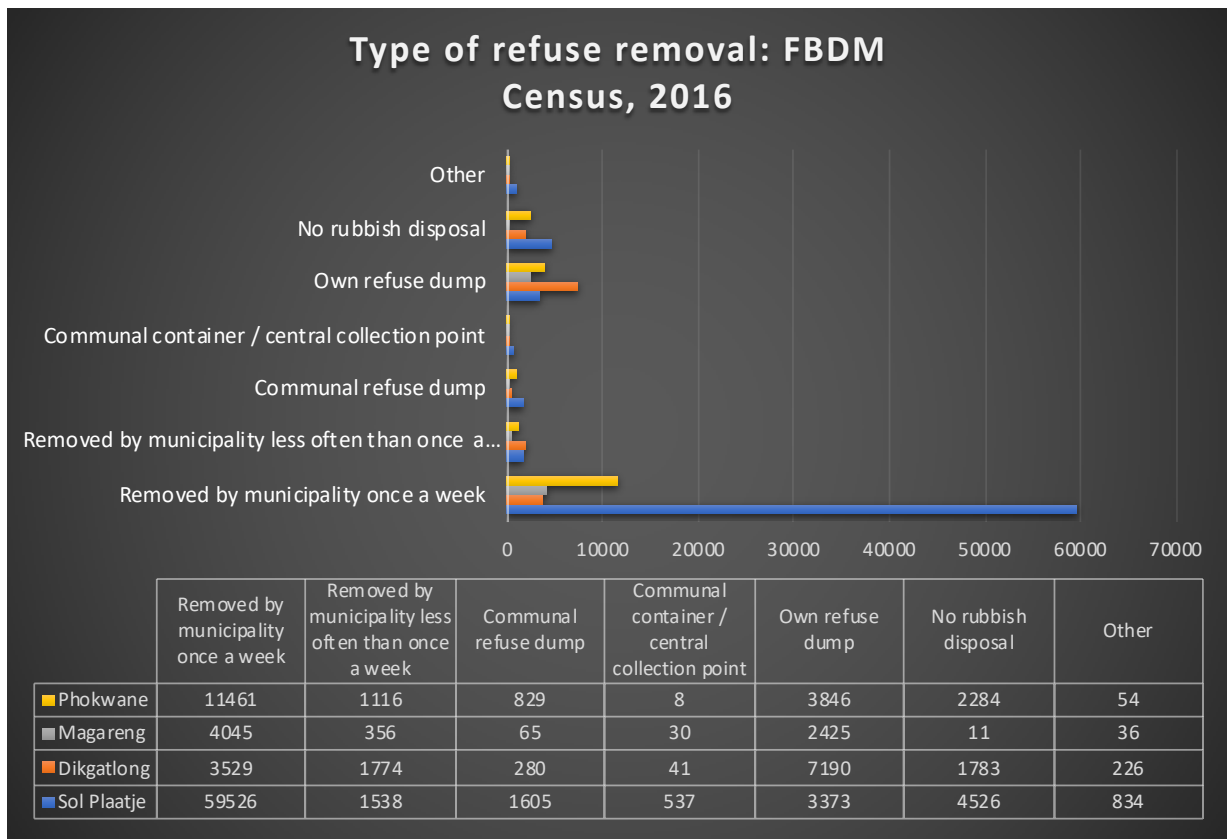
A distinction is made between formal and informal refuse removal. When refuse is removed by the local authorities, it is referred to as formal refuse removal. Informal refuse removal is where either the household or the community disposes of the waste, or where there is no refuse removal at all. A further breakdown is used in terms of the frequency by which the refuse is taken away, thus leading to the following categories:

- Removed weekly by authority
- Removed less often than weekly by authority
- Removed by community members
- Personal removal / (own dump)
- No refuse removal

Error! Reference source not found. Figure 31 indicates the refuse removal at each local municipality within the FBDM area of jurisdiction.



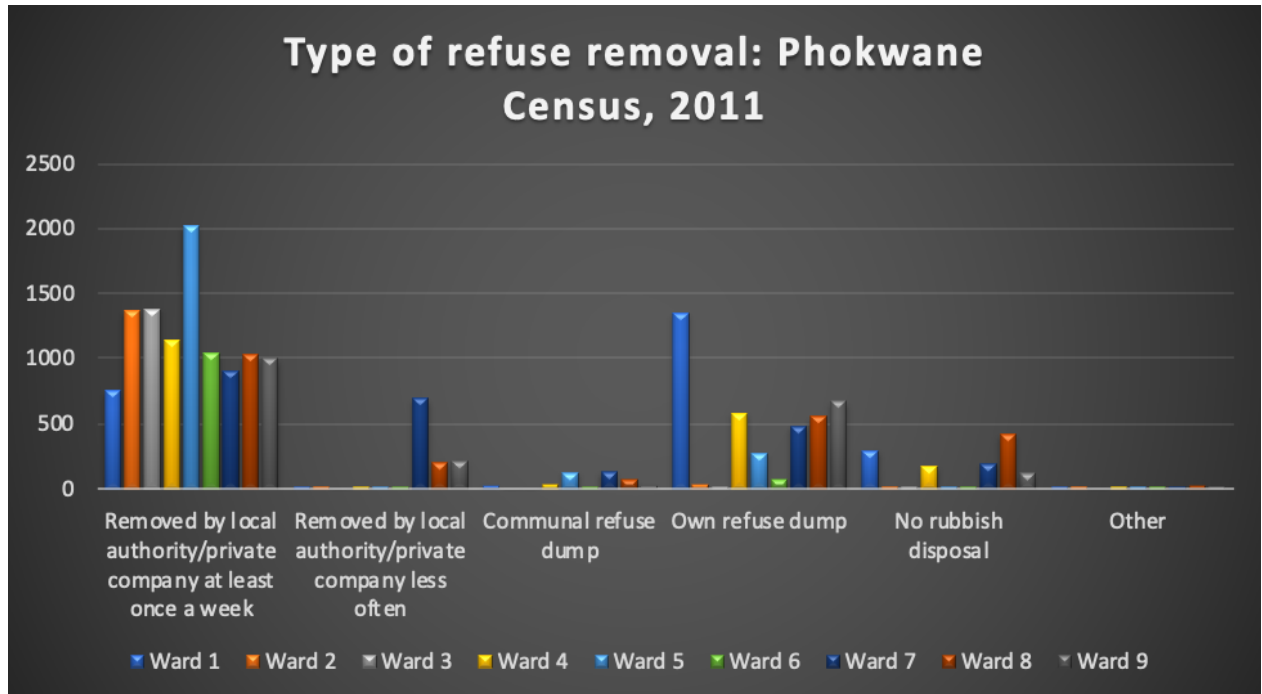
Figure 31: Refuse removal at four local municipalities in the FBDM area of jurisdiction, Census 2016



In all four local municipalities, there is a significant amount of households that do not have any refuse removal facilities. This pattern confirms itself when analyse refuse removal at ward level at three local municipalities.



Figure 32: Refuse removal in Phokwane area of jurisdiction, Census 2011





12. VULNERABILITY ASSESSMENT FOR FBDM

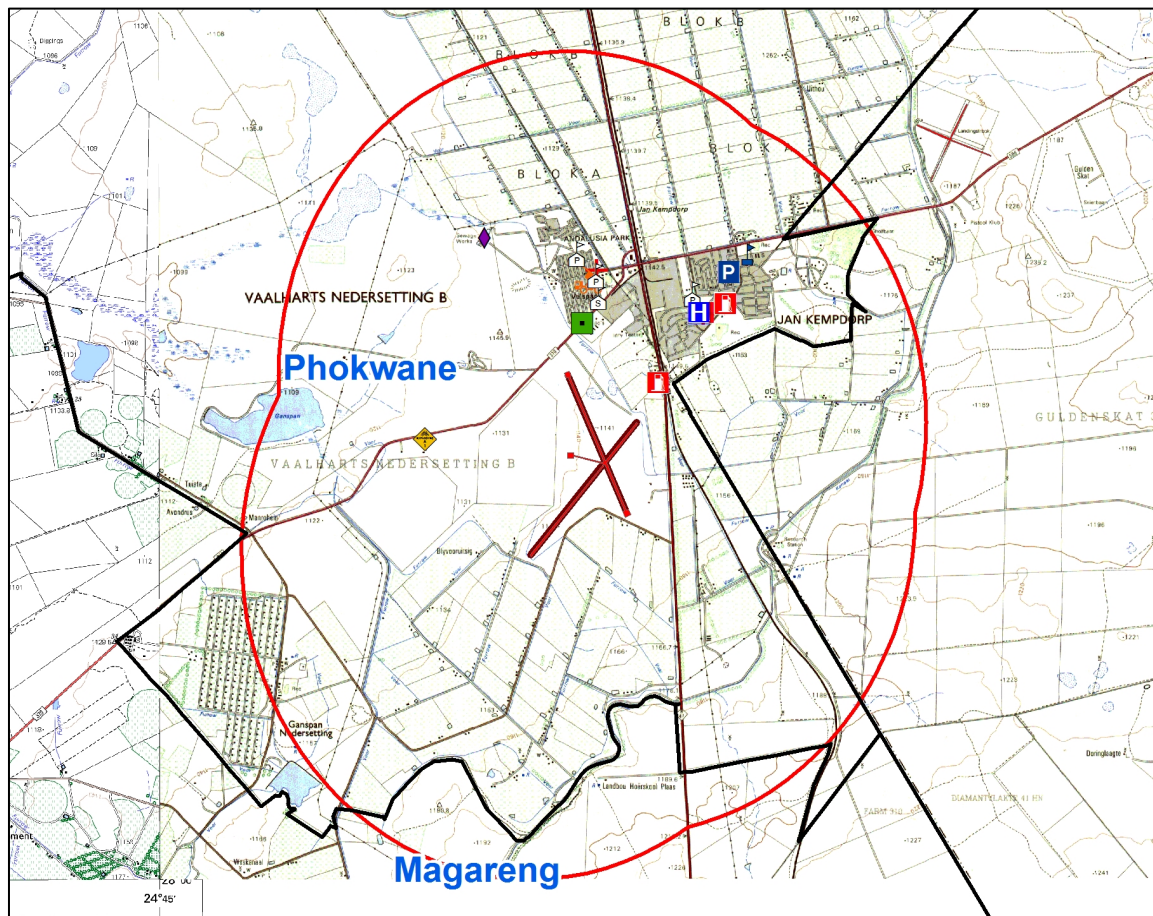
After the hazard identification and the socio-economic analysing, a vulnerability assessment was executed. The following section indicates these results and will be discussed more thoroughly in the risk reduction and disaster management plans.

12.1 Phokwane Local Municipality

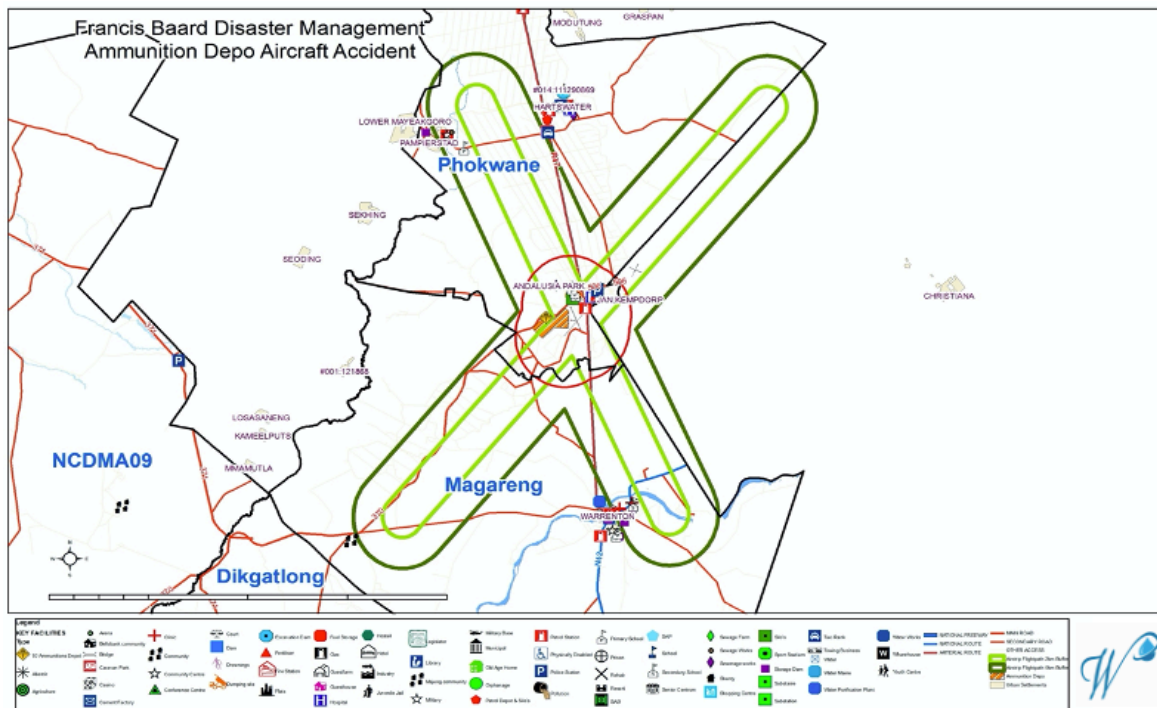
12.1.1 Ammunition Depot



Map 1: The 2 000 m risk zone at the Ammunition Depo in the Phokwane area of jurisdiction



Map 2: The 2 000 m risk zone at the Ammunition Depot in the Phokwane area of jurisdiction



Map 3: The 5 km dangerous zone for a possible military aircraft accident at 93 Ammunition Depot at Jan Kempdorp in the Phokwane area of jurisdiction



**Francis Baard Disaster Management
Phokwane Air Pollution Hazard Profile**

The map displays the Phokwane area with concentric hazard zones centered on Hartzimotor and Mankengooft. The legend indicates road types and air pollution levels. The map also shows surrounding areas like NCDMA09 and Magareng, and includes a scale bar and a north arrow.

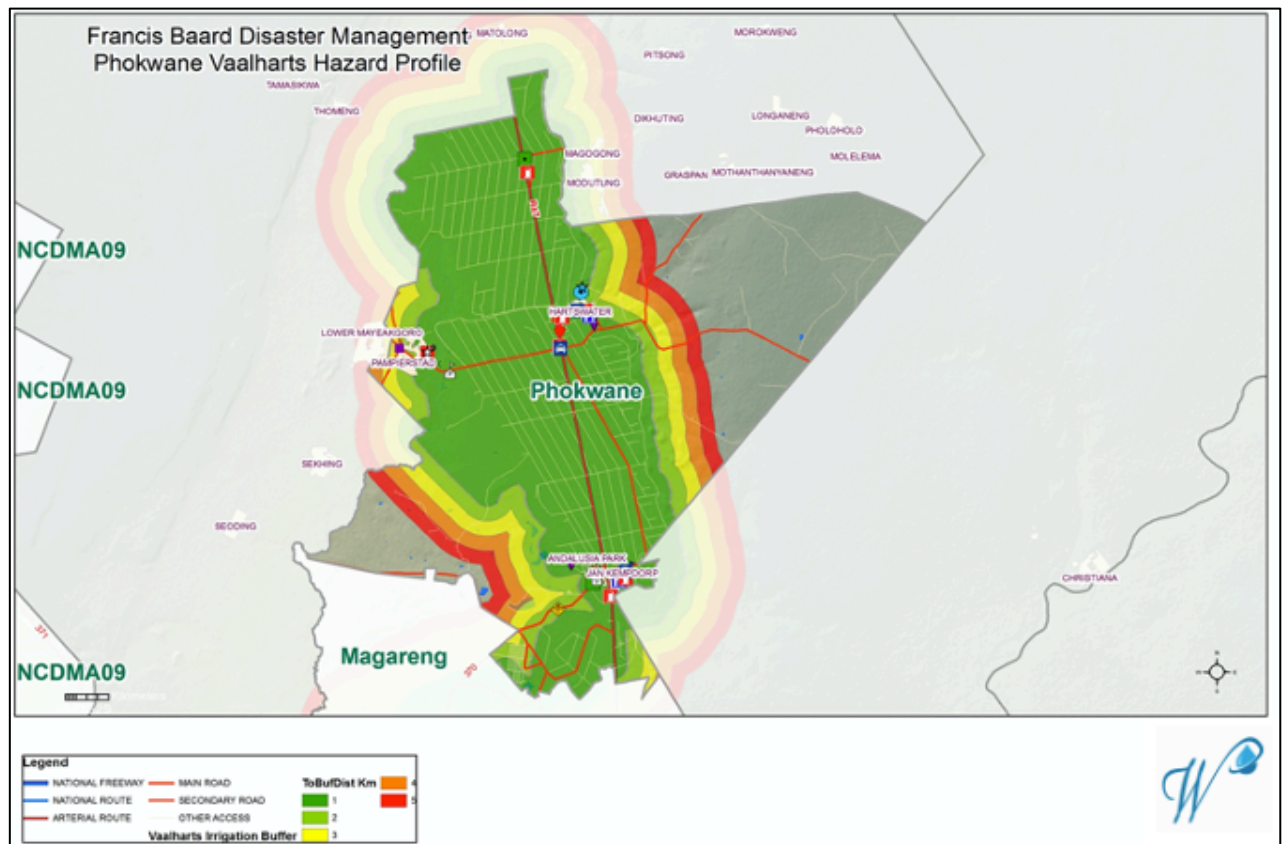
Legend

Road Types		To But Dist (Km)	
NATIONAL FREEWAY	MAIN ROAD	1	4
NATIONAL ROUTE	SECONDARY ROAD	2	6
ARTERIAL ROUTE	OTHER ACCESS	3	

Air Pollution

1
2
3

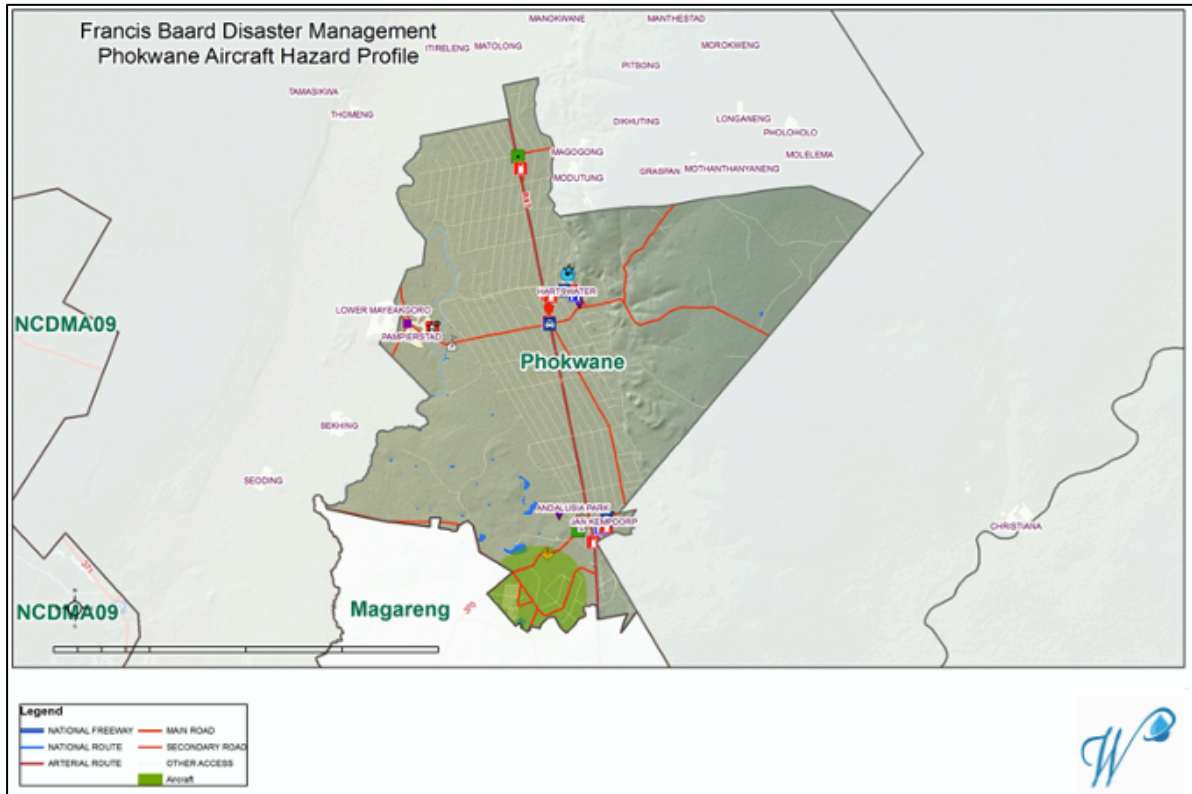
Map 4: Air pollution hazard profile for the Phokwane area of jurisdiction



Map 5: The 5 km air pollution hazard risk zone at Vaalharts Irrigation Scheme in the Phokwane area of jurisdiction



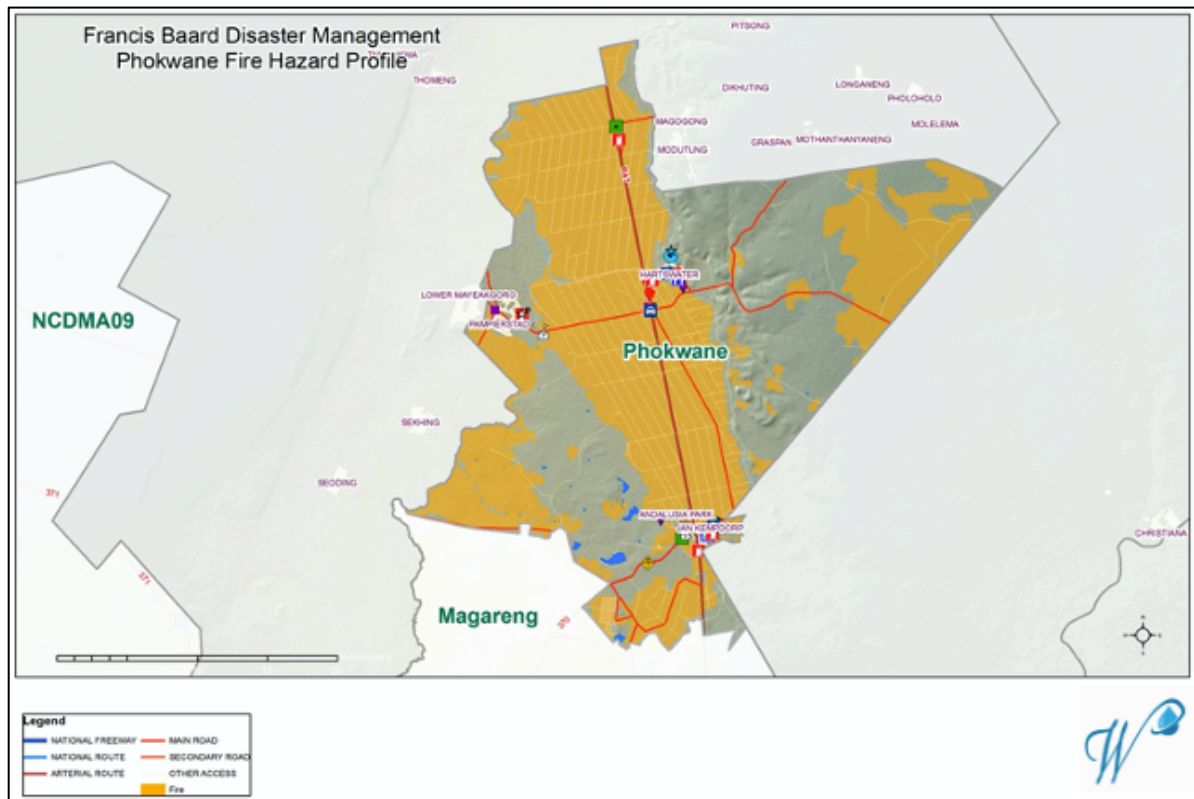
12.1.3 Aircraft Accidents



Map 6: Aircraft Accident hazard profile for Phokwane area of jurisdiction



12.1.4 Fires



Map 7: Fire hazard profile map for the Phokwane area of jurisdiction

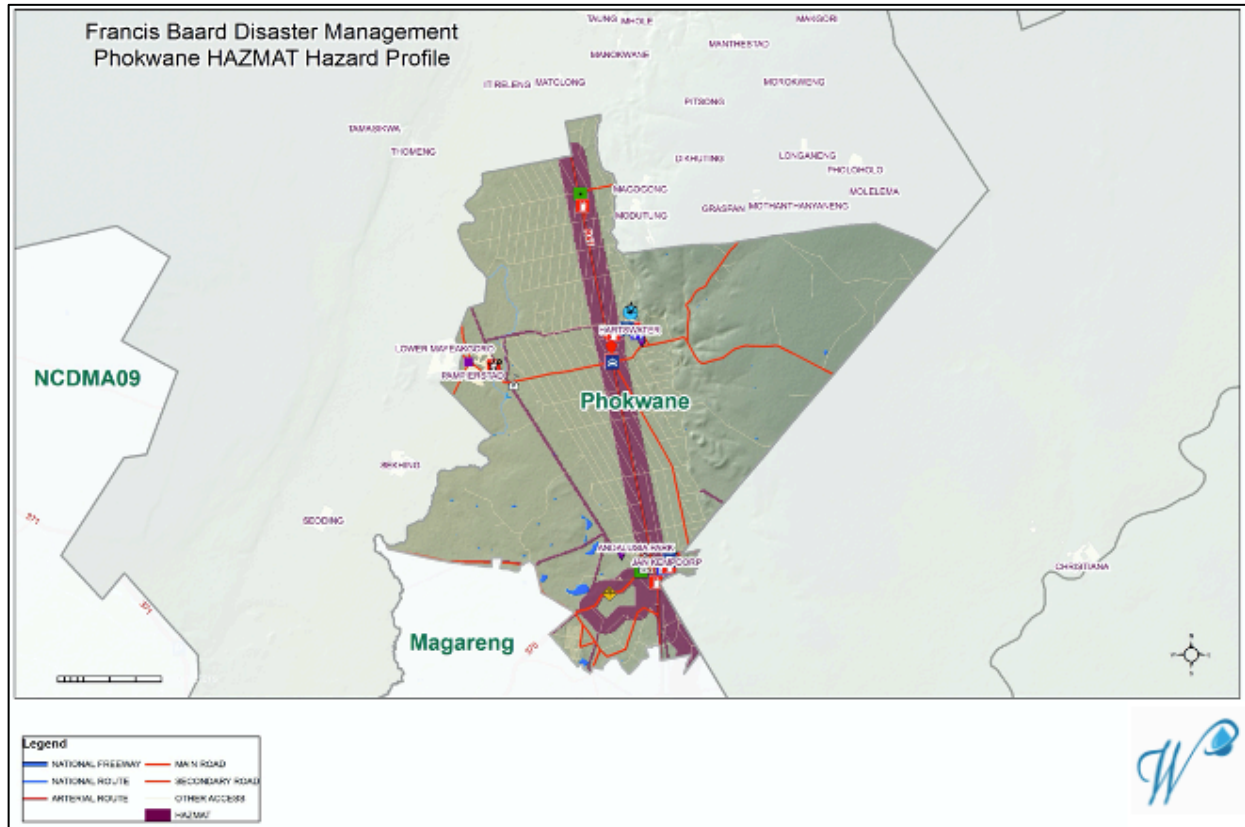


The map displays the Phokwane Flood Hazard Profile. It shows the town of Phokwane and surrounding areas, including NCDMA09 to the west and Magareng to the south. The map features a network of roads, including National Highways (red lines), National Routes (blue lines), and Secondary Roads (orange lines). Flood hazard areas are indicated by green shading. Key locations marked include Phokwane, Lower Mphahlele, and various surrounding villages like Mphahlele, Mphahlele, and Mphahlele. A legend in the bottom left corner defines the symbols used for roads and flood areas. A scale bar and a north arrow are also present in the bottom left corner.

Map 8: Flood hazard profile map for the Phokwane area of jurisdiction



12.1.6 Hazmat Hazard Profile



Map 9: Hazmat hazard profile for the Phokwane area of jurisdiction



**Francis Baard Disaster Management
Phokwane Water Pollution Hazard Profile**

The map displays the Phokwane area, showing land cover, roads, and water bodies. Key locations include NCDMA09, Magareng, and Phokwane. The map includes a legend for Sources, Roads, and Land cover.

Legend

Sources	ROADS	Land cover
TYPE	NATIONAL FREEWAY	Commercial
Keywell depot	NATIONAL ROUTE	Residential
Courtesy site	INTERVAL ROUTE	Cultivated
Public's service	MAIN ROAD	Others
Sanitation works	SECONDARY ROAD	
Water treatment plant	OTHER ACCESS	

Map 10:: Water Pollution in the Phokwane area of jurisdiction



13. DISASTER RISK ASSESSMENT FOR FBDM

After the vulnerability assessment, it was possible to execute the disaster risk assessment. Additional information was added to the vulnerability assessment in order to priorities the disaster risks for FBDM. The following additional information was added;

- History
- Vulnerability of people
- Vulnerability of property
- Maximum threat
- Probability of occurrence

The methodology used for the disaster risk assessment adds different threshold values when the above-mentioned parameters are low, medium or high. These threshold values are multiplied with a weighting factor to receive a total score for each individual and identified hazard. Values above 100 indicates the municipal attention to the identified risk.

Table 4 indicates the results of the disaster risk assessment of 2006 in comparison with the disaster risk assessment of 2020.

**Table 4: Prioritizing of identified risks for the FBDM, 2020**

	Natural & Human Induced Risks	Total
1	Municipal Services	290
2	Poverty	265
3	Drought	230
4	Storm water	215
5	Epidemics / Disease	210
6	Fire	205
7	Pollution - Water	185
8	Floods	170
9	Hazardous Materials	152
10	Big Hole	140
11	Aircraft Accidents	132
12	Erosion	125
13	Environmental Degradation	125
14	Extreme Weather	120
15	Road Accidents	110
16	Pollution - Air	65
17	Lightning	65
18	Dam Failure	29

It is clear from these two tables that disaster risk, including the socio-economic risk in the FBDM have significantly increased. These results is more visible in Figure 36 and it is clear that the highest risk in the FBDM is the decline in basic municipal services, followed by poverty, drought and then storm water. The backlog in maintaining and upgrading of storm water in the FBDM area of jurisdiction requires the municipal's attention to reduce the vulnerability of communities. A common (*according to results from the workshops with FBDM*) misuse and mistreatment is vandalism – members of the community who deliberately clogged storm water systems. Not only will this need appropriate public education programs, but also very stringent punishment measure for offenders.

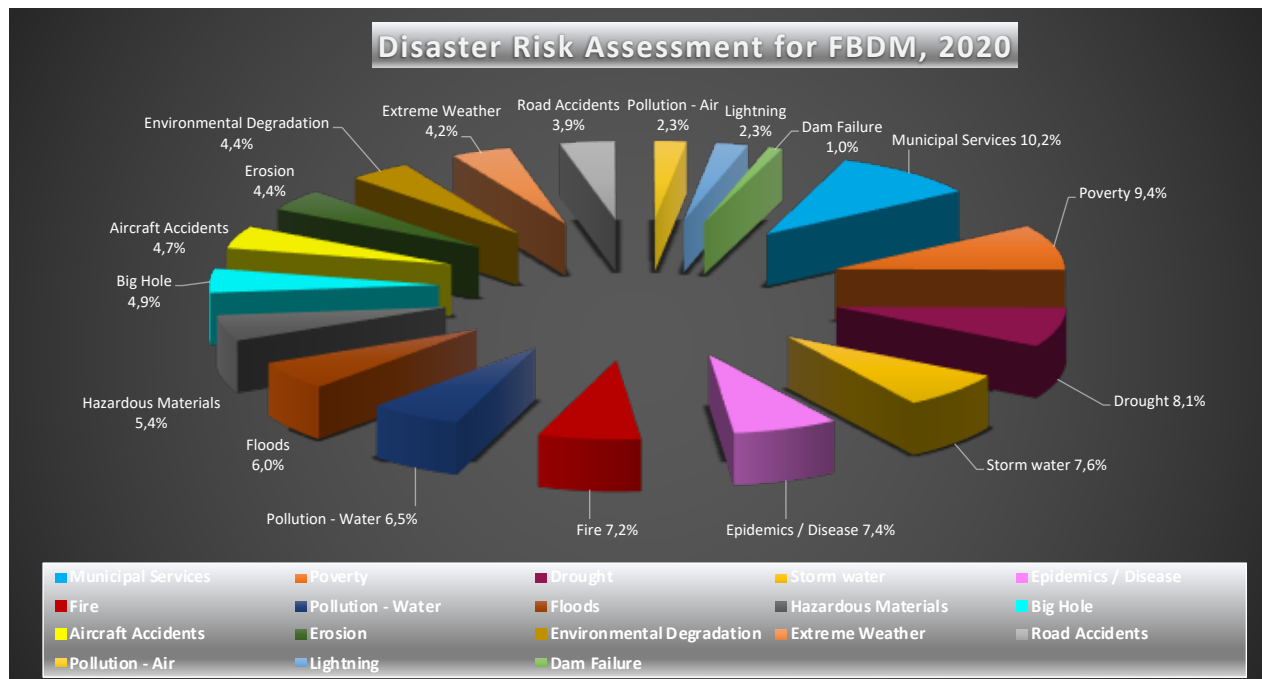


Figure 33: Disaster Risk Assessment for FBDM, 2020

This pattern is also present at the SPLM. A ***substantial increase*** in potential risks over the past ten years (2008 – 2018) in the SPLM area of jurisdiction. **Error! Reference source not found.** summarizes the 2008 results and summarizes the 2018 results in the SPLM area of jurisdiction.

13.1 Municipal Services

Water scarcity and the quality of water contribute to the enormous pressure on water resources in South Africa. Not only does FBDM facing serious water capacity problems, but also facing severe water extraction problems from the Vaal River. The poor water quality of the Vaal River and old filtering systems of local municipalities requires huge amounts of additional chemicals to purify water for human consumption. That leads to more regular backwashing of the pumps and filters every seven to eight hours, which causes and additional 10% water loss. The total water loss from extraction to water consumption at the end user is 50%. Adding the insignificant water pipeline and reservoir problems to supply water, the FBDM facing a very high water disaster risk in its area of



jurisdiction. Water is the number one resource for humans and animals to live and to survive and when officials taking the responsibility to manage and to control this very important and scarce resource, communities have the right to demand this basic service from municipalities.

The **electricity** infrastructure is, just as the water infrastructure, insignificant for basic service delivery. Acknowledging that electricity supply is the single most important income generation for a municipality, the failing of such a service will most definitely brings business continuation for local municipalities in the FBDM area of jurisdiction. It is not the intention of the DM plan to fully discuss and explain line departmental issue, but rather to highlight the risk FBDM is facing.

It is a real pity to notice that the **sewage** plants and stations are poorly maintained and manage to a level that raw sewage is now released into the open field. The lack of maintenance to storm water systems, sewage blocks caused by communities and illegal dumping of material into the municipal systems (*only to mention a few*) are all contributing to the sewage backlog system (*currently at 4 600*). Inappropriate and poor management of sewage systems only further increases potential threats and risks for communities, not only to health-related issues and outbreak of epidemics, but also has a negative impact on the environment (*environmental degradation*).

When adding these three elements together, it confirms that basic services to communities are the biggest threat in the FBDM area of jurisdiction and has become now even a bigger threat than the poverty risk (in comparison with the 2010 results). These risks may also contribute to a serious reduction in potential municipal revenue, a potential service delivery protests by communities, possible litigation against the municipality and also serious restrictions on further development in the FBDM area of jurisdiction (*which has a direct impact on land economic development objectives*). Last mentioned will have a direct negative impact on the already existing poverty status of communities in the FBMD and in Magareng area of jurisdiction.



13.2 Poverty

Poverty alleviating is currently the highest priority in the international arena;

“Hunger and poverty are ugly siblings. You cannot get rid of either unless you tackle the other as well... Hunger, after all, is both a source and a consequence of extreme poverty. A hungry man cannot think beyond his next meal... This has devastating consequences for the economic and social development of society as a whole,” Mr. Annan told government representatives and other officials at UN Headquarters.

“The world has the resources and the know-how to make hunger history. What we need is political will and resolve. Let us renew our pledge to work together towards the day when no man, woman or child goes to sleep hungry. Let us resolve to win the fight against hunger once and for all. And I think that, with determination, resolve and will, it can be done.”

From 2005 to 2015, poverty increased with 35% in the FBMD area of jurisdiction. Unfortunately, proposals to alleviate poverty from a world perspective will not and cannot succeed. As Napoleon Hill said it: ***“The trouble with this world is the lack of understanding of the power of the mind. If we do understand it, we would wipe out POVERTY within one generation”*** (The Law of Success in Sixteen Lesson, Napoleon Hill).



13.3 Natural Disaster Risks

13.3.1 Drought

Drought is a slow-onset disaster, henceforth it gives time to prepare and to adopt and does not suddenly strikes as most natural phenomenon do. Not only contributes drought to the supply of our water resources, but also has a direct impact on the environment, the agricultural sector and therefore to food production. It is a legal requirement of the Disaster Management Act (Act 57, 2002) that municipalities to establish a Disaster Management Advisory Forum (DMAF) and to bring together all the custodians to identify potential risks and to draft and implement appropriated risk reduction projects and programs. Therefore, this DM plan calls for the urgent action of FBMD not only to establish such a Forum, but to start functioning according to SA Law and Legislations. The Department of Agriculture and the Department of Water Affairs are main custodians and must implement appropriate drought risk reduction strategies. It is unfortunate, that officials are not acting proactively, finding communities very vulnerable (e.g. Western Cape drought and water shortage problems).

13.3.2 Storm water

The risk and threat caused by **storm water** significantly increased and received a higher priority threshold value as fire in the FBMD area of jurisdiction. The reason for this, is when the huge backlog of the sewage systems of 4 600, due to various reasons already known by FBMD are evaluated in terms of the history, vulnerability of people and property, maximum threat and the probability of occurrence, received a higher threshold value as fire. Therefore, the DM plan calls for appropriate risk reduction strategies to storm water systems as a higher priority as fires.



13.3.3 Fire

Saying this, that does not mean there is not fire risk in the FBMD area of jurisdiction. Appropriate **fire** risk reduction programs are still deemed necessary, but in terms of priority and budget allocation, it seems if the storm water systems requires a higher priority.

13.3.4 Water pollution

Water pollution and the quality of our water resource might be influenced by various activities. The low water levels of our rivers and dams is most definitely a contributing factor, but is further depleting because of the poor management of this resource as already explained and discussed. Inappropriate sewage management systems (*not only at informal development sites anymore, but also at formal developments*) are a main contributing factor to water pollution, also to the underground water resource. The water pollution and water quality threat and risk is of that nature that it requires provincial and national attention. The motivation for this can be motivated as water pollution and quality problems already culminated upstream before the extraction point in the FBMD area of jurisdiction. Therefore, the DMAF's responsibility to bring together all the relevant custodians to implement water pollution risk reduction programs.

13.3.5 Floods

Floods remain a threat in the FBMD area of jurisdiction and will remain a problem as so far as any development takes place in floodplains. More than 800 properties are at flood risk. Moving people and all properties from these high flood risk areas will solve the problem, but unfortunately this will not happen because of various socio-economic reasons why people are developing in or nearby floodplains (*the discussion of these reasons are outside the scope of this report*) and because of this, people will remain in these high flood risk areas. Therefore, additional and appropriate flood risk reduction programs are required. It is advisable and recommended that FBMD not only determine flood lines at high risk areas, but also to simulate different amounts of water releases to



determine the water levels and time of occurrence at communities at risk. With this information, appropriate flood early warning system and messages can be development.

13.4 Natural Disaster Risks

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determine the water levels and time of occurrence at communities at risk. With this information, appropriate flood early warning system and messages can be development.

13.4.6 Epidemics & Diseases

Epidemics and **diseases** also received a higher threshold value than the 2008 results. Again, all these human-induced risks increase because of the lack of basic management principles. The outbreak of listerioses currently in South Africa and also the recent outbreak of bird flu that killed more than four million layers causing an egg shortage overnight are both good examples of a sudden disease and / or epidemic outbreak. The epidemic and disease risk is actually higher than what the threshold value indicates, as the outbreak of any disease or epidemic relies on various other incidents, e.g. inappropriate handling of sewage and or food manufacturing and distributing. If these departments are not able to respond to such an incident, the risk will be higher than originally anticipated.

13.4.7 Seismic Risk

The whole area of Magareng Local Municipality is vulnerable to historically mining activities and might cause severe damage to infrastructure. Addition to this, it seems that the service water level in Magareng also contribute negatively to potential damage to buildings. This calls for a in-depth geo-space analysis to be addressed in the IDP of Magareng Local Municipality

13.4.8 Erosion

There are three main principles to control **erosion**:

- use land according to its capability
- protect the soil surface with some form of cover
- control runoff before it develops into an erosive force.



Land capability

Soil erosion can be avoided by using land within its capability. The land's position, soil type and slope determine how vulnerable it will be to erosion. It may not be suitable for agriculture, or suitable only for an activity which limits erosion.

Surface cover and runoff

Surface cover is a major factor to control erosion because it reduces the impact of raindrops falling on bare soils and wind removing soil particles. It also reduces the speed of water flowing over the land.

Erosion risk is significantly reduced when there is more than 30% soil cover. Total cover is achievable for many grazing and cropping systems. Runoff concentrates as it flows downslope. By the time rivers draining large catchments reach the coast, they are usually just a few hundred meters wide. Even though surface cover encourages runoff to spread, runoff concentration is inevitable. Coordination across the catchment is important when implementing runoff control measures. Runoff may pass through several properties and cross several roads (*sometimes railway lines*) as it passes from the most remote part of a catchment to a major drainage line or creek.

Erosion control in cropping lands

- *Tillage*

Conservation cropping practices that maintain cover on soils include minimum and zero tillage practices. Tillage implements can destroy the soil surface which might increase erosion problems, while modern technology that kill weeds without burying stubble and herbicides can minimise the frequency of tillage.

- *Contour banks and strip cropping*

Runoff concentration is managed by structural measures such as contour banks in upland areas, or strip cropping on floodplains. These systems involve a total change in the way a farm is managed.



Runoff systems must be carefully planned. Flow between properties and across roads and railway lines must be coordinated and suit those affected by the changes.

When runoff water can impact neighbouring properties or infrastructure, land owners are encouraged to discuss with their neighbours and seek professional advice.

Approximately 80% of soil lost as a result of poor cover can be trapped in the paddock by contour banks. The banks channel the runoff at low speed into grassed waterways. Good surface cover between contour banks and in waterways will ensure their stability and dramatically reduce the amount of soil deposited in waterways.

On flood plains, strip cropping is used to spread flood flows rather than allowing it to concentrate.

Green cane harvesting

Another measure that maintains soil cover is green cane harvesting or 'trash blanketing'. When a cane crop is harvested, the leaves and tops of the cane are left on the ground as a 'trash blanket'. This protects the soil from erosion by raindrop impact. This practice has been widely adopted in many Queensland cane growing districts.

13.4.9 Epidemics & Diseases

Epidemics and **diseases** also received a higher threshold value than the 2010 results. Again, all these human-induced risks increase because of the lack of basic management principles. The outbreak of listerioses currently in South Africa and also the recent outbreak of bird flu that killed more than four million layers causing an egg shortage overnight are both good examples of a sudden disease and / or epidemic outbreak. The epidemic and disease risk is actually higher than what the threshold value indicates, as the outbreak of any disease or epidemic relies on various other incidents, e.g. inappropriate handling of sewage and or food manufacturing and distributing. If these

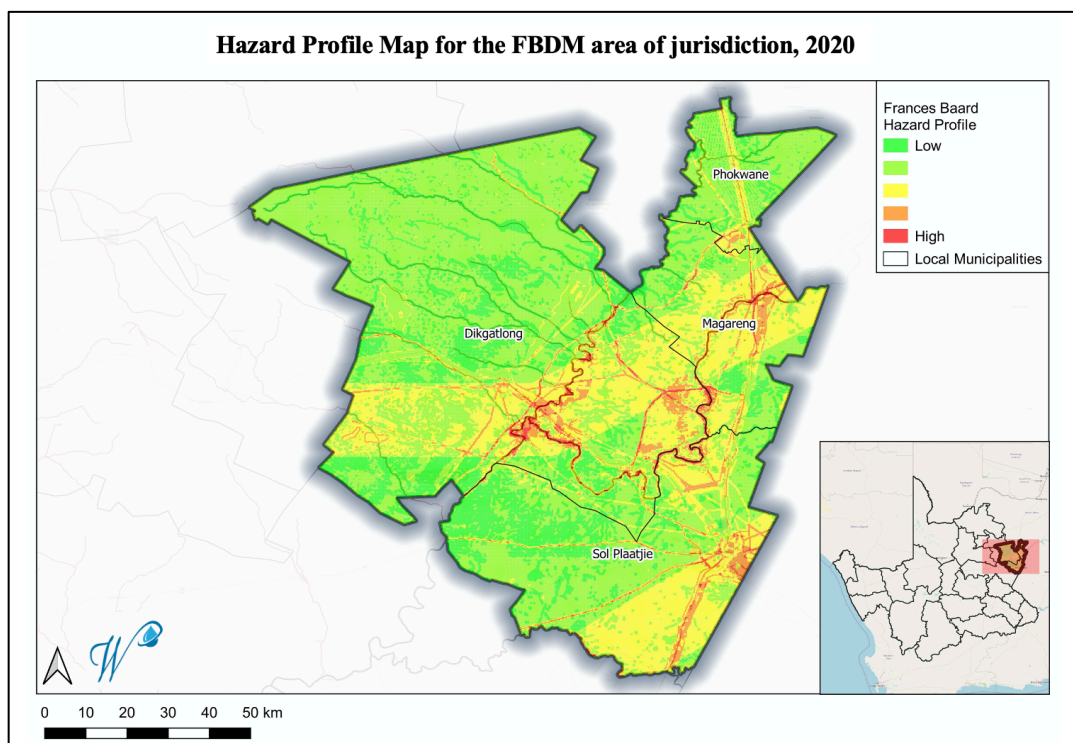


departments are not able to respond to such an incident, the risk will be higher than originally anticipated.

14. DISASTER RISK PROFILE MAPS FOR FBDM

These results from the disaster risk assessment were used to compile various disaster risk profile maps using GIS analysis and techniques, which were developed over time for this purpose. Hazard layers were overlaid on top of each other to create the hazard profile map for FBDM (Map 11). Green areas indicate less hazards in comparison with red areas which indicate that more hazards are present in that red area.

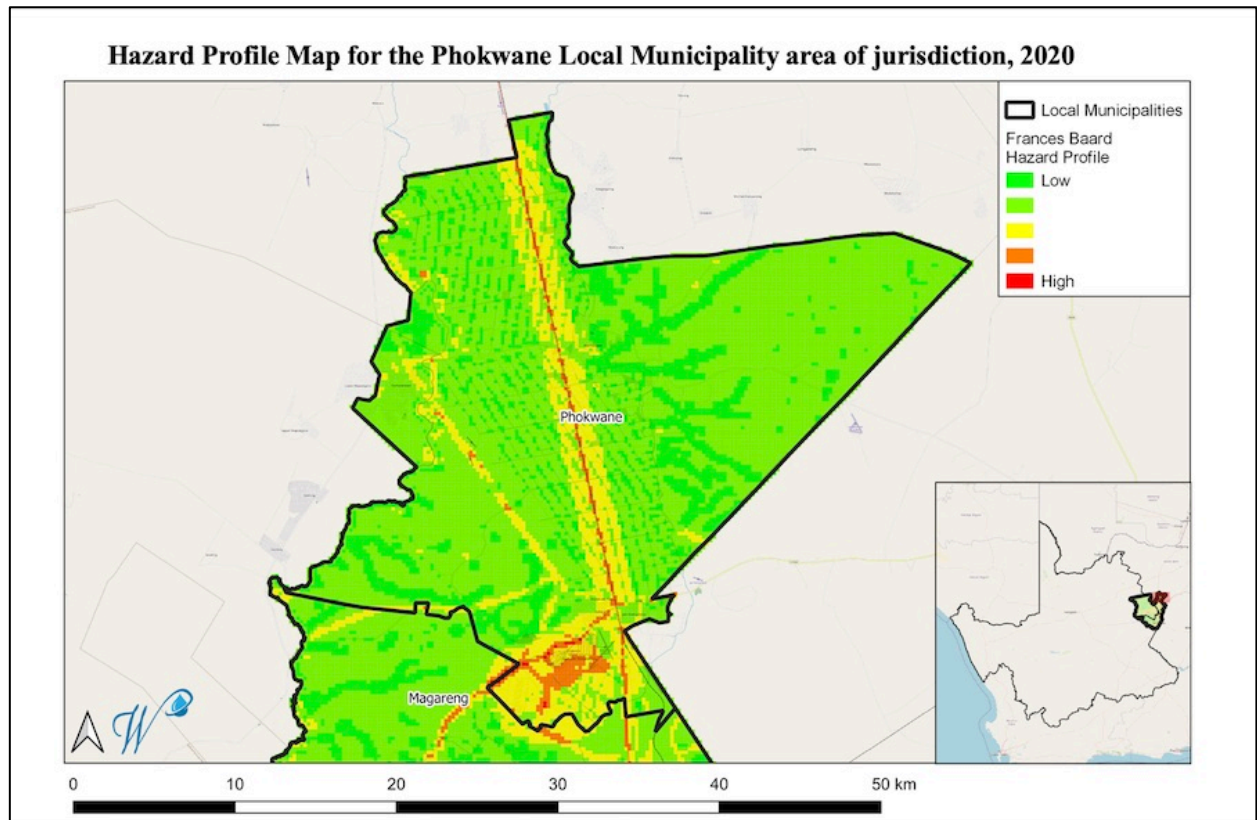
14.1 Disaster Hazard Profile Maps for FBDM



Map 11 Hazard Profile Map for the FBDM area of jurisdiction, 2020



From the base map (Map 11) it was possible to compile the hazard profile map for each local municipality in the FBDM area of jurisdiction.



Map 12: Hazard Profile Map for the Phokwane local area of jurisdiction, 2020

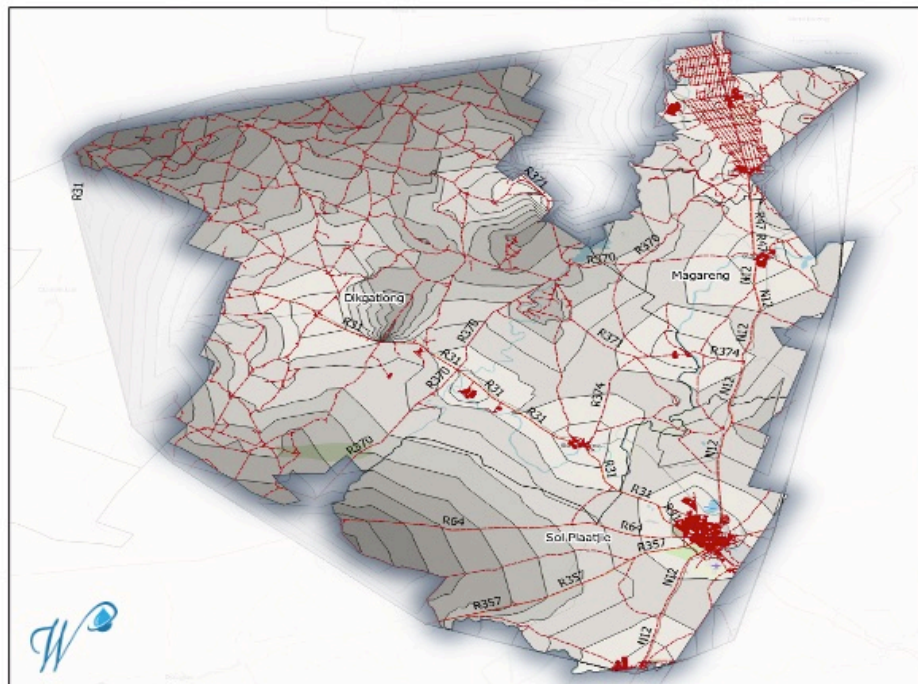
14.2 Disaster Vulnerability Profile Maps for FBDM

Vulnerability of the four local municipality can be determine by using three parameters, *amongst others*, to determine the institutional capacity of local municipalities, namely the distance from;

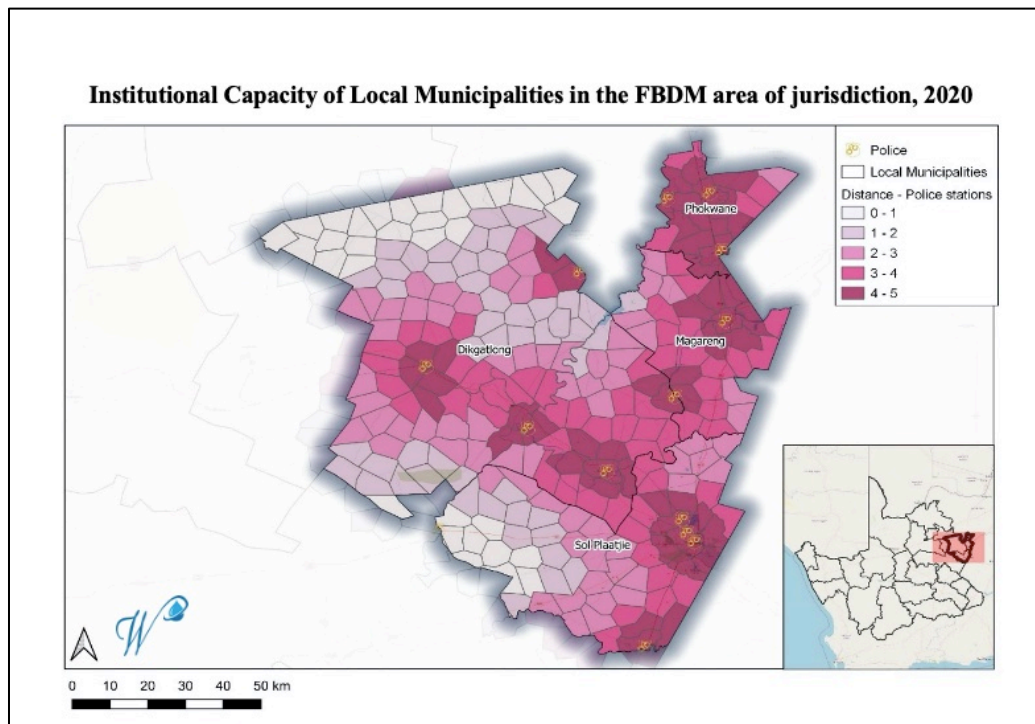
- Police Stations
- Fire Stations
- Hospitals



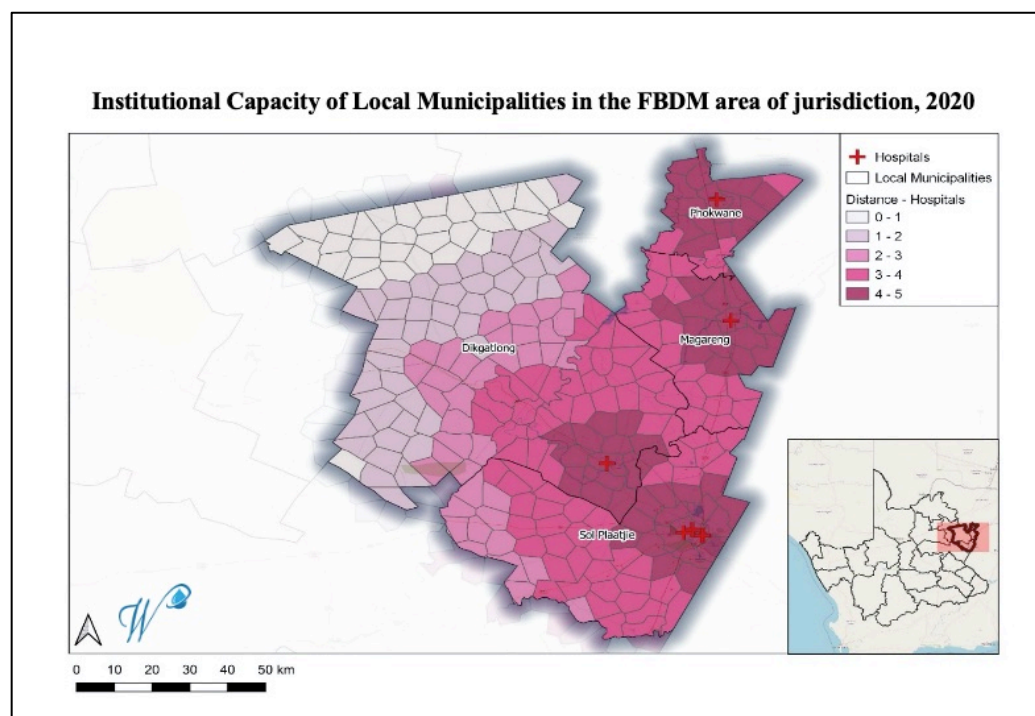
Iso areas of Police Stations in the FBDM area of jurisdiction, 2020



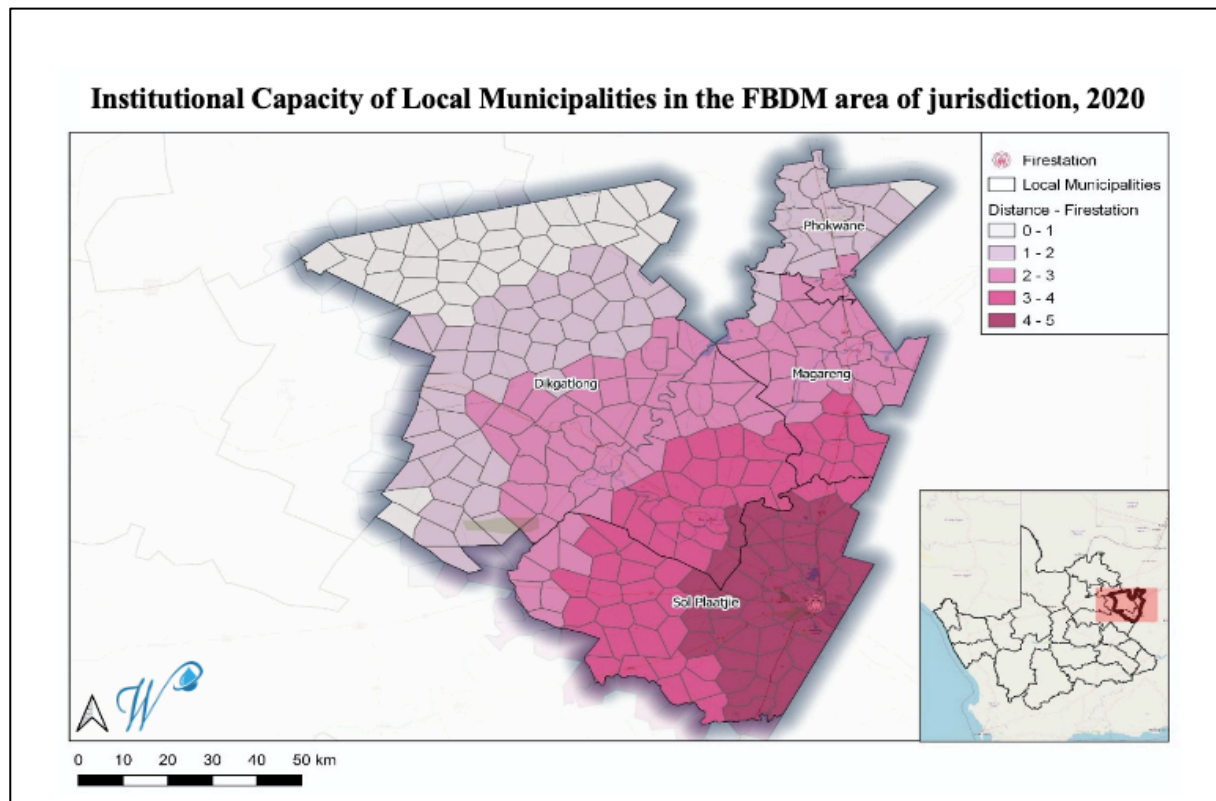
Map 13: Iso-areas of police stations in the FBDM area of jurisdiction, 2020



Map 14: Distance from police stations in meso zones in the FBDM area of jurisdiction, 2020



Map 15: Distance from hospitals in meso zones in the FBDM area of jurisdiction, 2020

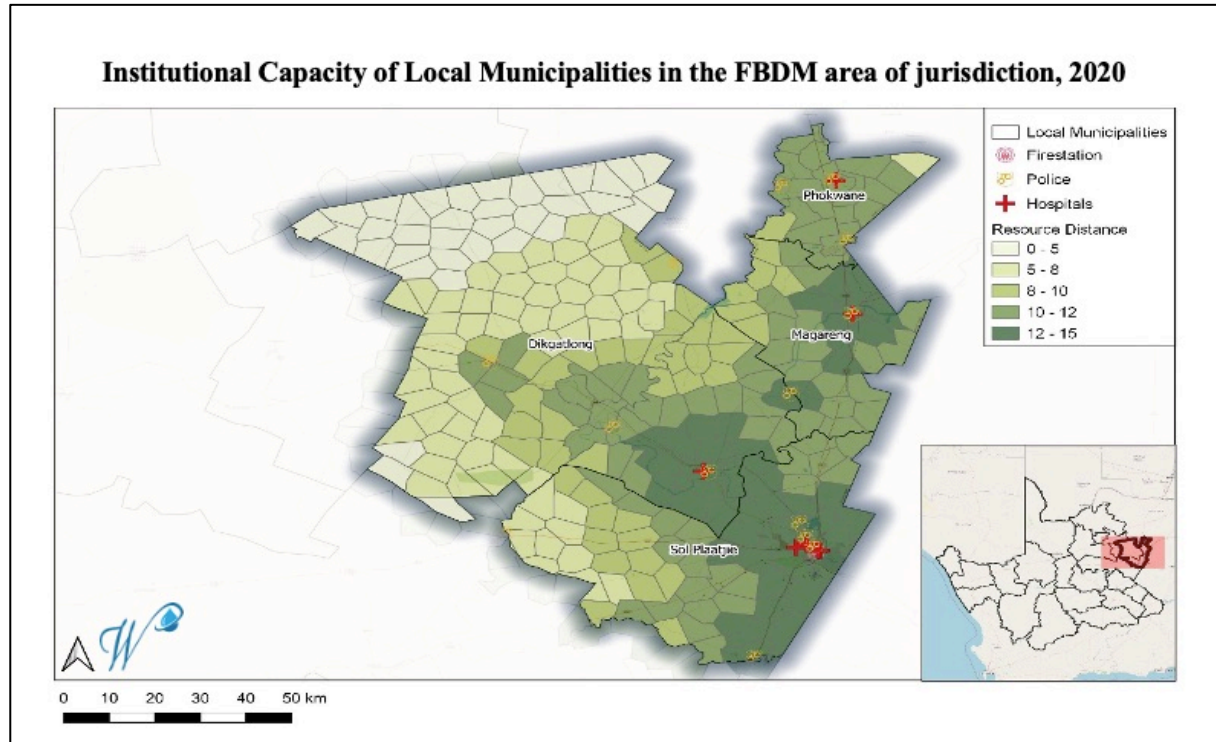


Map 16: Distance from fire stations in meso zones in the FBDM area of jurisdiction, 2020

The distance groups of the amenities were combined to compile the institutional capacity map for FBDM area of jurisdiction (Map 16). The darker the green colour, the higher is the institutional capacity to cope with disaster and henceforth are less vulnerable.

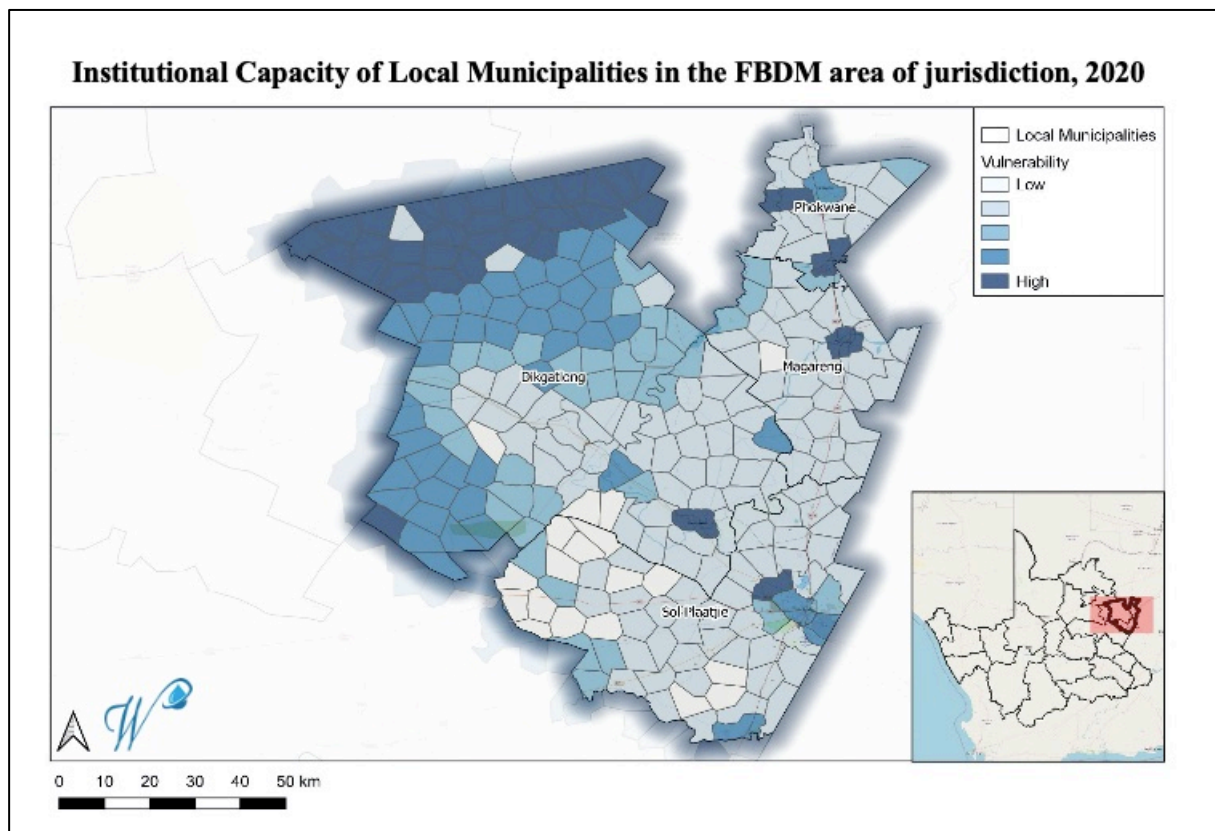


14.3 Institutional Capacity Profile Maps for FBDM



Map 17: Combined amenities (Resource) Distance Index for FBDM area of jurisdiction, 2020

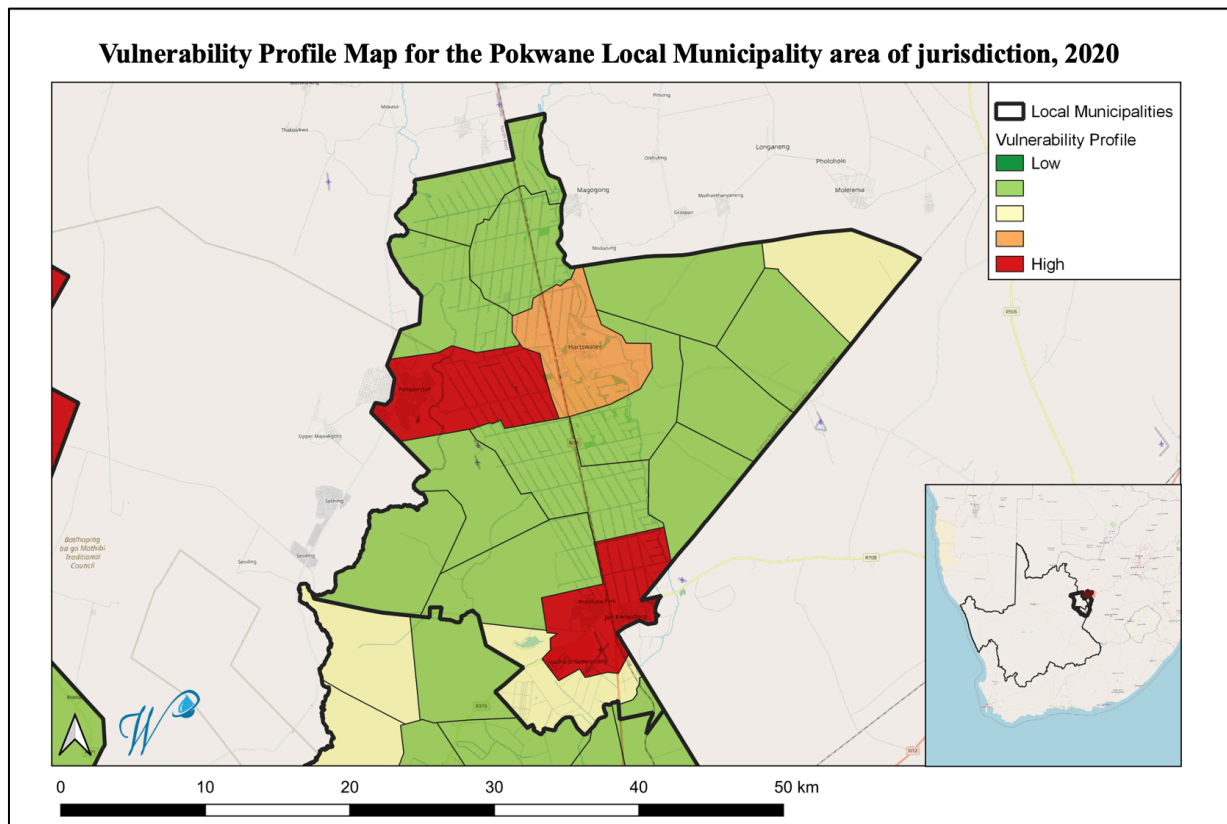
After this, the resource distance index was added to the overall vulnerable profile of Frances Baard District Municipality to incorporate the distance from amenities. The assumption is that the further communities are away from resources (*from an amenity*) the higher is the vulnerability and less will they be able to cope with disasters. The darker the blue colour the higher is the vulnerability of that area.



Map 18: Vulnerability Profile of Frances Baard District Municipality with distance from amenities (police stations, hospitals and fire station), 2020

With this base map it was possible to compile various vulnerability maps for each local municipality in the FBDM area of jurisdiction (**Error! Reference source not found.**, Map 19, **Error! Reference source not found.**, **Error! Reference source not found.**).

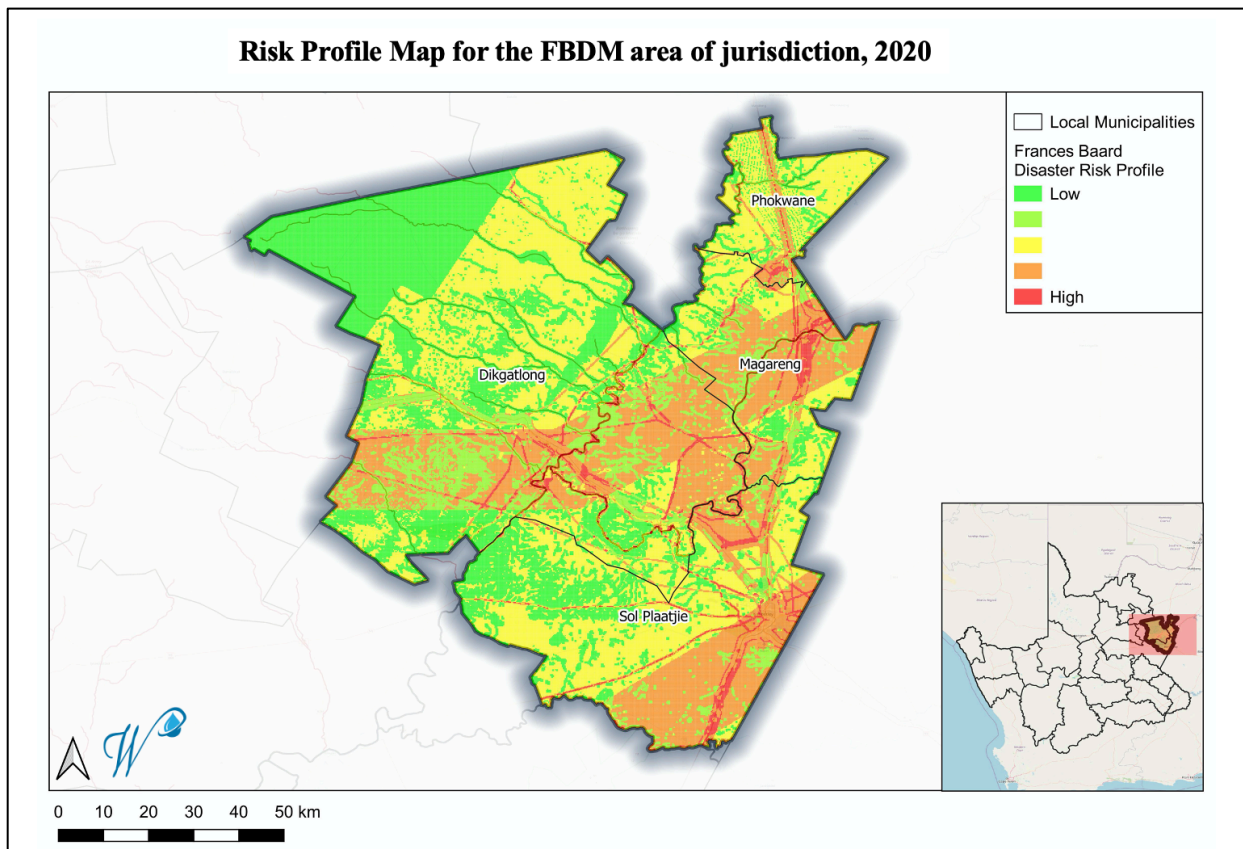
14.4 Institutional Capacity and Vulnerability Profile Maps of Local Municipality in the FBDM area of jurisdiction



Map 19: Institutional Capacity & Vulnerability Profile map of Phokwane Local Municipality in the FBDM area of jurisdiction, 2020

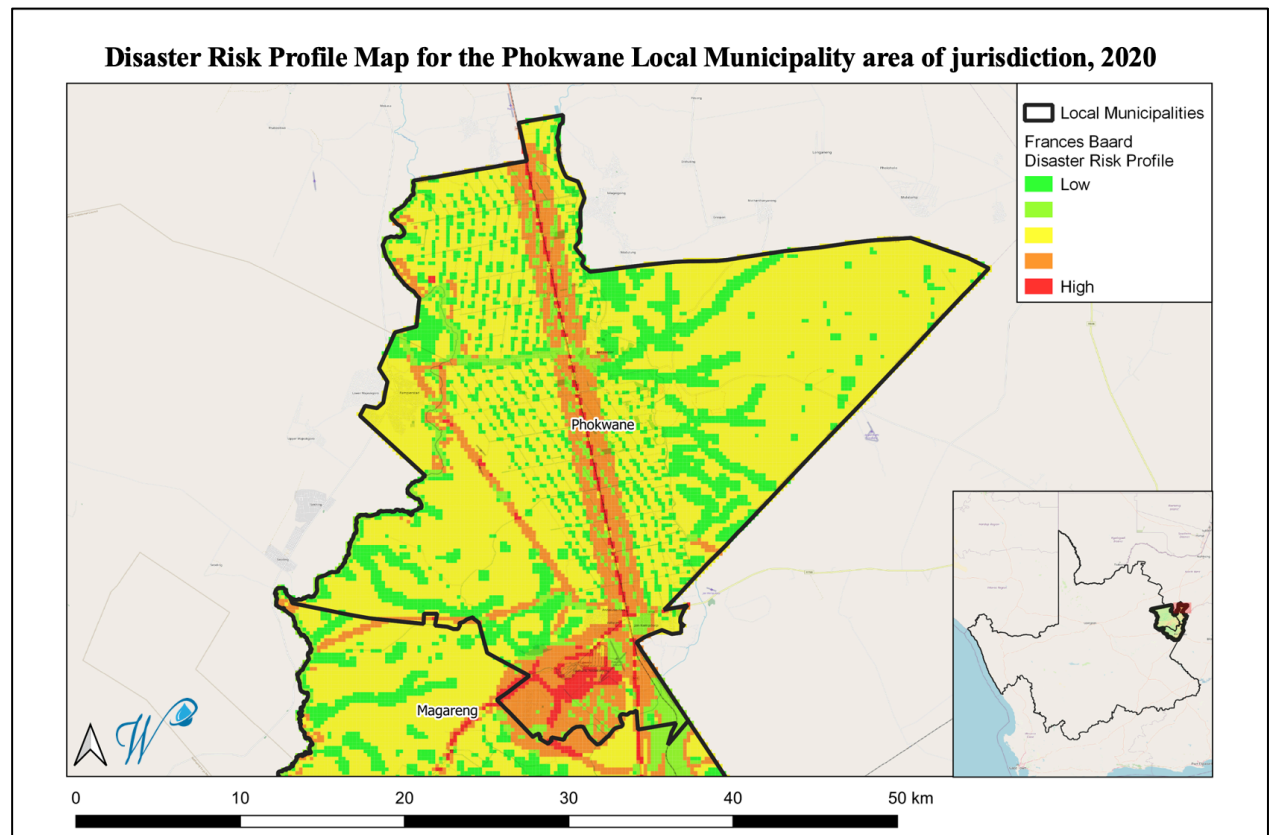
14.5 Disaster Risk Profile Maps for FBDM

When the risk profile threshold values were added to the vulnerability profile maps, it was possible to compile the Disaster Risk Profile map for each local municipality. The risk profile of each area is indicated by three different colours, namely green, yellow and red. Green represents the lower risk areas while the red colour represent the high risk profile areas.



Map 20: Risk Profile Map for the FBDM area of jurisdiction, 2020

With the base map (Map 20) it was possible to compile disaster risk profile maps for the four local municipalities in the FBDM area of jurisdiction.



Map 21: Risk Profile Map for the Phokwane Local Municipality in the FBDM area of jurisdiction, 2020



15. DISASTER RISK REDUCTION FOR FBDM

With the aforementioned information available, it become possible to identify and to propose appropriate disaster risk reduction guidelines for the FBDM. These guidelines might also assist the other sector plans, the SDF and the IDP of the municipality, *inter alia*, in the identification of appropriate disaster risk reduction projects and plans and also to formulate sustainable development objectives for the municipality.

It cannot be over emphasised that risk reduction is predominately the role and responsibility of line departments (*at all spheres of government*). Therefore, DM only fulfil a co-ordination role, by;

- identify potential threats and risks, and

 - to ensure that each line department is aware of the potential threat and risk and
 - to co-ordinate that appropriate risk reduction projects and programs are registered and captured in the IDP and the SDF of the municipality.

This is the main reason why roles and responsibilities of all custodians are identified and agreed upon to ensure that identified threats and risks are dealt with the implementation of appropriate disaster risk reduction project (*see Appendix C for Roles & Responsibilities*).

It is crucial, and therefore deemed necessary that the DMP be aligned with the SDF to allow the municipality to draft sustainable development objective (*e.g. areas suitable for development and area not suitable for development*). Likewise, the DMP is also align with the IDP, not only to ensure that sufficient funds are correctly allocation to line departments for disaster risk reduction, but also to ensure that proposed projects will reduce identified risks and alleviate the vulnerability of communities in the municipal area of jurisdiction. According to the DM Act, the Municipal Manager and the Mayor are primarily responsible for disaster risk reduction in the municipality.

The DMP of FBMD therefore calls each line department to take cognizance of identified threats and risks and to fully investigate and address these risks and its consequences in each municipal sector plan.



15.1 Municipal Service

The following disaster risk reduction strategic issues are proposed for each line department.

Directorate Infrastructure

15.1.1 Water

The high risk of water services has been fully addressed and discussed and calls this department to identify and implement risk reduction projects on the following;

- Upgrade and update water extraction services.
- Replacement of old water filter technology for water purification.
- Upgrade and installation of new and additional water pipe lines to all communities in the FBDM area of jurisdiction.
- Maintenance, upgrading and installing of new water reservoirs in the FBDM area of jurisdiction.
- Liaison with Local, Provincial and National water authorities, e.g. Department of Water Affairs, Department of Agriculture and Department of Town & Regional Planning to identify and implement water quality risk reduction projects and programs from all water extraction points.

15.1.2 Electricity

The DMP calls this directorate for;

- Installation and upgrading of two main Eskom supplied stations to supply electricity to the southern part of FBMD first and also secondly to the northern part of the FBMD area of jurisdiction.
- An emergency service back-up plan, should such an incident occur, leaving the municipal without any electricity to *inter alia*, hospitals and mortuary services.



15.1.3 Sewage

The lack of inappropriate sewage service also has seriously secondary effects on health related issues. To address and to lower the vulnerability of communities, this department should identify risk reduction project to;

- Maintain and upgrade the sewage disposal system for all four local municipalities in the FBDM area of jurisdiction..
- Immediate attention to raw sewage that is currently been released into the open field.

15.1.4 Storm Water

Storm water management must not be dealt with in isolation, but rather solve into a holistic, integrated manner. Last mentioned entails, *inter alia*, the integration of storm water, with town and regional planning, sewage management, floods, water resource management and even drought relieve programs (*see recommendations later on*).

- Maintenance of current storm water systems.
- Storm water management especially in the informal settlements.
- Liaison with Town & Regional Planning to ensure appropriate storm water management systems in and at informal settlements.
- Investigation of storm water storage and recycle facilities as part of holistic, sustainable water resource management practices.
- Appropriate public awareness and education programs regarding public vandalism actions in blockading of the storm water and sewerage systems of the municipality.



Directorate Administration

15.1.5 IT

Failure of the IT-system of any municipal might and will cause serious disruption to the potential income stream of the municipality. Henceforth it is highly recommended that this line department of FBMD identify and register a sustainable backup IT-system should such an incident occur.

Directorate Planning

15.2 Poverty

The world is suffering severely from the consequences of poverty. The constantly increasing rates of poverty on the globe confirms that historically worldly programs to date are not successful, nor did it at any stage uplift communities out of poverty. It furthermore confirms the complexity of the problem, henceforth, this will not be the responsibility of only one Directorate alone, nor will it be the sole mandate of any municipality alone as well.

This action will call for extraordinary leadership and initiatives to bring together all the custodians, e.g. private sector, organised business, NGO's, churches amongst others to identify the point of departure for FBDM (*see recommendations later*).

Again, it is recommended to address poverty into a holistic, integrated and sustainable way, within the Land Economic Development (LED) strategy.

Having said this, officials of government must bear in mind that once the perception went out that everything will be forced into a socialist system, taking from the rich and give to the poor, such poverty reduction initiative would be very difficult.



15.3 Natural & Human made Disasters

Directorate Planning

Department of Land Affairs

Department of Agriculture

Department of Water Affairs

15.3.1 Drought

The human nature might easily be in a comfort zone when it comes to slow onset disasters. Man feels that is the cause of nature and that there is nothing to do and rather sit and play it out. That might be the case, but far from the real truth. As indicated in the Disaster Management Framework (DMF), taking cognisance of the international environment, how the H.A.A.R.P. system on the globe influence weather patterns, hence contributing to cyclones, floods and drought patterns on the globe, it can be concluded that even a phenomenal like drought, to a certain extend is human induced.

The following drought reduction measures might be considered;

- A drought relief strategy between Disaster Management and the relevant custodians (*e.g. Department of Agriculture, Department of Water Affairs and Sanitation*) are deemed necessary and of a high priority.
- Ensure pro-active planning and actions in terms of;
 - Awareness
 - Avoidance
 - Early warning
 - Rehabilitation
- Setting up and maintaining a comprehensive drought plan and a system of information management, monitoring and evaluation;
 - Compiling veld indicator maps to enable livestock farming communities to make informed decisions;
 - Conducting research in drought-prone areas;



- Assisting provincial departments of agriculture with drought assessments;
 - Implementing and improving early warning systems;
 - Developing and implementing priority risk and disaster management programmes for risk reduction;
 - Sourcing allocated funds from National Treasury for disaster drought assistance programmes and service delivery;
 - Outlining the criteria for drought assistance; and
 - Participating actively in risk and disaster management forums at regional, provincial, national and international levels.
- The Provincial Department of Agriculture should
 - lead education and awareness campaigns;
 - conduct drought assessments and compile reports;
 - appoint and pay service providers to deliver services to affected farming communities;
 - ensure that farming communities implement risk reduction measures;
 - measure vulnerabilities of communities so as to target priority assistance;
 - ensure enough capacity for drought management;
 - implement disaster assistance schemes for affected farming communities;
 - determine and establish the severity and magnitude of drought in the province;
 - prepare and review drought disaster management operational plans;
 - ensure that farming communities timely de-stock in seasons of decreased veld and forage production;
 - compile drought indicator maps to review the drought situation in the province;



- design its own model(s) to identify drought disasters within the Disaster Management Framework prescribed by the Disaster Management Act (57 of 2002); and
- prepare a provincial disaster management plan.

15.3.2 Fire

Directorate Administration

Ambulance Service – Provincial & Private

During the facilitation process, it has been confirmed by the Fire Services to deal with fire as a whole and not necessary distinguish between veld fire, structural fire or fire caused by hazmat and other. In terms of risk reduction, the following might be considered;

- Upgrade of fire-fighting equipment and station.
- Empowerment of local communities to deal with minimum fire-fighting skills and equipment.
- Public awareness and fire risk reduction programs.
- Establishment of fully fledged FPA's.
- Seasonal making of fire breaks and controlled burns.
- Typical fire prevention measures – empowerment of community with knowledge – awareness.
- Development of a policy for informal development settlements.
- Ensure suitable access routes to all informal settlements – for fire-fighting rescue purposes.



15.3.3 Water Pollution

Department of Water Affairs and Sanitation

The first line of water supply is at the extraction point. In the case of FBMD, the Vaal River is the main water source for the municipality. Unfortunately, the Vaal River is currently well known for its very low water quality (*according to many research reports available and known to the municipality*) which already caused a high water extraction risk for FBDM. It has been mentioned that the possibility does exist to extract water with better quality and at four time cheaper rate from the Orange River. Notwithstanding this, the DMP is well aware of the proposed report and recommendations to maintain the status quo to extract water from the Vaal River. Water resource management can only be dealt with a holistic, integrated and sustainable way, which means that water pollution cannot be dealt with in isolation. Development practices upstream (*e.g. residential, commercial, industrial, mining and agricultural practices*) might have a direct impact on our water resources and must be dealt with accordantly.

From the point of extraction, municipalities not only have to constantly budget for day-to-day maintenance of water resource equipment and infrastructure (*e.g. pumps, filters, water pipelines and water reservoir*), but also register long term replacement and upgrading of water infrastructure.

Ongoing drought and economic recession (*amongst other factors*) contribute to uncontrolled urbanisation, which off course puts additional stress and demand on urbanised water resources.



15.3.4 Floods

Directorate Infrastructure

Ambulance Service – Provincial & Private

Strategic Economic Development & Planning: Town & Regional Planning Community & Social Development – Emergency Service – Disaster Management

Flood risk reduction has many aspects such as;

- Monitoring of rainfall in water catchment areas
- Monitoring of river water levels
- Flood early warning system
- Evacuation procedures and drills
- Building regulations
- Detailed flood risk assessment (e.g. determining and quantifying the hydrological and hydrology information, the land-use type, economic losses,) to determine optimal flood control and flood remedial works.

Communities and properties at flood risk have to be informed of the potential risk. An effective flood risk communication system will be deemed necessary to communicate with at risk communities to disseminate information.

15.3.5 Epidemic & Disease

Directorate Administration

Provincial Health: Communicable Diseases

District Environmental Health

SANDF Health – Environmental Health

Disease and epidemics can at any time occur and extend into chaos, of such a nature that a local municipality will not be able to cope with its own resources. A pro-active risk reduction plan will be deemed necessary to improve the readiness status of this department to such an incident. Other factors such as poor water quality, the release of



raw sewage in the field and into water resources, as well as poor food processing quality control measures contribute and even increase the risk of health disease and epidemics. The DMP calls for the improvement of the readiness status of this department and the municipality to deal with any disease and epidemic outbreak

15.3.6 Hazmat

Transnet – Fire Department

ACSA – Fire Department

SANDF Fire Department

Department of Environmental Affairs

The hazmat risk in FBMD has increased in terms of the bulk transportation of hazmat, total storage of hazmat as well as the handling of hazmat. Hence, the DMP calls for;

- Appropriate risk reduction measure to ensure safe transportation and appropriate route planning for the transportation of such material,
- Improvement, updating and disseminating of relevant storage regulations for specific hazmat categories,
- Appropriate training programs for safe handling of hazmat per specific hazmat category.

15.3.7 Geological Threats – Open Cast Mines

Directorate Infrastructure

Private Sector:

De Beers, Petra Diamonds

Department of Mineral Affairs

In the FBDM and especially in the SPLM there are several open cast mines which contributes to the vulnerability of communities. The Big Hole is the highest threat and



geological risk for Kimberley. The problem is well documented and also well known to the municipality. It is a pity that this potential risk is only currently monitor and that no pro-active precaution measures are in place. The DMP of FBMD calls therefore appropriate risk reduction programs for all open cast mines, with special emphasis to at least stabilise the geology movements in and around the Big Hole.

15.3.8 Aircraft Accidents

Directorate Administration

Disaster Management

Governmental Department: ACSA

Governmental Department: Transnet

Ambulance Service – Provincial & Private

SAPS

Due to the Kimberley Airport and various other smaller air stripes in and around Kimberley have a potential aircraft accident threat and risk. It seems if the Standing Operating Procedures for any incident from ACSA is in place to respond to such an incident. However, the DMP calls hereby a continuance liaison with ACSA for pro-active planning to determine the safest flying paths in and over residential areas.

It has been mentioned, that aircraft training might be above high-density residential areas and also violating approved flight heights when in training. The municipality may bring this under the attention of the Kimberley Airport custodians, specifying and agreeing on areas suitable for aircraft training that minimised the possible impact of an aircraft accident during training times.



15.3.9 Erosion

Directorate Planning

Department of Agriculture

Department of Land Affairs

Department of Environmental Affairs

Soil erosion is a natural process which occur when there is loss of or removal of top layer of soil to due to rain, wind, deforestation or any other human activity. There are six main causes of soil erosion.

- **Soil Texture:**
Small grain and open structure soil erodes more than the larger grain and closed structure soil.
- **Ground Slope:**
Steeper slope ground erodes more than the ground having mild slope due to increased speed of run off than infiltration.
- **Intensity and amount of rainfall:**
More the intensity of rainfall more will be the soil erosion.
- **Mismanaged utilization of soil resources:**
The soil erosion is enhanced by improper surface drainage, removal of forest litter, overgrazing etc.
Distribution of rainfall and landscape:
If the ground surface is such that rainfall distributes evenly, there is not plenty rainfall, the erosion will be less.
- **Deforestation:**
It is one of the major factors responsible for soil erosion. Removal of forest cover which function as a binder of the top layer of the soil with increasing land demand have resulted in enhancing extent of soil erosion.



The Northern Cape Province is well known as a semi-arid area, hence periodically dry periods with over grazing of land (*currently a general mismanagement practice in agriculture*) contributes to soil erosion. As a point of departure, FBMD might consider appropriate education programs to landowners where such a potential erosion risk might occurs.

15.4 Disaster Risk Reduction Recommendations

The following disaster risk reduction recommendations are purposed for FBDM;

15.4.1 Water Resource Management

South Africa is still one of few countries in the world that are using expensive water for domestic use. The poor water quality even before the extraction point and also the scarcity of our water resource might force the supplier of water to distinguish between water for human and animal consumption and general domestic, commercial, industrial and agricultural (food production) use. Millions of litres of water are wasted through normal domestic use.

Serious consideration must be given to appropriate recycling methods and procedures of water. Many research has been done on this topic and new innovation ways might be possible to “harvest” water (*e.g. storm water, rain water etc*).

15.4.2 Electricity

- Notwithstanding that the selling of electricity by municipalities to end users is the main source of income, FBDM is at high electricity failure risk. Many alternative electricity resources are available today. Creating appropriate incentives for using alternative sources for energy, might most definitely alleviate the pressure on the current supplier.
- From a selfish economic point of view any monopoly might benefit the supplier, but from a consumers point of view this is far from the truth. A monopoly



("alone" or "single" and "to sell") exists when a specific person or enterprise is the only supplier of a particular commodity. Monopolies are thus characterized by a lack of economic competition to produce the good or service, a lack of viable substitute goods, and the possibility of a high monopoly price well above the seller's marginal cost that leads to a high monopoly profit.

- It is for this reason that the DMP strongly recommend (taking cognisance of the deteriorating of this single basic services by only one supplier in South Africa into account) that not only alternative sources of energy needs to be introduced, but also to privatise such a service to the end user and consumer. This is just basic, healthy sustainable economic principles.

15.4.3 Sewage & Storm water

- It is recommended to draft a short term sewage maintenance plan (six to 18 months) and
- To draft a medium to long term sewage upgrading and replacement plan (2 – 5 years).
- A total holistic, integrated sustainable approach is highly recommended – to integrate and to align the sewage maintenance, upgrading and replacement plan with the storm water, flood and future development master plans.
- The FBMD has now a competitive advantage to move away from “a status quo” based storm water and sewage system, towards a more sustainable and new innovation technology approach.

15.4.4 Drought

FBDM Disaster Management to;

- act as conduit for information concerning drought disasters in the municipal area;
- act as an advisory body on drought disaster issues;
- incorporate early warning systems in its planning;



- make recommendations regarding assistance and initiate and facilitate efforts to make assistance available;
- establish disaster management centres within the municipal area; and
- prepare a municipal drought disaster management plan.

15.4.5 Fire

- Executing appropriate fire prevention and public education programs
- Ensure appropriate road network and access points to high fire risk areas.
- Liaison with all custodians for making available resources if and when a massive evacuation of people are required.
- Ensure that controlled burns are well maintained in high fire risk areas.

15.4.6 Floods

- Determining water levels at high flood risk areas for different amount of water releases (cumecs = m³/s) in identified water catchment areas in the FBMD area of jurisdiction.
- Develop, test, exercise and implement a Flood Early Warning System (FEWS).
- Public awareness and education programs to communities at high flood risk.
- Update and compile new sustainable development guidelines for high flood risk areas.

15.4.7 Epidemics & Disease

- Capacity building for pro-active disease and epidemic outbreaks.
- Improve the hygienic level of population.
- Vaccination.
- Registration and control of carries.
- Preventing infection begin brought into large population areas.
- Protection of borders.
- Medical education.



15.4.8 Hazmat

- Compile and implement an appropriate hazmat safety handling guideline.
- Compile and implement an appropriate hazmat safety storage guideline.
- Compile and implement an appropriate hazmat safety transportation guideline.

15.4.9 Geological Threats: Big Hole

- Identify short term stabilising risk reduction remedial works for the Big Hole.
- Draft a detailed geological risk reduction plan for the SPLM, including all open cast mines.
- Implement geological risk reduction plan in the FBMD area of jurisdiction.

15.4.10 Aircraft Accidents

- Liaise with ACSA to ensure the most safest airplane take-off and landing strip at the Kimberley Airport.
- Ensure regularly testing and maintaining of all emergency service equipment to effectively respond to any aircraft malfunction incident.

15.4.11 Erosion

- Liaise with identified custodians (*e.g. Department of Agriculture, Department of Water and Sanitation*) appropriate erosion risk reduction programs; e.g.
 - For cropping lands, develop appropriate land management field manual maps and describe the land types in the FBMD area of jurisdiction and provide advice on land use and management for each soil type.
 - For grazing lands, develop maps of soils and land types in the FBMD area of jurisdiction. These give graziers an indication of what soils their property may have and are a useful planning tool.



- Encourage erosion risk reduction remedial works in the FBMD area of jurisdiction such as;
 - Soil surface covering projects, e.g. Tree Planting
 - Farming practices

The following section outlays guidelines for FBDM to declare a national disaster, using drought as an example.

16. DECLARATION OF A NATIONAL STATE OF DISASTER

- The involvement of Advisory Services and local government in a province's assessment is crucial so as to advise the specific National Department on the scale and extent of the damage caused by any incident. The Provincial department will then be informed about the financial assistance required to normalise the situation. Key determinants will be considered during the assessment. In the case of a drought, aspects such as veld, livestock, fodder and crops, weather and climatic conditions, and water supply systems so as to ascertain whether the disaster was beyond the farmers' control or not will be considered.
- ***Using drought as an example, the following considerations apply to the declaration of drought:***
 - 1. In the event of a national disaster, the Minister of Agriculture and Land Affairs may, in terms of the Disaster Management Act (57 of 2002), by notice in the Government Gazette, declare a national state of disaster if –
 - (a) existing legislation and contingency arrangements do not adequately provide for the national executive to deal effectively with the disaster, or
 - (b) other special circumstances warrant the declaration of a national state of disaster.
 - 2. If a national state of disaster has been declared in terms of subsection (1) the Minister may, subject to subsection (3), and after consulting the responsible cabinet



member, make regulations or issue directions or authorise the issue of directions concerning –

- (a) the release of any available resources of the national government, including stores, equipment, vehicles and facilities;
- (b) the release of personnel of a national organ of state for the rendering of emergency services;
- (c) the implementation of all or any of the provisions of a national disaster management plan that are applicable in the circumstances;
- (d) the evacuation to temporary shelters of all or part of the population from the disaster-stricken or threatened area if such action is necessary for the preservation of life;
- (e) the regulation of traffic to, from or within the disaster-stricken or threatened area;
- (f) the regulation of the movement of persons and goods to, from or within the disaster-stricken or threatened area;
- (g) the control and occupancy of premises in the disaster-stricken or threatened area;
- (h) the provision, control or use of temporary emergency accommodation;
- (i) the suspension or limiting of the sale, dispensing or transportation of alcoholic beverages in the disaster-stricken or threatened area;
- (j) the maintenance or installation of temporary lines of communication to, from or within the disaster area;
- (k) the dissemination of information required for dealing with the disaster;
- (l) emergency procurement procedures;
- (m) the facilitation of response and post-disaster recovery and rehabilitation;
- (n) other steps that may be necessary to prevent an escalation of the disaster, or to alleviate, contain and minimise the effects of the disaster, or
- (o) steps to facilitate international assistance.



- 3. The powers referred to in subsection (2) may be exercised only to the extent that this is necessary for the purpose of –
 - (a) assisting and protecting the public;
 - (b) providing relief to the public;
 - (c) protecting property;
 - (d) preventing or combating disruption; or
 - (e) dealing with the destructive and other effects of the disaster.
- 4. Regulations made in terms of subsection (2) may include regulations prescribing penalties for any contravention of the regulations.
- (5) A national state of disaster that has been declared in terms of subsection (1) –
 - (a) lapses three months after it has been declared;
 - (b) may be terminated by the Minister by notice in the Government Gazette before it lapsed in terms of paragraph (a); and
 - (c) may be extended by the Minister by notice in the Government Gazette for one month at a time before it lapses in terms of paragraph (a) or when the existing extension is due to expire.



17. ALIGNMENT OF THE DMP WITH SDF & IDP

It has been confirmed by local municipalities in the FBDM area of jurisdiction that the SDF of each local municipality is in a process of being reviewed and to be updated. While the municipality is in a process of developing and drafting appropriate sector plans (e.g. water services, integrated waste management, infrastructure, LED, SDF, DMP), this gives the municipality a competitive advantage to integrate, to align and to update all sector plans with one another. It is therefore highly recommended that these individual sector plans be made available (even in draft format) to the Department of Town and Regional Planning. With all this information available to the Department of Town and Regional Planning, a more sustainable long term SDF can be compiled.

From these plans, specific spatial issues and needs can be identified as valuable input to the SDF. Figure 34 indicates the link between the IDP and the SDF to ensure a sustainable strategic policy plan for the municipality.

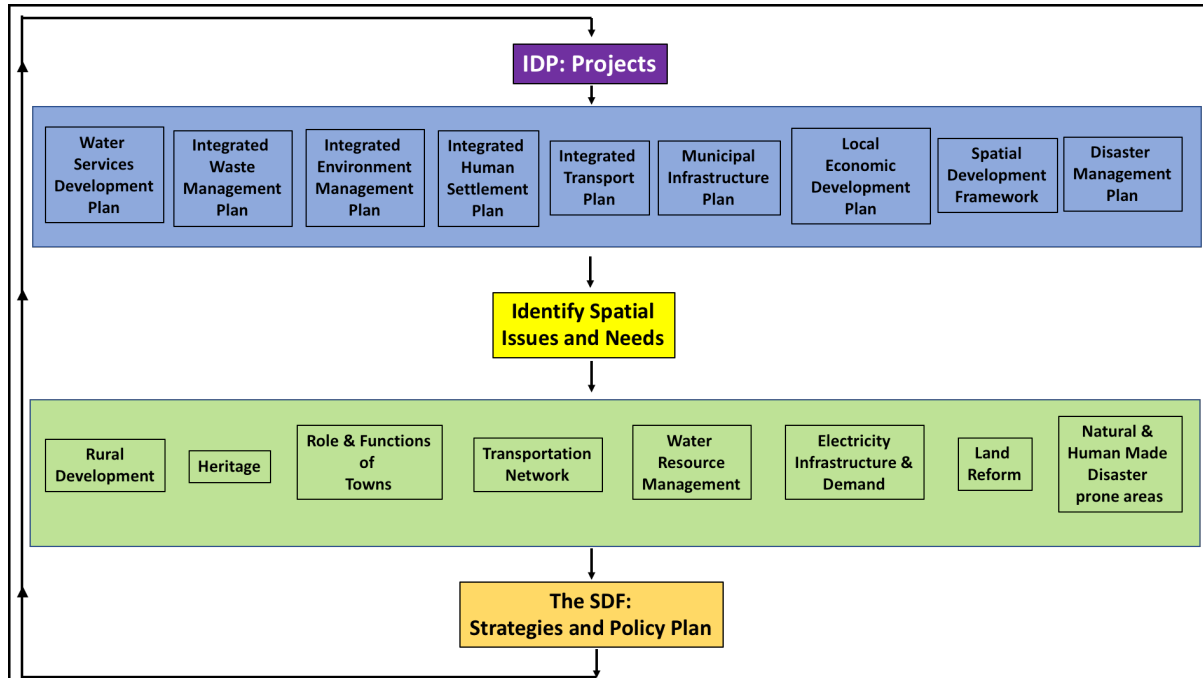


Figure 34: The link between the SDF and the IDP



17.1 Align with SDF

The Municipal Systems Act, Act No. 32 of 2000 (MSA) requires that each Municipality prepare an Integrated Development Plan (IDP) to serve as a tool for transforming local governments towards facilitation and management of development within their areas of jurisdiction.

A Spatial Development Framework (SDF) is one of the Sectoral Plans (*a sectoral plan relates to any function of the Council*) of an Integrated Development Plan (IDP). According to the Municipal Systems Act, 2000 (Act 32 of 2000), the purpose of an SDF is to provide general direction to guide decision making on an ongoing basis, aiming at the creation of integrated, sustainable and habitable regions, cities, towns and residential areas. Chapter 5 of the Act sets out the requirements for Integrated Development Planning. This is of particular importance for the SDF of FBMD, as the following is stated:

- All municipalities must draft an Integrated Development Plan (IDP) (Section 25).
- One of the core components of an IDP is a Spatial Development Framework (SDF). The SDF must relate to the development priorities and objectives of geographic areas of the municipality and indicate how the development strategies will be co-ordinated.
- An adopted IDP will act as the principle planning instrument to guide and inform all planning and development, and will bind all persons.
- When approved as part of an IDP, the SDF will attain statutory status (section 30).

The SDF will prevail over other plans as prescribed in the Physical Planning Act, 1991 (Act 125 of 1991) and will rationalize the system of municipal planning into a 5 year planning cycle, subject to annual monitoring and review.

The SDF is a primary spatial response to the development context, needs and development vision of the municipality. It is a key land use management tool at a strategic



level that has an important role to play in guiding and managing Municipal decisions relating to the use, development and planning of land. It is a legislative requirement and should resonate with the national and provincial spatial development priorities.

The SDF is also a transformation tool. With its focus on spatial restructuring, it guides the location of future development in a manner that addresses the imbalances of the past. It enables the municipality to manage its land resources in a developmental and sustainable manner. It provides an analysis of the spatial needs and issues and provides strategies and programs to address these challenges. In summary, the SDF has the following benefits:

- It facilitates effective use of scarce land resources.
- It facilitates decision making with regard to the location of service delivery projects.
- It guides public and private sector investment.
- It strengthens democracy, inclusivity and spatial transformation
- It promotes intergovernmental coordination on spatial issues.
- It serves as a framework for the development of lower order plans and a detailed scheme and is the basis for various Land Use Management Systems.
- It guides and informs the spatial location of municipal infrastructure investment and spatial priorities;
- Provides visual representation of the desired urban form of the municipality in the short, medium and long term.

Ultimately, the SDF and accompanying Package of Plans, defines and facilitates a progressive move towards the attainment of an agreed upon desired spatial form within the municipality's area of jurisdiction.



17.1.1 Land Use Planning Ordinance, 1985 (No15 of 1985) (LUPO)

LUPO states that the “general purpose of a structure plan (SDF) is to lay down guidelines for future development within a municipal area, in such a manner that it most effectively promotes the area as well as the general welfare of the community”. In terms of LUPO Structure plans (SDFs) can be approved in terms of Section 4(6) and Section 4(10), the latter giving the municipality delegated powers to amend plans (*where necessary*) and approve planning applications.

17.1.2 Sustainability

The SDF contains references to principles contained in the Development Facilitation Act, 1995 (Chapter 1) and principles of the National Environmental Management Act, 1998 (Chapter 1). The overarching guiding principle according to the SDF is that of sustainability in Development. It defines sustainable development as “development needs of present generations should be met without the ability of future generations to meet their own needs, being comprised. Sustainable development encompasses the integration of social, economic and ecological factors into planning decision-making and implementation so as to ensure that development serves present and future generations. Sustainable development is not the goal but the process of maintaining a dynamic balance between the demands of people for equity, prosperity and quality of life and what is ecologically possible. It would probably be more realistic to use the term sustainability. The notion of an ongoing process is more appropriate and therefore sustainability is the concept that indicates the pathway or direction that we need to move along to achieve greater balance between the social, economic and ecological environment.

Development is also not seen in its narrow meaning of growth, expansion and acquiring of knowledge, but as progress through improvement, evolution and the quest for wisdom.



Sustainable human settlements are those towns and communities which;

- Enables its inhabitants to live in a manner that supports the state of sustainability and the principles of sustainable development; and
- Have institutional, social and economic systems that will ensure the town / community's continued existence.

Philosophic debates over the meaning and objectives of sustainable development cover a wide spectrum. "Green Development" prioritises what its proponents consider to be environmental sustainability over economic and cultural considerations. Proponents of the alternative approach (Figure 35) argue that it provides a context in which to improve overall sustainability where "Green Development" is unattainable. For example, a cutting edge sewage treatment plant with extremely high maintenance costs may not be sustainable in regions of the world with fewer financial resources. An environmentally ideal plant that is shut down due to bankruptcy is obviously economically less sustainable than one that is maintainable by the community, even if it is less effective from an environmental standpoint.

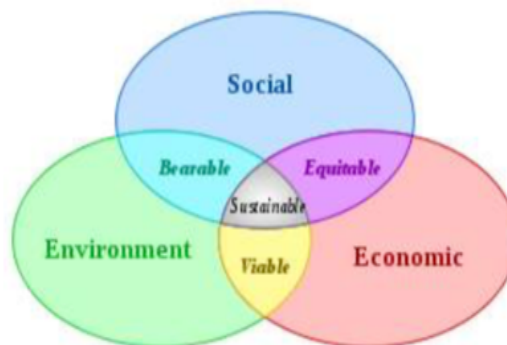


Figure 35: Scheme of sustainable development: at the confluence of three constituent parts



17.1.3 Bio-regional planning

In essence, sustainable development can only be achieved through maintaining biodiversity. The key to ensuring the preservation of biodiversity is the maintenance of environmental integrity. Maintaining environmental integrity in the planning process therefore becomes one of the primary determinants of land use planning. In terms of the World Conservation Strategy, sustainable development is considered to be a set of tools and strategies which respond to five broad requirements namely:

- Integration of conservation with development;
- Satisfaction of basic human needs;
- Achievement of equity and justice;
- Provision of social self-determination and cultural diversity and;
- Maintenance of ecological integrity

Bio-regional planning refers to an integrative, internationally accepted approach to regional planning and management that endeavours to promote sustainable development. This approach by definition thereof supports a sustainable relationship between ecological processes and the needs of communities.

The SDF should include, address and give effect to inter alia:

- The principles contained in Chapter 1 of the National Environmental Management Act (Act 107 of 1998);
- The directive principles contained in Chapter 2 of the Land Use Management Bill
- Bio-physical sensitivity analysis / assessment of the area in question;
- Objectives that reflect the desired spatial form of the area;
- Indicate desired patterns of land use within the municipality;
- Localised spatial development principles including specific strategic guidelines for spatial restructuring and spatial integration of areas in which particular types of land use should be encouraged and others discouraged;
- Special development areas for targeted management to redress past imbalances



- Directions of growth;
- Major movement routes;
- The urban edge;
- Basic guidelines for a land use management system;
- Priorities in terms of public sector development and investment; and
- Areas where strategic intervention is required.

The following tools and concepts will be required to address issues currently faced by municipalities:

Nodes

These are areas where a higher intensity of land uses and activities will be supported and promoted. Nodal development improves efficiency as it provides easy access and creates thresholds for a variety of uses and public transport services.

Corridors

Corridors are links between nodes, along which an increased intensity of development will naturally be attracted and should be encouraged. Similar to nodes they improve access to opportunities.

Infill and Densification

In addition to nodes and corridors, it may necessary to identify areas where infill development and densification will be pursued, as a tool to achieve spatial integration, increase population thresholds

Containment

This concept refers to the need to limit inefficient low-density development, typically through the use of an urban edge, which indicates the boundary for urban development for an agreed period of time.



Protection

This concept is explicitly aimed at protecting valuable natural, economic or heritage resources, such as agricultural land, wetlands, ecological corridors or scenic landscapes. Protection may be required for components of settlements (e.g. the establishment of a network of green spaces in urban areas) or rural landscapes outside of settlements.

Growth Areas

The identification of appropriate / future growth opportunities is an important aspect of an SDF. By proactively indicating such areas, based on the agreed the principles, the often, negative impacts of unguided market forces can be curtailed. These can include the redevelopment of existing development areas to higher intensities, vacant land suitable for infill development as well as Greenfield sites.

17.1.4 Disaster Management Inputs to SDF

- In a nutshell, the SDF of a municipality must first identify areas suitable for development and areas not suitable for development. Appropriate land-use planning is essential for this. For example, an area might not be suitable for high residential development, but can be suitable for another land-use type (*e.g. agricultural practices, parks etc.*). The integration of all sector plans will be deemed necessary to arrive at this conclusion.
- The DMP for FBDM clearly identify (and where applicable also indicates it on spatial maps) potential hazards and risks for the municipality. Each potential risk identified, must fully be addressed in all sectoral plans of FBMD. It is therefore the line department's responsibility to ensure that a detailed risk reduction and / or remedial works plan be drafted as a valuable input to the SDF.



The highest priority for FBDM is the upgrading and all municipal services. Hence, the SDF must clearly indicates spatially the current water services, electricity and sewage network with sustainable development guidelines for all future development.

- It cannot be over emphasized that South Africa, all spheres of government must seriously develop new by-laws for alternative water resource, energy and sewage use for all future development.
- Many work and research and development has been done in this regards and hence it is not necessary to re-invent the wheel.

The spatial distribution and analysis of poverty in the FBMD area of jurisdiction will be deemed necessary as a first step to address poverty issues. It is not the aim of this report to address poverty, but alternative, innovation thinking and methods are necessary at the highest level. It is clear from historically experiences, that all these initiatives in the past failed. By repeating the very same methods are and will be only a waste of resources. The world does not have the answer to this global problem and hence, the world will not be able to solve it. Rather, the answer to poverty is spelled out by many bible scholars. Thus, poverty alleviation is the responsibility of the “church”. Unfortunately, it does not refer to the “institutional church” as many perceptions are, but rather to true spiritual filled biblical scholars (*unfortunately, this discussion falls outside the scope of works and this document*). It can be stated that poverty is a state of mind, and intense, new spiritual and moral education programmes at all levels are required for sustainable poverty alleviation programmes.

The SDF must take into account that the Northern Cape Province is located in a semi-arid area of the country. Drought risk increased severely over the last decade. The impact of such a natural phenomenal cannot be manage in isolation. A holistic, integrated approach is necessary to ensure any sustainable development practices. As drought not only directly influence the availability and quality of our water resources, but also has a direct impact on the agricultural community. It is a pity to see how both commercial- and non-commercial farmers still implementing unsustainable farming practices (*e.g. over gracing of land*).



The SDF of FBDM must take cognisance of all potential threats and risk as indicated in Table 1. It's spatial distribution and magnitude to be confirmed in each sectoral plan and to follow a holistic, integrated approach to sustainable development.

The following remarks are of importance:

- When new development is planned in a specific zone, cognisance must be taken of the different risks identified in Table 2. For example, if any new development needs to take place in the CBD area, the potential risk of storm water, flooding, possible aircraft accidents, collapse of the open cast mine and possible hazmat incidents, amongst others must be taken into consideration.
- This table must only be used as a guideline to finalise the SDF. Hence, further detailed studies will be necessary to approve any new development.
- Where development already exists in a high risk zone, it is recommended that appropriate risk reduction projects and programmes are register and align with the IDP.

The SDF proposals, centred on the key spatial structuring elements, essentially indicate the following:

- shows areas to be protected, including natural, agricultural and heritage resources and urban open spaces;
- Identifies a hierarchy of roads, transport corridors and nodes to promote accessibility and efficient movement of people and goods;
- Restructures the Municipality into a compact city to ensure that access to opportunity and amenity at the local and metro scale is equally available to all communities;
- Identifies future growth areas and where to direct growth in a sustainable manner and ensure that people are well located with respect to employment and social and recreational services;



- Identifies well located land, close to urban opportunities, areas where infill densification and urban; renewal should be pursued
- Identifies areas where economic growth and investment will be pursued, and those where social investment will take preference;
- Critical to achieving these objectives is a single integrated Land Use Management System (LUMS) that provides a clear direction and fosters a sense of security and confidence in the Municipality to its citizens, landowners, developers and businesses.

The following spatial distribution are also deemed necessary;

- Urban Development Line
- Major Investments
- Future Economic Investment
- Urban Investment Notes
- Rural Investment Nodes
- Recreation & Tourism Opportunity
- Densification Corridors
- Dams
- Urban Core
- Urban Development
- Rural Development
- Disaster hazard, threats and risks



17.1.5 Disaster Management Guidelines for Sustainable Development

It is clear and there is unity amongst all custodians that municipalities are bind by legislations and by-laws to ensure sustainable development. Sustainable development can only be successfully implemented when a holistic, integrated approach is follows. It entails, amongst other things, that silo-based planning will be inadequate to solve complex problems facing by municipalities. Hence, a holistic and integrated approach is deemed necessary where interdependencies and interlinkages exists between individual sectors.

This demands the acknowledgement and a better understanding of the dynamic interdependence and interconnectedness of numerous complex systems and sub-systems, such as water, energy and ecosystems and the impacts and changes they will undergo from various future threats, including climate change. This is key to reducing the risk of catastrophic shocks and cross-sectoral cascading systems failure and exploiting beneficial opportunities from feedback loops, which enhances the sustainability of these systems, and the resilience of vulnerable populations that depend upon them. Traditional sector-based approaches and tools are not fit for this purpose as the challenges are more complex and systemic in nature, which highlights the integrated systems approach as being critical to sustainable development planning and strategy formulation.

Sometimes it is clear that role players are all reading the same book, but not yet on the same page. When analysing or addressing any specific aspect and / or system, e.g. water, energy, sewage, natural disasters and threat in isolation may worsen a situation at another sector, aspect or system. Looking holistically to any problem, therefore it requires to take into account all aspects, systems or threats simultaneously, and integrate these results by taking cognisance of the consequences of the impact of any change in one sector unto all other sectors.



To solve, or at least alleviate the vulnerability of communities in the FBDM area of jurisdiction, requires a holistic, integrated approach to problem solving. Therefore, when identifying appropriate project to improve municipal services for example, a holistic integrated approach requires the identification of possible relief or reduction on vulnerable communities in terms of poverty, drought, storm water, fire, water pollution, floods, epidemic and disease, hazmat, the threat of the Big Hole, possible aircraft accidents, erosion and environmental degradation.

The integration of the municipal sector plans cannot be over emphasized which is deemed necessary to guide the IDP in the allocation of funds and funding distribution. The very same process and procedures are necessary to draft and to finalise the SDF or a municipality. The master plan of FBDM must address the very important, single question of ensuring sustainable development indicating the reduction of vulnerability of communities. It is sad to say that in most cases, the vulnerability of communities increased over time. It might be concluded than, if custodians are then at all in the same book, let alone to be on the same page.

17.1.6 Integrated approach to LED

The lack of an integrated approach to LED curtails the provision of diversified economic opportunities to communities. Only those LED projects that affect a single municipal entity are attempted to be implemented. This type of implementation has resulted in small townships and rural community development projects, with limited economic impact. The following principles are recommended to improve integration;

- LED implementation must be cross-cutting, with all departments of the municipality involved in the process.
- LED needs to respond to and address social, economic, natural, physical and other needs of communities.
- LED performance needs to be embedded in all Departments and implemented by all senior managers.



Local municipalities could make a larger impact on local economies by utilising LED as an integral part of their overall planning as part of service delivery. An integrated use of LED by local government was introduced in the White Paper on Local Government (South Africa, 1998a) as well as in the local Government: Municipal Systems Act 32 of 2000. Figure 36 is a summary of the integrative process as proposed.

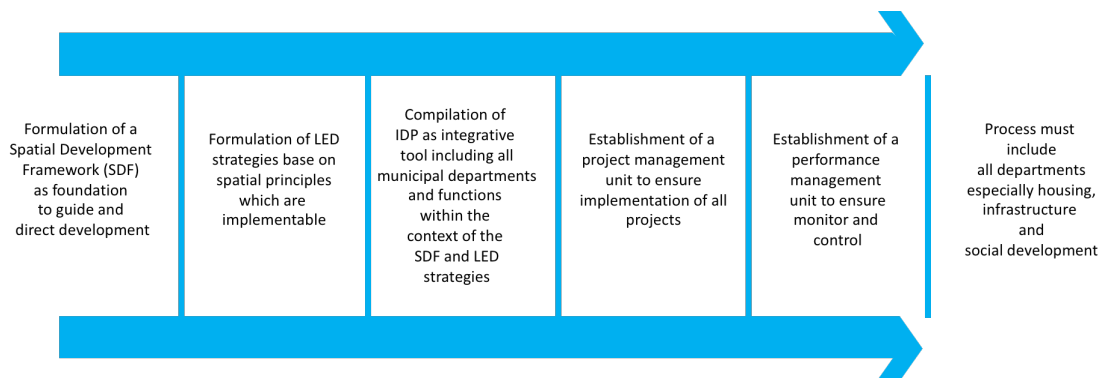


Figure 36: Integration of the LED function at the local government sphere

17.2 Align with IDP

The following procedures will guide the municipality to align the disaster management plan with the IDP. This is necessary to link all development projects with disaster risk reduction. Sustainable development can take place when identified disaster risks are taken into account during the finalisation of development projects.

1. It is the main responsibility of disaster management to execute a detailed disaster risk assessment to compile appropriate disaster risk reduction guidelines / projects and plans. In order to align disaster management with the IDP, it is recommended to make provision for disaster risk reduction in the IDP process. Hence, for each hazard, at ward level, all the communities, infrastructures and critical facilities at risk have to be listed.
2. This list will be integrated into the IDP list of projects by adding at least a disaster risk reduction component.



3. The IDP manager will notify the line departments and the head of each line department will first align all identified communities, infrastructure and facilities at risk with existing projects and will also, where applicable, register new development / risk reduction projects.
4. The head of the line department will follow existing IDP processes to budget for risk reduction projects.
5. Where applicable, the necessary amendments will be made.
6. After amendments, the proposed projects will first be approved by Council.
7. All the heads of the line departments will be notified after approval of proposed projects.
8. When the IDP make available the necessary funds and budgets, the next step will be to implement the identified disaster risk reduction projects.

An Integrated Development Plan (IDP) is a super plan for an area that gives an overall framework for development. It aims to co-ordinate the work of local and other spheres of government in a coherent plan to improve the quality of life for all the people living in an area. It should take into account the existing conditions and problems and resources available for development. The plan should look at economic and social development for the area as a whole. It must set a framework for how land should be used, what infrastructure and services are needed and how the environment should be protected.

The IDP process is guided by various legislation, policies and guidelines which require careful consideration when the document is compiled. These include amongst others the following:

- SA Constitution, Act 108 of 1996 White paper on Local Government
- Municipal Structures Act, 117 of 1998 Municipal Systems Act, 32 of 2000
- Municipal Planning & PMS Regulations (2001) Municipal Finance Management, Act 56 of 2003
- Intergovernmental Relations Framework Act, Act 13 of 2006



The Municipal Structures Act (MSA) Act 32 of 2000 requires municipalities to develop Integrated Development Plans that should be single, inclusive and strategic in nature. Once adopted, the IDP of a municipality will guide development within the relevant council's area of jurisdiction, and should also be reviewed annually. In addition the Act also stipulates the IDP process and the components to be included.

The purpose of integrated development planning is faster and more appropriate delivery of services and providing a framework for economic and social development in a municipality. A range of links exist between integrated development planning and its developmental outcomes, which have great relevance, in particular in a context of financial crisis of municipalities, urgency of service delivery, and employment generation. Integrated development planning can contribute towards eradicating the development legacy of the past, making the notion of developmental local government work and fostering co-operative governance.

The IDP should be reviewed annually and is the principal strategic planning instrument that guides and informs all planning, budgeting, management and decision-making in a municipality. It is a tool for bridging the gap between the current reality and the vision of satisfying the needs of the whole community in an equitable and sustainable manner. Integrated development planning will enable municipalities to develop strategic policy capacity to mobilise resources and to target their activities.

In practice the IDP is a comprehensive strategic business plan for the Municipality over the short and medium term. According to the Municipal Systems Act, every Council has to prepare its own IDP which will guide them for the five years that they are in office. The IDP is therefore linked to the term of office of councillors.

Under the new Constitution, local government has a new, expanded role to play. In addition to the traditional role of providing services, municipalities must now lead, manage and plan for development and also play an active role in social and human development.



In addition to ensuring that all citizens have access to at least a minimum level of basic services, municipalities must now also take a leading role in addressing poverty, and in promoting local economic and social development. They must not only deliver on present demands for services - they must also anticipate future demands and find ways to provide services in an effective, efficient and sustainable manner over the short, medium and long term.

The value of integrated development planning for municipalities lies in the formulation of focused plans, based on developmental priorities. It is essential to spend the limited council resources on the key development priorities of the local community. This is the essence of the IDP - how to align the projects, plans, budgets and other council resources with the sustainable development priorities of the community.

Looking at the current SDF and IDP of the FBDM it is unclear to see any evidence of a integrated holistic approach to reduce disaster risks. It is assumed that local municipalities did budget significant amounts for water & sanitation, electricity, roads and storm water projects, but it is not convincing that these proposed projects will address the vulnerability of communities on the long term. Not only is the total amount budget allocation to Economic development in the capital budget insignificantly, so is the proposed projects inappropriate to address poverty alleviation.

In conclusion and to summarise disaster risk reduction, Table 5 strategic guidelines to each Directorate to ensure the implementation of appropriate risk reduction remedial works in the FBDM area of jurisdiction.



Table 5: Disaster Risk Reduction Strategic Objectives Guidelines for Directorates of FBDM, 2020

Directorate	Risk	Strategic Aims	Risk Reduction Objectives	Risk Reduction Activities
Infrastructure				
Water & Sanitation Infrastructure	Water Service	Moving away from status quo based water supply strategies and plans toward more sustainable and green water resource & supply management	Design, develop & implement a water resource management system to distinguish between normal domestic and industrial water use from more expensive drinkable water for human and animal consumption	Installation of new water resource management systems for all new development, e.g. distinguish between normal household and industrial water use from expensive drinkable water.
		Distinguish expensive drinkable water from all other water uses	Alternative and new innovation water purification systems at the extraction point	Installation of new innovation water purification systems for major (bulk) and minor (household) systems.
		Develop & implement water harvesting, water recycling policy for all new developments		Liaison with Local, Provincial and National water authorities, e.g. Department of Water Affairs, Department of Agriculture and Department of Town & Regional Planning to identify and implement water quality risk reduction projects and programs from all water extraction points.
		Create and implement a reward and penalty system when applied with new green water policy of municipality		Upgrade, maintain of current water resource management system
Electrical Infrastructure	Electricity Service			
		Moving away from status quo based electricity supply strategies and plans towards the use of more green sources of energy	Design & develop alternative sources of energy for all new development in the FBDM area of jurisdiction	Implementation of new sources of energy for all new developments
		Create and implement a reward and penalty system when applied with new green energy policy of municipality	Compile an extensive electricity maintenance plan for FBDM and its four local municipalities	Upgrade and maintain current main Eskom supplied stations for electricity supply to Northern & Southern part of the municipality
			An emergency service back-up plan, should such an incident occur, leaving the municipal without any electricity to <i>inter alia</i> , hospitals and mortuary services.	



Water & Sanitation Infrastructure	Sewage Service			
		Develop & implement alternative green sewerage & new innovations purification systems	Design & develop an alternative new innovation sewage system for the FBDM to be implemented for all development	Implementation of new innovation sewage system for all developments
		Create and implement a reward and penalty system when applied with new green sewerage policy of municipality	Design & develop new innovation sewage & water recycling system for FBDM and it's four local municipalities	Implementation of new innovation water recycling system for all developments
			Drafting short term sewage maintenance plan (6-18 months) and a medium to long term upgrading and replacement plan (3-5 years)	Immediate attention and risk remedial works at all raw sewage spills in open field and/or into water resources
Water & Sanitation Infrastructure	Storm water			
		Develop & implement storm water harvesting and recycling systems	Compile an extensive storm water maintenance plan for FBDM	Maintenance of current storm water systems (major & minor)
			Investigate, design & develop harvesting and recycling of storm water in the FBDM area of jurisdiction	Implement a new innovative storm water harvesting & recycle system in the FBDM area of jurisdiction
			Development of new storm water management systems for all new development, with special attention to informal developments	Implement appropriate public awareness and education programs regarding public vandalism actions in storm water blockading activities
				Special attention to storm water management systems in the informal settlements
Administration	IT			
		Sustainable IT System	Development sustainable backup IT-system	Implement sustainable backup IT-system



Planning	Poverty			
		Distinguish between poverty alleviation and poverty aid programs	Determine the causal factors of poverty	Maintain poverty aid programs as outlined in the IDP
		Following holistic, integrated, sustainable, multi-sectoral and cross-sectoral approach	Develop a new poverty alleviation strategy to eliminate poverty	Accepting that poverty is a state of mind (Napoleon Hill) - it would require extensive investment in human resources to alleviate poverty.
	Drought			
		Pro-active, sustainable agricultural and water use international best-practices for arid prone areas	International best-practice agricultural methods	A drought relief strategy between DM and the relevant custodians (Department of Agriculture, Department of Water Affairs and Sanitation)
		Implement a reward & penalty drought management system for all farm communities and water users	International best-practice water use methods	Ensure pro-active planning and actions in terms of awareness, avoidance, early warning and rehabilitation



Administration	Fire			
Disaster Management & Fire Fighting		Fire prevention, mitigation and public awareness strategies	Pro-active fire risk reduction programs	Upgrade fire-fighting equipment and station
				Empowerment of local communities to deal with minimum fire-fighting skills and equipment
				Public awareness and fire risk reduction programs
				Establishment of fully fledged FPA's
				Seasonal making of fire breaks and controlled burns
				Typical fire prevention measures – empowerment of community with knowledge – awareness
				Development of a policy for informal development settlements
				Ensure suitable access routes to all informal settlements – for fire-fighting rescue purposes



Infrastructure	Water Pollution			
Water & Sanitation Infrastructure		Liaison with National Water Resource Management Bodies of SA regarding unsustainable development practices in and around water resources	Design, develop & implement alternative, new innovation green water purification plants moving away from status quo practices	Implementation of new innovation water purification systems at the extraction point
		Develop a reward & penalty water pollution management system for all custodians	Alternative and more sustainable dumping policy (dumping of sewage, industrial & agricultural waste)	Implementation of reward and penalty water pollution system
		Water harvesting & recycling & re-use programs and projects	Water harvesting, desalination, water efficiency, waste water treatment, recycling and re-use technologies programs and projects	Strengthen and formulate new by-laws for sustainable development practices up-stream for all water resource users
Infrastructure	Floods			
Water & Sanitation Infrastructure		Formulate sustainable development practices in floodplains	Determine appropriate flood lines and hydrographs indicating water levels and time interval for the implementation of appropriate flood early warning systems.	Determine flood lines to determine floodplain sustainable development policy
Planning				Monitoring of river water levels
Disaster Management & Fire Fighting				Flood early warning system
				Evacuation procedures and drills
				Building regulations



Administration	Epidemic & Disease			
Personal Health & Environmental Health Services		Develop new sustainable development and food handling policy guideline	Due to unsustainable practices, the risk of epidemic & disease increased, e.g. water pollution may cause bilharzia, malaria, cholera and contaminated food products may lead to listeriosis and can all be prevented through sustainable development policies and promotion of safe handling of food.	Compile pro-active epidemic and disease risk reduction guidelines
Provincial Department Communicable Diseases / District Environmental Health /				Dissemination of information through public awareness and education programs
				Capacity building for pro-active disease and epidemic outbreaks (improving hygienic level of population, vaccination, registration and control of carries, preventing infection begin brought into large population areas, protection of borders and medical education)
Administration	Hazmat			
Disaster Management & Fire Fighting		Implement Hazmat prevention and mitigation strategies	Public training, awareness and education programs	Appropriate risk reduction measure to ensure safe transportation and appropriate route planning for the transportation of such material,
Fire Departments: Transnet, ACSA & SANDF / Department of Environmental Affairs				Improvement, updating and disseminating of relevant storage regulations for specific hazmat categories,
				Appropriate training programs for safe handling of hazmat per specific hazmat category.



Administration	Geological Threats			
City Engineering / Community & Social Development: Emergency Services Disaster Management		Drafting & Implementing appropriate rehabilitation strategy for all geological threats in the FBDM area of jurisdiction	Develop and implement pro-active geological risk reduction plan	Identify short term stabilising risk reduction remedial works for the Big Hole.
Private Sector: De Beers, Petra Diamonds / Department of Mineral Affairs				Implementation of prevention & mitigation & rehabilitation projects for Open Cast Mine with priority to the Big Hole
Administration	Aircraft Accidents			
Disaster Management & Fire Fighting		Liaison with ACSA to implement appropriate prevention & mitigation strategies	Develop and implement pro-active aircraft risk reduction remedial works	Liaise with ACSA regarding safe training flight paths for small airplanes
Governmental Departments: ACSA, Transnet / Ambulance Service (Provincial & Private) / SAPS				Continuously liaison with ACSA for most suitable and safe flight paths in and around FBDM area of jurisdiction
Planning	Erosion			
Disaster Management & Fire Fighting		Develop erosion prevention & mitigation guidelines	Implement pro-active erosion risk reduction remedial works	Develop land management field manual maps for cropping lands guiding land-use management for each soil type
Provincial Departments: Agriculture, Land Affairs, Environmental Affairs				Develop land management field manual maps for grazing lands guiding land-use management for each soil type
				Encourage soil surface covering projects and implementation of more sustainable farm management practices



CLOSING REMARKS

It is clear from these analyses that communities are no longer only vulnerable because of the risk profile in their area of jurisdiction but are exposed to international events. Henceforth, all spheres of Government must take cognizance of what is happening on the globe. The Covid 19, Coronavirus pandemic is a wake-up call for all spheres of Government Internationally. Behind the scenes are forces at work that will stop at nothing, not even sacrifices of human lives, to reach their own agendas and goals. HAARP, is another international man-made manipulation of weather patterns that cause devastated disasters on the globe. The impact of HAARP on the Africa continent is an increase of 40% in drought patterns. At other places along the coasts of targeted areas, HAARP is used to create cyclone to wipe out communities – as it was indicated that this weapon is use for weather war against humanity. Few are aware of what is happening at CERN in Switzerland. Cern, and European Organization for Nuclear Research on the surface seems innocent, but at the entrance stands the statue of Shiva – the goddess of destruction. This is in a nutshell exactly what Cern is all about – as some beliefs out of destruction and chaos comes a new order – “*order out of chaos*”. Scientists at Cern are investigating matter (*matter is the foundation of everything the Universe is made up from*) and now also found dark matter (*anti-matter which is very unstable and uncertain*) in the Universe. One grain of anti-matter is the equivalent of four atomic bombs dropped on Hiroshima. Stephen Hawking, an international well-known nuclear scientist, and an atheist announced: “*Activities at Cern, could pose create dangers to our planet. The god particle found by Cern could destroy the Universe. Do they know what they are doing? You are about to open pan doors box and once the box is open you cannot put what is coming out back into the box*”. Hawking, an atheist who does not believe in the spiritual world believes that scientists at Cern is trying to unleash the gates of hell.



The above-mentioned, is only a few examples of what is going on in the national arena – it all path the way to create fear, chaos and destruction for one purpose: “to bring a new order out of this chaos”. That is the new world order.

Let members of all spheres of Government take cognizance of this warning – disasters will increase on planet earth. The cloud of darkness will get thicker and the “*light*” will get brighter – it all depends on which side you choose to be. There is only one precaution measure to be pro-active for the next international disastrous event that is at hand; “*That is to accept Jesus Christ as your savior*”.