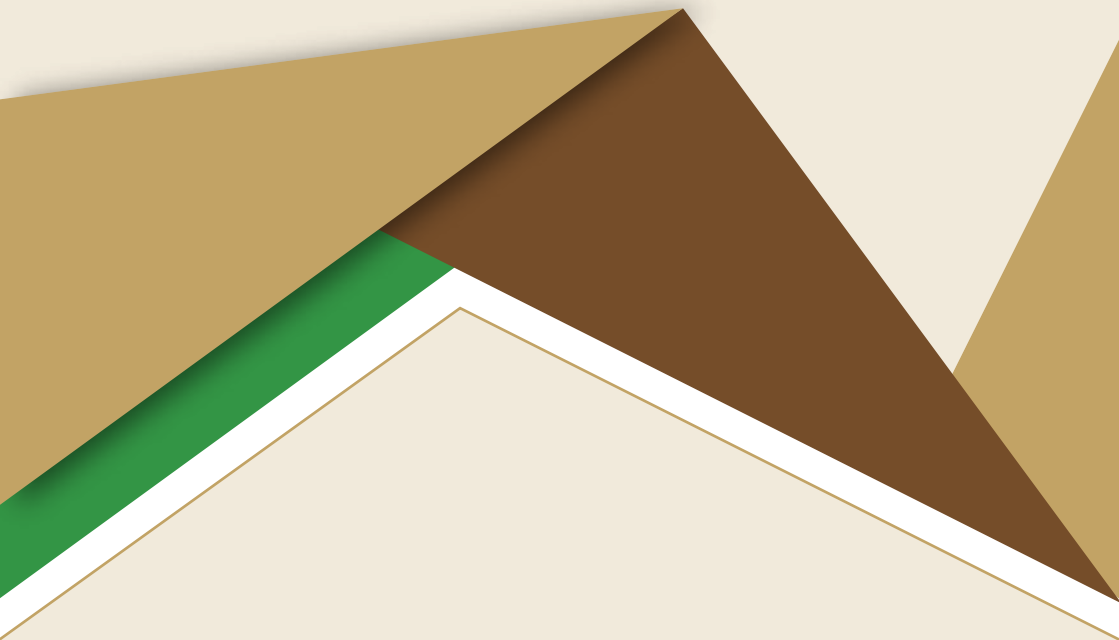




# Physical Security and Stockpile Management: Preconditions and Sustainability



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## Introduction

National and international interventions are often able to improve Physical Security and Stockpile Management (PSSM) practices in the short-term. However, these improvements are often not maintained over time. In extreme cases, significant improvements to the safety and management of stockpiles, including the provision and construction of key infrastructure, have produced short-term benefits but have fallen out of use within a matter of years. Repeated often enough, the result is a series of piecemeal and disconnected interventions that, while well-intentioned, achieve little lasting impact. The reasons for this go beyond the absence of sufficient resources to maintain weapons and ammunition management projects over the long-term. Instead, they include a range of institutional and structural factors at the policy and operational levels that, when unaddressed, severely limit the sustainability of PSSM projects.

This Operational Guidance Note (OGN) draws on experiences relevant to African contexts and identifies the central preconditions that should be in place in order to improve the sustainability of PSSM interventions. These preconditions include transparency, oversight and visibility, regulatory frameworks, operational priorities, stock valuation, awareness and training, storage infrastructure, and risk management. The OGN suggests that, when PSSM interventions take place in the absence of one or more of these necessary preconditions, the intervention should start at the local level and seek to establish the missing precondition(s) as part of the intervention. This is because sustainability will only be assured if the identified weakness is addressed. Guidance in prioritising the steps that can be taken to achieve significant improvements in PSSM project sustainability is provided at both the policy and operational levels, as well as at the level of individual PSSM interventions.

## Key References

There are two key references for this OGN. These are:

- The International Ammunition Technical Guidelines (IATGs)  
<https://www.un.org/disarmament/convarms/ammunition/iatg/>
- The International Small Arms Control Standards (ISACS)  
<http://www.smallarmsstandards.org/isacs/>

For more detailed practical guidance on the physical security and management of stockpiles of weapons and ammunition, readers may refer to two accompanying OGNs within this series:

- Incremental Steps towards the International Small Arms Control Standards.
- Incremental Steps towards the International Ammunition Technical Guidelines.

## Identification of Factors Limiting PSSM Sustainability

In parts of Africa, there are problems with the inadequate, and even dangerous, storage of large quantities of weapons and explosives. The factors that lead to these problems are also linked to problems of PSSM project sustainability. This is because the issues that lead to poor storage practices are, in most cases, the same issues that limit the sustainability of any project designed to improve PSSM. Put otherwise, the factors that contribute to Unplanned Explosions at Munitions Sites (UEMS) are often the same underlying factors that undermine PSSM project sustainability. Lessons from accidents are therefore relevant to this OGN, and what follows below, is a series of sustainability factors derived from this linkage.

Elevated risk levels in PSSM, seen both globally and in the African context, are commonly caused by:

- Inappropriately large holdings of ammunition (inappropriate in relation to storage capacity, and/or mismatched against operational requirements).
- Deterioration of stored ammunition over time, with a corresponding reduction of stability and an increase in risk. A reduction of the shelf life of stored ammunition may also be caused by rough handling and exposure to elevated/fluctuating temperatures and humidity levels.
- Inadequate human resource capacity, and knowledge, to manage stock effectively.
- Storage infrastructure and procedure that is inadequate to mitigate the risks, and consequences, of an unplanned event.
- Inadequate prioritisation of resources to reduce risk.

Behind these risk factors are a number of institutional and structural contributory factors at the policy, operational, and local levels. Each of these institutional and structural factors has an impact on the sustainability of PSSM interventions, and they are discussed in turn below.

## Stock Holding

### 1. Transparency

The separation of stockpiles into what is 'required' and what is 'surplus' can be sensitive. If many weapons are removed from a stockpile, or declared surplus or unusable, what remains is a reduced (and more accurate) reflection of operational capacities. There is, therefore, understandable sensitivity surrounding weapons stocks, and full transparency is difficult to achieve. The result of this, however, is a lack of oversight, and a tendency to retain, rather than dispose of, surplus stock.

Steps to consider in addressing this issue are mainly at the policy level, and include:

- Policy directives requiring surplus stock to be identified and disposed of, with identification of the accountable risk owner.
- Introduction of surplus stock monitoring and reporting requirements.
- In international fora, the introduction of surplus stock transparency reporting mechanisms.
- Operational doctrine and procedure to ensure operational (i.e., usable, needed) weapons stock holdings are defined and known, and tied to military requirements and the weapons systems in use.

### 2. Oversight and visibility

Without communication, including reporting and meeting structures at higher command and policy levels, accountability remains weak and the ability of management to act is impaired. Most Ammunition Storage Areas (ASAs) are behind locked doors and out of the public eye, and even most members of the security forces do not visit them. Stockpiles receive relatively little visibility or

consideration even at the local level. However, without suitable governance and risk management mechanisms, considerations of safety and risk surrounding ammunition storage – such as accumulating stock levels when usage rates are lower than predicted - can easily fail to be elevated to the right level. When coupled with poor or inefficient stock monitoring and recording systems, the effect is that the issue remains 'out of sight and out of mind,' dealt with on a daily basis only by relatively few individuals. Without the ability to aggregate information, the full extent of a nation's ammunition holdings can be difficult or impossible to ascertain, masking the issue and hindering the prioritisation of resources to reduce risk.

Steps to address a lack of stockpile oversight and visibility include:

- Policy on stockpiles that allocates accountability, introduces reporting requirements, and separates ownership of standards for munitions storage from responsibility for compliance with them and establishes approaches to risk management.
- Establishment of transparency reporting mechanisms in international fora, which enable states to share and publicise commitments to surplus stockpile reduction, plans to implement, best practice in doing so, and progress in reducing surplus stocks.
- Policy steps to publish information on surplus stockpile levels and plans for risk reduction and disposal.
- Introduction of national guidelines for ammunition management.
- Operational doctrine and procedure to establish monitoring mechanisms and reporting requirements for surplus munitions stock. These should ensure oversight by local commanders in the first instance, and be standardised to enable aggregation in due course when resources permit.
- At the local level and in individual PSSM interventions, high profile pilot projects and the "showcasing" of interventions should be considered.

### 3. Accountability levels and regulatory framework

With several agencies involved in arms and ammunition control, and with low visibility of the risks of storing surplus and aging ammunition, it is often unclear who is accountable for accidents, and to whom. In other words, risk

ownership and the accompanying governance structures for risk ownership are often not well established. This is compounded by the unclear separation of policy, regulatory, and management functions. In situations where actions, or omissions, by armed and security forces pose lethal risks to civilian populations and infrastructure, it is appropriate for oversight and ultimate responsibility to be held at the ministerial level. Furthermore, policy should be in place to establish regulatory and management accountability within government and armed forces structures, and to introduce monitoring and regular reporting requirements and require surplus stocks to be identified and reduced. There may be several armed duty bearers in a particular country, and all of these agencies, plus their governing ministries will need to be involved. Other agencies may include finance ministries (for funding) and urban/rural planning departments and local governments (for siting storage facilities). To simplify matters and expedite action in conditions of high risk and resource shortage, an approach that focuses on those agencies that are responsible or involved in storage that poses the most significant risk (for e.g., high explosive content munitions) is a useful starting point.

Actions here are at the policy and operational levels and include:

- Establishment of political ownership for risks associated with munitions storage. It is appropriate to focus on the storage of munitions that pose the greatest risk. These tend to be aircraft bombs and high explosive content munitions, generally the preserve of armed forces and, therefore, ministries of defence. Where multiple agencies are involved, consideration should be given to the appointment of a lead agency, and the formation of an inter-agency committee.
- Promulgation of policy on the reduction of risks associated with ammunition storage. Policy should require surplus stocks to be identified and reduced, establish accountability for the planning and implementation of surplus stock reduction, mandate reporting and monitoring requirements, separate responsibility for storage standards from implementation, and commit to transparency on progress in regard to surplus stock reduction.
- Establishment of guidelines for ammunition storage, and policies for risk management approaches. Guidelines should, as far as practicable, be IATG compliant, and, in conditions of resource scarcity, follow the IATG's

suggested incremental approach toward implementation.

- Establishment of operational doctrine to link military procurement and stockpiling firmly with military capability requirements, to make commanders upwardly accountable for the risk management of stocks, and to maximise use of stores nearing the end of their shelf life (e.g., for live fires training).

Where PSSM interventions take place without these structures in place, sustainability will be severely limited. Therefore, to improve the likelihood of long-term sustainability, PSSM interventions will need to be planned and resourced to provide the local risk management, oversight and monitoring actions that are missing when appropriate regulatory frameworks are absent.

## Operational priorities

At the operational level, resource scarcity can lead to a focus on front-line, operational capability issues rather than support and logistics. As a result, mismatches in weapons and ammunition stock can occur. This is understandable but counter-productive when it comes to ammunition supply: the ability to supply the right ammunition to the right weapons system operators at the right time confers an operational advantage.

Actions here include:

- Training at command and staff levels in munitions management aspects of procurement and logistics.
- Introduction of operational doctrine that promotes an understanding that the reduction and disposal of unsafe munitions confers a logistical and operational advantage.
- Doctrine and logistics processes to maximise training use of munitions nearing the end of their shelf lives. Old stock nearing the end of its shelf life constitutes an asset that is often cheaper to train with in live fire exercises than it is to dispose of after not being used at all.
- In procurement processes, the introduction of through-life cost consideration stock valuation.

When ammunition stocks continue to feature as operational and financial assets,

there is less of an incentive to remove them. For example, the authors know of ammunition in one country that was received in the mid-1980s. It is still held by the recipient country, even though the weapon system itself was never delivered and no longer exists. The same country also holds stocks of aircraft bombs, even though it no longer has any aircraft capable of carrying the bombs. The reason given for this was that the ammunition had been brought “onto the books” with a cash value, and the officers responsible for storing the ammunition did not have the authority to write it off.

Action here is a sustainability condition, in that without it, store quantities will tend to increase due to the reluctance to write off weapons and ammunition currently in storage. Possible solutions to this issue, at the operational level, include the revision of accounting doctrine through:

- Introduction of through-life procurement processes and associated accounting.
- Introduction of depreciation charges for booked assets, and associated accounting and management practice.
- Realistic munitions write-down procedures that reflect the reality that munitions are lifed items that become a costly liability once their useful life has expired.

## Stock Condition

### 1. Understanding munitions deterioration

Ammunition is a deteriorating asset, the value of which descends below the point of worthlessness to become a liability and source of risk. The storage of ammunition is normally undertaken by logistic personnel, and these non-specialists (in weapons storage) may not have received comprehensive guidance concerning the shelf life of ammunition and asset disposal. This can be a problem even during routine inspections when an ASA may appear neat and tidy but still be hazardous, and dangerous deterioration in stock condition can go unnoticed. In the example below, the stack shown appears to be held in a very tidy manner, but poor stock management means that some of the contents of the boxes at the bottom of the stack are actually very old.

A number of capacities are required to address the issue of deteriorating ammunition, including in terms of human resources, information management and monitoring, as well as logistical and disposal capacity. Further compounding these issues is a lack of awareness of ammunition deterioration and shelf life, which can occur through insufficient training, inadequate stock record keeping, and poor awareness of environmental and handling factors.



*Figure 1 - Poor stock management means that some of the contents of the boxes at the bottom of the stack are actually very old.*

## Awareness and Training

In addition to the steps mentioned above, the sustainability of PSSM interventions will be significantly improved if investment is made in raising the awareness of operators and local commanders. It is insufficient to provide training to mid- or lower-level technicians (as recommended in IATG 01.90, discussed below), if local risk owners (for example, commanders of military units housing ammunition on the compound) are not made aware of the risks they are carrying and do not understand that they are accountable for these risks. Steps for achieving this include:

- Munitions awareness training at the level of unit commanders charged with its storage.
- Munitions management modules in command and staff courses.

The training of operators should follow the requirements of the IATGs. However, where limited resources do not permit the training of operators to IATG levels,

even modest investments in awareness raising are likely to yield significant sustainability benefits. With sustainability in mind, training should, however, centre on all relevant stakeholders at the local level, including commanders, and not simply focus on the establishment of a limited number of qualified ASA operators.

IATG training requirements are set out in IATG 01.90: Ammunition management personnel competences. Generally speaking, at least one Ammunition Officer would normally be expected to be in each ASA. However, where resources are limited, the largest target for training is the junior staff for each ASA: the 'Ammunition Handler's Course' need only be two or three weeks long, providing that trained handlers are suitably supervised. A detailed breakdown of the content of each and every available training course is beyond the scope of this OGN and would depend on a detailed training needs analysis focusing on the local context.

## Storage Infrastructure

It is common for safety precautions to be thought of entirely in terms of their cost. The safe storage of even moderate amounts of explosive ordnance requires significant investment in terms of infrastructure and, as noted above, ongoing investment in human and monitoring resources. By way of example, the authors encountered an ASA of perhaps 1000+ tons that was kept in a tin shack within 100 metres of an apartment building. The apartment building was also being used to hold rubbish and a considerable number of items of unexploded ordnance. In this instance, the infrastructure investment, and risk management of holdings, were clearly inappropriate to the net explosive quantities stored. It was recommended that the holders of the ASA remove the surplus stocks. However, this was not done and the shed subsequently exploded.

Storage infrastructure is costly both to establish and maintain, especially when building to internationally recognised ammunition storage requirements. In addition, storage infrastructure has no inherent sustainability in the absence of associated governance structures, including, most notably, the active management of the stock within the storage facility. PSSM interventions that focus solely on storage infrastructure are likely to fail in the longer term, and recognition is



*Figure 2 - An ammunition store containing unused ordnance, recovered unexploded ordnance (some in a very unstable condition) and wooden and paper waste material.*



*Figure 3 - This is the same ammunition store. It is in an unprotected light building with considerable urban development outside the compound, including one new apartment building within 100m.*

needed that storage itself is a long-term, costly decision. However, it should also be recognised that shortcuts in storage infrastructure constitute acceptance of reduced safety margins in comparison to international standards, and should not be regarded as an acceptable long-term solution. Recommendations for storage infrastructure therefore revolve around:

- Implementation of IATG 3-level 'road map' recommendations towards storage compliance.
- Reduction of stock levels to minimum levels, to reduce infrastructure and longer-term sustainability implications to a minimum.

## Risk Management

A risk management approach to ammunition management is a cornerstone of the IATGs. In conditions of high (or undefined) risk, appropriate risk management procedures offer a means of ensuring that limited resources are applied to best effect. Effective risk management in ammunition storage calls for oversight of the size of the hazard and the consequence of an incident. Risk management principles call for:

- Removal of unnecessary risk, which implies:
  - o Matching munitions holding levels with operational requirements.
  - o Acceptance of the principle that surplus stock should be used, transferred, or destroyed.
  - o Monitoring and reporting mechanisms to allow oversight of risk levels. Where these do not exist or cannot be aggregated, they should be put in place at the local level before attempts to aggregate and create oversight at higher levels.
- Acceptance of risk at the right level, which implies:
  - o Allocation of accountability for munitions storage, with regular reporting mechanisms, plans for risk reduction (which will vary depending on the local context) and progress reports.

There are a number of actions involved in reducing ammunition liability. These are discussed below.

- **Reduce the magnitude of risk.** A needs assessment will be instrumental in the development of any potential ammunition storage solution. Reduction of the risk relating to ammunition storage can be achieved through:
  - o Reduction of surplus stock through use (training), transfer (sales), or destruction.
  - o Removal of stock to locations where the consequences of an unplanned explosion are minimised.
  - o Improvements in storage management systems and infrastructure. This route is expensive, and applicable to irreducible stocks of needed ammunition only, once surplus stock has been eliminated.

- **Inspection and proofing.** A comprehensive monitoring, reporting, ammunition inspection and proofing regime will identify old stocks that are no longer fit for use and thus help to reduce overall liability.
- **Turnover.** Calculations of stock requirements, linked to annual operational usage rates and the shelf life, are a key prerequisite for adequate stock management.

## Prioritizing Sustainability Considerations

Ensuring the sustainability of PSSM actions entails addressing issues at several levels. As identified above, key issues centre on policy, regulatory frameworks, relevant operational doctrine, monitoring and reporting mechanisms, visibility of the issue, ownership of risk and accountability for it, infrastructure, training and resourcing of operators and managers, and risk management systems. Taken together, these elements constitute a governance system for PSSM interventions which, along with a set of principles (articulated in policy), will provide assurance of correct oversight, ownership, planning, and resource allocation. The key actions and steps required in this governance system, at the policy, local, and operational levels, are summarized in Table 1 below.

Addressing PSSM risks in conditions of limited resources, where many features of the aforementioned governance system may be absent, demands a degree of prioritisation. For example, it is likely that progress can be made in reducing levels of unsafe stock, despite weaknesses in the governance system. However, sustainability will only be assured if compensation is made for the identified weakness. The guiding principle, and chief tool, for doing so should be that PSSM interventions that take place in the absence of necessary preconditions should start at the local level, and should seek to establish the missing components of the governance system as part of the intervention. For example:

- While it may be impossible to establish accurate national stockpile holdings and relate them to the national operational requirement, it may be possible to match local holdings with the local requirement, and PSSM interventions should seek to do so.
- National risk management architecture may be absent or difficult to adapt. But adoption of the principles at the local level, with identification of the local



risk owner, and establishment of reporting mechanisms to enable him or her to have the oversight to make informed decisions about munitions management may be possible, and should be included in PSSM actions.

- Where national public plans and reports, and international transparency reporting is absent, PSSM interventions should seek to maximise visibility of the action through local reporting, and publicity of successful pilot projects.

More generally, PSSM interventions should include an assessment of the factors outlined in this OGN. The guiding principle mentioned above should also be used to address weaknesses and ensure intervention sustainability.

## Coherence between Interventions

If PSSM interventions take place in situations where there are weaknesses in the key governance areas outlined above, then coordination between agencies undertaking PSSM activities is key, particularly if continuity of approach is to be maintained. This will necessitate information sharing between actors as far as possible, progress reports, and identification of the key issues and lessons to be addressed. Where accountability for munitions safety and stockpiles is firmly established, the responsibility for establishing and maintaining information sharing fora, and for stakeholder identification and engagement, will clearly lie with the accountable national agency, or the lead agency where an inter-agency arrangement is in place. Where it is not, more ad-hoc and informal coordination mechanisms may need to be set up, and agencies involved in PSSM initiatives should seek to do so. It follows that consideration of coordination structures, arrangements for information sharing, and stakeholder analysis should form part of PSSM interventions.

## Summarized Sustainability Considerations

It should be apparent that there is no 'quick fix' to sustainability that can be achieved by the provision of a piece of equipment, infrastructure, or training in isolation. A holistic approach is needed to achieve the sustainable safe storage of explosives, ammunition and weapons, even in conditions of resource scarcity. Laying the foundation for the sustainability of PSSM interventions involves clarity

of accountability for the problem, and acknowledgement of political/ministerial oversight and ultimate accountability. It involves the separation of regulatory authority and standards from operational and management structures. It requires policy on risk management approaches and principles to be produced and adopted. Finally, it demands a range of adjustments and provisions at the operational doctrine level, as well as a regular stakeholder engagement structure, structures for inter-agency meetings, risk management documentation and communication.

Incentives to reduce stockpiles include regarding ammunition holdings as a rapidly depreciating asset. They include doctrine and training to consider storage consideration an operational enabler, to understand that depreciation can be limited by correct storage conditions, and to realise that stock nearing the end of its useful life can still provide operational benefit in live firing and other training events.

*Table 1. Sustainability considerations at a glance*

1	Transparency	Sensitivity on weapons stocks, which relate to issues of operational capability, can reduce oversight, and lead to retention in preference to disposal of surplus stock.	<p>Policy:</p> <p>Directives on surplus stock;            Identification of accountable risk owner;            Surplus stock monitoring and reporting requirements;            In international fora, surplus stock transparency reporting mechanisms.</p> <p>Operational :</p> <p>Doctrine and procedure to define operational (i.e., usable, needed) weapon stock requirement.</p>

2	Oversight and visibility		<p>Policy: Allocation of accountability; Reporting requirements; Separation of standards and implementation roles; Risk management policy; Transparency reporting mechanisms in international fora; Public information policy on surplus stockpile levels and plans.</p> <p>Operational: National guidelines for ammunition management; Monitoring mechanisms and reporting requirements for surplus munitions stock.</p> <p>At local level and in individual PSSM interventions: High profile pilot projects and “showcasing” of interventions.</p>
3	Regulatory frameworks	Lack of key regulatory frameworks results in loss of accountability, visibility, and safety standards.	<p>Policy: Political ownership identified – consideration of lead agency; Policy on reduction of surplus stock, monitoring, and risk management; Separation of standards and implementation roles.</p> <p>Operational: National guidelines for ammunition storage; Procurement and stockpile linked with capability requirements; Use of stores for live fires training</p>
4	Operational priorities	Lack of resources drives focus toward front-line capacity, rather than logistical and munitions storage issues.	<p>Operational: Training at command and staff levels; Doctrine to further the understanding of links between munitions management with operational capability; Use of aging stock for live fires training; Through-life cost procurement.</p>

5	Stock valuation	Asset value reduces incentives to dispose of stock.	Operational: ‘Through-life’ procurement; Depreciation charges for booked assets; Realistic munitions write-down procedures.
6	Awareness and training	Awareness of issues is required at operator and managerial level.	Munitions awareness training for unit commanders, and in logistic modules at command and staff courses; Training of operators to IATG standards where resources permit; Focus on junior staff ammunition handlers in scarce resource situations.
7	Storage infrastructure and systems	Should be understood as a costly solution, to be applied after other risk and stock reduction has taken place.	Implementation of IATG 3-level “road map” toward storage compliance; Reduction of stocks to minimum necessary levels.
8	Risk management	Options for risk reduction vary by location and context. Effective management requires understanding and application of risk management principles and procedure.	Introduction of risk management policy and guidance to select local options; Reduce surplus stock through use, transfer, or destruction; Removal of stock to safer locations; Provide suitable infrastructure.

## Conclusion

Some of the central risks pertaining to munitions storage are inappropriately large holdings of ammunition, the deterioration of stored ammunition over time, environmental and handling factors, human resource capacity and knowledge, storage infrastructure and procedure, and the poor prioritisation of resources to reduce risk. The contributory factors that result in the materialisation of these risks, and in commonly seen weaknesses in munitions storage, are key factors affecting the sustainability of PSSM interventions. These factors are present at the local, operational, and policy levels, and steps to address them, and to strengthen PSSM sustainability include transparency initiatives, the allocation of accountability, measures to improve oversight and visibility, regulatory framework improvements, operational doctrine considerations, accounting and procurement improvements, awareness and training initiatives, strengthened risk management and risk reduction, and the application of standards to storage infrastructure and systems. Taken together, these factors form a governance system, the existence of which is a precondition for the success, and sustainability, of PSSM interventions. Interventions should be designed to address weaknesses in the governance system, starting at the local level, and prioritising resources according to the local context to maximise risk reduction. While local improvements may be achieved without this analysis and consideration, the effects are likely to be unsustainable, and the investment wasted.





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