



# MANAGING MINERAL WEALTH THROUGH NATURAL RESOURCE FUNDS: A SYSTEMATIC REVIEW

TECHNICAL REPORT, JANUARY 2018

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**Funding**

This is an independent report commissioned under the DFID Systematic Review Programme for South Asia. This material has been funded by South Asia Research Hub, Research and Evidence Division, Government of UK. The views expressed do not necessarily reflect the UK Government's official policies.

**Acknowledgements**

The authors gratefully acknowledge the advice and feedback received from the Advisory Group, comprising Prodipto Ghosh, Distinguished Fellow, TERI, S. Vijay Kumar, Distinguished Fellow, TERI and Nitya Nanda, Fellow, TERI.

The authors are also grateful to Kelly Dickson, Jeff Brunton, Claire Stansfield and Mukdarut Bangpan at the EPPI-Centre; Sujata Gamage at LIRNEasia; Pooja Singh, Neha Rajpal, and Gunjan Bansal at PricewaterhouseCoopers (PwC India); and MK Bineesan and Kiran Shivpuri at TERI for their support in the preparation of this review.

**Conflicts of interest**

There were no conflicts of interest in the writing of this report.

**Contributions**

The opinions expressed in this publication are not necessarily those of the UK Department for International Development, PwC India, the EPPI-Centre or LIRNEasia.

**Citation**

This report should be cited as: Ghose J, Bakshi SK, Arora N, Sharma R, Deepa N, Govindan M (2016) *Managing mineral wealth through natural resource funds: A systematic review*. Technical Report. London: EPPI-Centre, Social Science Research Unit, UCL Institute of Education, University College London.

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## LIST OF ABBREVIATIONS

CASP	Critical Appraisal Skills Programme
DFID	Department for International Development
DRC	Democratic Republic of Congo
EITI	Extractive Industries Transparency Index
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GIRoA	Government of the Islamic Republic of Afghanistan
HIC	High-Income Country
LIC	Low-Income Country
LMIC	Low- or Middle-Income Country
MEITI	Myanmar Extractive Industries Transparency Initiative
MGE	Myanmar Gems Enterprise
MOGE	Myanmar Oil and Gas Enterprise
MOMP	Ministry of Mines and Petroleum
NGO	Non-Governmental Organization
NLD	National League for Democracy
NRF	Natural Resource Fund
NRGI	Natural Resources Governance Institute
NRR	Natural Resource Revenue
NRRM	Natural Resource Revenue Management
NRSF	Non-renewable Resource Stabilization Fund
OSF	Oil Stabilization Fund
PSC	Production Sharing Contract
PwC	PricewaterhouseCoopers
RGI	Resource Governance Index
SOE	State-Owned Enterprise
SWF	Sovereign Wealth Fund
TERI	The Energy and Resources Institute
UMIC	Upper Middle-Income Country

## EXECUTIVE SUMMARY

### ABSTRACT

This systematic review sought to understand the efficacy of natural resource funds (NRFs) as an intervention to manage revenues from mineral resources in low- and middle-income countries experiencing politically fragile circumstances. An NRF is a type of a sovereign wealth fund, and is a government-owned special-purpose investment vehicle whose principal source of financing is revenue from mineral resources such as petroleum, natural gas and coal.

This review was done in two stages. A range of natural resource revenue management interventions were examined in Stage I and, based on a mapping of identified studies, the focus of the review was narrowed to NRFs in Stage II. A configurative synthesis of evidence was conducted to answer three questions related to: existing practices and policies relating to NRFs; the extent to which NRFs have been able to meet stated objectives; and measures which can be taken to make NRFs more effective, including in poor governance contexts.

The impacts of NRFs have been diverse. While some NRFs have been able to ensure smoothing and stabilization of government expenditure, studies also show that they have led to increased volatility and unsustainable spending in certain cases. Their impact on socio-economic development is similarly mixed. Key enablers required for the effective functioning of NRFs include: (i) defining objectives at the outset; (ii) clear fiscal rules governing the deposit of funds into and withdrawal from NRFs; (iii) rules governing utilization of money, especially relating to investment decisions; (iv) developing domestic expertise in NRF management; and (v) instituting transparency and accountability measures such as enabling independent oversight agencies, civil society organizations and citizens to monitor the performance of the fund.

### BACKGROUND

The effective management of revenues generated from the extraction and use of natural resources, especially mineral resources, can lead to improved economic and social outcomes in resource-rich countries. However, mismanagement of these revenues can exacerbate poverty, inequality and conflict. It thus becomes imperative to understand the range of interventions which are available to governments to manage resource revenue effectively. Key interventions include competitive bidding, royalties, resource rent taxes, production sharing contracts, natural resource funds, cash transfers, sector-specific budgetary allocations, independent audits and effective sanctions. However, these interventions have been used with varying levels of success, partly because of the design of the intervention and partly because of other factors such as political will, technocratic ability, and appropriate transparency and accountability measures.

Nonetheless, if used appropriately, interventions to manage and augment revenues from natural resources may help governments to raise levels of natural resource revenue, ensure its optimal allocation, and bring in transparency and accountability in its management.

### OBJECTIVES

The objective of this review was to understand the efficacy of NRFs as an intervention to manage revenues from mineral resources, including in low and middle-income countries experiencing politically fragile conditions. An NRF is a type of a sovereign wealth fund, and is a government-

owned special-purpose investment vehicle whose principal source of financing is revenue from mineral resources such as petroleum, natural gas and coal.

The review was divided into two stages. In the first stage, reviewers examined interventions for mineral resource revenue management more broadly, including: (i) generation-related interventions such as competitive bidding, royalties and resource rent taxes; (ii) allocation-related interventions, such as NRFs, cash transfers and sector-specific budgetary allocations; and (iii) transparency- and accountability-related interventions such as independent audits, reporting requirements and effective sanctions.

Based on a mapping of literature in the first stage, in the second stage of the review the focus was narrowed down to NRFs as an intervention to manage natural resource revenue. The review sought to understand key practices relating to NRFs, their effects, and how to make NRFs more effective, including in low and middle-income, politically fragile countries.

## METHODS

Stage I of the review included: (i) searching relevant databases for studies, using the inclusion and exclusion criteria based on our primary review question ‘how can mineral resource revenue be managed effectively in resource-rich, developing (low- and middle-income) countries, experiencing politically fragile conditions?’; (ii) screening studies to exclude those that did not meet the inclusion criteria; and (iii) coding key characteristics of the studies included for mapping based on the inclusion and exclusion criteria. These characteristics included details such as publication date, aim and study design, geographical location and other descriptive details to support analysis in Stage II.

In Stage II of the review, the focus of the review was narrowed to examine the functioning of NRFs as an intervention to manage revenue from mineral resources in particular. Based on key characteristics of studies identified in Stage I, 41 studies were selected for data extraction, quality appraisal, and synthesis. A configurative synthesis of these studies was conducted to answer the three in-depth review questions:

- How are NRFs used to manage resource revenues by resource-rich countries?
- What has been the effect of existing NRFs used to manage natural resource revenue?
- How can NRFs be made more effective, including through institutional support and revenue sharing arrangements between national and sub-national levels of government?

## RESULTS OF STAGE I: SEARCHING, SCREENING, AND CODING

Our initial search identified a total of 7,387 studies. After removing 2,510 duplicates, 4,877 studies remained. These studies were screened based on their titles and abstracts and 4,204 studies were excluded as they did not meet the inclusion criteria. The inclusion and exclusion criteria are outlined in detail in Chapter II. Of the 673 studies which remained, 293 studies were coded after a full-text screening.

We found that 226 studies examined interventions pertaining to allocation and distribution, 75 studies examined interventions relating to transparency and accountability, while 48 studies examined interventions pertaining to revenue generation. Further, of the 226 studies which examined interventions pertaining to allocation and distribution, the largest number (n=127) examined NRFs, while 35 examined sub-national transfers and 20 examined cash transfers. This

allowed us to focus on NRFs as an intervention for the management of mineral revenues in Stage II of the review.

In terms of outcomes examined, 196 studies examined outcomes related to allocative efficiency, such as resource revenue sharing, cash transfers and intergenerational equity; 72 studied outcomes relating to revenue and output; another 72 studied outcomes relating to transparency and accountability, while 26 studied outcomes relating to institutional capacity. If a study examined more than one intervention or outcome, all relevant interventions or outcomes examined were coded. This implies that codes were not mutually exclusive, and the total number of interventions or outcomes examined is more than the total number of studies.

## RESULTS OF STAGE II: DATA EXTRACTION AND SYNTHESIS OF EVIDENCE

Of the 293 studies which were coded, 127 studies examined NRFs as a natural resource revenue management intervention and were included in the in-depth review. The reviewers screened the 127 studies and selected those studies which had data pertaining to any of the three review questions for the synthesis. Consequently, 41 studies were identified for data extraction and synthesis. A configurative synthesis of evidence from these studies was conducted to answer our three main review questions. Key findings for each of the three questions are outlined below.

### 1. HOW ARE NATURAL RESOURCE FUNDS USED TO MANAGE RESOURCE REVENUE BY RESOURCE-RICH COUNTRIES?

Mineral resources such as coal, oil and gas generate large revenues for governments, and the effective management of the revenue generated from these resources can contribute towards economic growth and development. However, evidence shows that resource-rich countries experiencing politically fragile conditions have also seen an escalation of conflict, regional inequality and unsustainable levels of public spending after resource discovery. This has been attributed to low transparency and accountability, rent seeking, and low absorptive capacity.

Resource-rich countries establish NRFs for several reasons, chief among them being macroeconomic stabilization, sterilizing revenue flows to protect against outcomes such as Dutch Disease,<sup>1</sup> promoting socioeconomic development, high returns from investments, and promoting intergenerational equity.

#### DEPOSIT, WITHDRAWAL, SAVINGS AND INVESTMENT RULES FOR NRFS

Countries have adopted a range of fiscal rules and management structures to operationalize NRFs. We find that fiscal rules governing the deposit into and withdrawal of money from NRFs and those pertaining to utilization of the money of the fund, particularly relating to investment decisions, play a significant role in determining the extent to which an NRF can meet its objectives.

The context in which the rules operate is important, and, especially in low governance contexts, governments should attempt to develop rules to prevent excessive interference by the political elite in decision making and the misuse of funds. One of the reasons for the success of the Norwegian NRF has been the clearly defined rules about how much to save and how to spend the revenue. However, the type of rules a country adopts, will vary. If a country requires financing for development projects and has the absorptive capacity to utilize investments effectively, the

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<sup>1</sup> This occurs when resource exports grow leading to currency appreciation in the exporting country with consequences for other non-mineral sectors.

government may wish to spend more and save less. The government may also wish to save a portion of resource revenues to create a buffer in case of an economic downturn or decline in mineral prices. The rules should identify the sources of revenue for the fund, such as royalties, taxes, bonuses, fines, sale of profit oil, etc. Rules also should specify how often withdrawals can be made, where they must go and measures to ensure accountability and transparency in expenditure made using these withdrawals. The rules will need to be accompanied by an institutional set-up to encourage compliance.

Fiscal rules may specify the linkages of the NRF with the budget. We find that even when NRFs are linked with budgets and used for meeting budgetary expenditures, having clear and enforceable rules regarding meeting budgetary expenditure from NRFs ensures a greater likelihood of success.

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## 2. WHAT HAS BEEN THE EFFECT OF EXISTING NATURAL RESOURCE FUNDS USED TO MANAGE NATURAL RESOURCE REVENUE?

The impacts of NRFs have been diverse. While some NRFs have been able to ensure smoothing and stabilization of government expenditure, the literature also shows that they have led to unsustainable government spending and volatility in expenditures in certain cases. Their impact on socioeconomic development is similarly mixed. The next section outlines certain enabling factors which allow NRFs to function effectively.

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### IMPACT ON DUTCH DISEASE

Studies of high- and medium-quality show that NRFs can help prevent Dutch Disease and promote macroeconomic stabilization. Norway, Botswana and Chile are a few examples. For example, Norway's NRF has helped avoid appreciation of the Norwegian kroner, excessive spending and pro-cyclical spending. Monetary policy and fiscal policy measures have in conjunction helped avoid pressures on price levels and the exchange rate. However, two studies selected for this review show that NRFs have had no impact on addressing exchange rate volatility and Dutch Disease.

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### IMPACT ON GOVERNMENT EXPENDITURE

There is mixed evidence, of high- and medium-quality on the impact of NRFs on the smoothing and stabilization of government expenditure. Some studies have highlighted the positive impact of NRFs on this; however, others show that the creation of NRFs has led to increased volatility in government spending. The case of Azerbaijan is an example of state policies causing unconditional transfers from the fund and undermining the stabilization role of the fund. Excessive interference by the executive in the management of the fund may hinder compliance with the rules. While elected representatives have the mandate to make decisions regarding public spending, investment (and other spending and saving) decisions relating to NRF fund utilization require a high amount of financial expertise and if managed incorrectly can also lead to the loss of large amounts of resource revenues

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### IMPACT ON WELFARE OR SOCIOECONOMIC INDICATORS

Studies, both high- and medium-quality, show a positive impact of NRFs on welfare outcomes and socioeconomic development. However, studies also show that some funds yield poor outcomes, mainly because of the prioritization of accumulation of assets over spending on welfare outcomes. Welfare impacts may also be limited by low stakeholder involvement and fund mismanagement.

### 3. HOW CAN NRFs BE MADE MORE EFFECTIVE, INCLUDING THROUGH INSTITUTIONAL SUPPORT AND REVENUE SHARING ARRANGEMENTS BETWEEN NATIONAL AND SUB-NATIONAL LEVELS OF GOVERNMENT?

The studies selected for synthesis show that key enablers required for the effective functioning of NRFs include: (i) defining objectives at the outset; (ii) clear fiscal rules governing the deposit of funds into and withdrawal from NRFs; (iii) rules governing utilization of money, especially relating to investment decisions; (iv) developing domestic expertise in NRF management; and (v) instituting transparency and accountability measures such as independent oversight agencies, civil society organizations and citizens to monitor the performance of the fund. These are discussed below.

#### APPROPRIATE FISCAL RULES

To be effective, NRFs must have clear objectives, and their deposit, withdrawal and investment rules must be aligned with those objectives. Potential objectives can include smoothing expenditures, savings, mitigating Dutch Disease, earmarking funds for public investment, and ring fencing. The literature supports following a price-contingent rule, which requires that the fund accumulate revenues when commodity prices are above a stipulated threshold and spend if needed, when prices are below a chosen threshold.

Appropriate fiscal management of funds and creating an overall strategy for investments can be key drivers for the success of funds. Choosing how and where to invest (for example, choosing between foreign and/or domestic investment options) must be determined by investment rules. Initial investment choices of the NRF should be conservative, liquid and low risk, especially because investment expertise may not be developed in the early stages of the fund. For a developed economy, it may make sense to invest in global financial markets or use the fund to finance pension payments. However, for a low-income fragile country, NRFs could also be used to help create domestic infrastructure and promote industrial growth. Investment rules should also cover measures to enable the diversification of the investment portfolio. NRFs can be used to promote the diversification of the economy by funding the development of the non-mineral sectors. This can allow countries to prepare for a time when non-renewable resources are depleted.

#### INSTITUTIONAL STRUCTURE FOR MANAGEMENT AND OVERSIGHT

Although Norway's NRF is often cited as an example of a successful NRF, it is not clear that it would work in resource-rich countries with weak institutional capacity. A clear allocation of roles and responsibilities for fund management and vigilant oversight can play a key role in the success of NRFs. NRFs also seem to perform better in a context where there are greater constraints on the discretionary use of executive power, greater party competition, and active participation of citizens in the monitoring and enforcement of transparency and accountability mechanisms. Sound corporate governance (including aspects such as an independent board, professional staff, transparent reporting and independent audit) is another prerequisite for effective NRFs.

#### TRANSPARENCY AND ACCOUNTABILITY MEASURES

Transparency is an important enabling factor to make NRFs effective and leads to greater accountability from fund managers. Transparency measures can reduce the possibility of misuse of funds and encourage compliance with fiscal rules governing saving, spending, deposits and withdrawals. Instituting transparency measures can also encourage compliance with fiscal and investment rules by helping align public expectations with government objectives. NRFs tend to be

more successful if their operations are integrated into the national development goals of their sponsoring governments. Finally, instituting transparency measures can inculcate a sense of ownership towards the NRF, generating and sustaining popular support for a strategy to save substantial resource revenues to enable the NRF to function in the long run.

#### SUB-NATIONAL GOVERNANCE ISSUES

In the context of revenue sharing with sub-national governments, it is important to keep expenditure responsibilities in mind. Decentralization of fiscal revenues should be aligned with the costs of public service delivery given sub-national expenditure assignments.

The evidence suggests that it is important to ensure intergovernmental transfers to local governments are regular and predictable. Alternatively, local governments should be allowed to address resource revenue volatility autonomously through debt management or saving a portion of their revenues in a sub-national NRF with a focus on meeting local needs. The revenue transfer formula should be simple and enforceable, as this will help enable compliance. However, it is also important to build a degree of flexibility into the system, so that if political circumstances and economic conditions change, it should also be possible to make small adjustments to any revenue-sharing formula.

#### IMPLICATIONS FOR POLICY AND PRACTICE

Key implications for policy and practice relating to NRFs include:

- Resource-rich countries establish NRFs for several reasons, chief among them being macroeconomic stabilization, sterilization against outcomes such as Dutch Disease, high returns from investments and promoting intergenerational equity.
- The successful functioning of NRFs requires appropriate institutional and administrative structures, sound fiscal rules, oversight by independent agencies and the active role of citizens in holding fund management accountable.
- However, these cannot be a substitute for sound macro-economic management policies, as the wider political and economic context in which NRFs are created can play a significant role in preventing the misuse of funds.
- NRFs tend to be more successful if their operations are integrated into the national development goals of their sponsoring governments.
- In some countries, NRFs have not been able to accumulate reserves, largely because of strong political pressures to spend money in short-term investments.
- The type of fiscal rules a government applies should be determined on the basis of the objectives of the fund and the amount of savings or expenditures necessary to meet that objective in the country context.
- Sound corporate governance (including aspects such as an independent board, professional staff, transparent reporting and independent audit) is another prerequisite for effective NRFs.
- Appropriate financial management of funds and creating an overall strategy for investments can be key drivers for the success of funds. Choosing how and where to invest (for example,

choosing between foreign and/or domestic investment options) must be determined by investment rules.

- Initial investment choices of the NRF should be conservative, liquid and low risk, especially because investment expertise may not be developed in the early stages of the fund.
- For a developed economy, it may make sense to invest in global financial markets or use the fund to finance pension payments. However, for a low-income fragile country, NRFs could also be used to help develop infrastructure and promote industrial growth.
- Investment rules should also cover measures to enable the diversification of the investment portfolio. NRFs can be used to promote the diversification of the economy by funding the development of the non-resource sectors. This can allow countries to prepare for a time when non-renewable resources are depleted.
- Instituting transparency measures can encourage compliance with fiscal and investment rules by helping align public expectations with government objectives.
- They can also increase confidence in and a sense of ownership towards the NRF, generating and sustaining popular support for a strategy to save substantial resource revenues, often contrary to public pressure for immediate expenditure, to enable the NRF to function in the long run.

## DIRECTIONS FOR FUTURE RESEARCH

The availability of a limited number of quantitative studies estimating the impact of NRFs suggests that further research is required to estimate and evaluate the impact of the intervention on specific outcomes.

It would be useful to develop a relatively standardized methodological approach for analysing the impact of NRFs, given their varied objectives and institutional structures. However, it may be challenging to isolate the impacts of NRFs, because country contexts differ widely, and vary across time, making any pre- and post-comparison difficult.

Finally, we find that most studies on the subject examine middle- or high-income countries, and fewer examine low-income countries, especially with politically fragile environments and high levels of natural resource mismanagement. With increasing use of NRFs in low-income, fragile contexts, there is a need to understand and develop context-specific recommendations for these countries.

## CONTEXTUALIZATION

Contextualization of findings was done for two South Asian countries, Afghanistan and Myanmar.

**Afghanistan:** Afghanistan has large deposits of minerals such as iron ore, copper, cobalt, gold, lithium, niobium, uranium, chromite, graphite and marble. In 2010, the US Geological Survey estimated that the country's geological resources might be approximately \$908 billion, based on remote sensing surveys from 2005 to 2009 (Renuad 2010). These resources have remained largely undeveloped due to the lack of the necessary infrastructure for mineral development, such as power, mining, mineral processing facilities and roads, as well as security concerns. However, if developed appropriately, they provide an opportunity for the country to grow economically, and improve the quality of life of its citizens.

We suggest that an NRF ought to be established in Afghanistan only if certain conditions are established to ensure that it is able to function effectively. These include well-functioning public finance institutions with appropriate accountability and transparency mechanisms, established and stable fiscal rules, clearly defined rules for investment, adequate representation on the decision-making bodies of the funds by experts in wealth management, and independent oversight of the fund. In terms of operationalizing an NRF in the country, evolving public consensus on the usefulness of an NRF also becomes central to its success.

In this context, there is a need to address a range of issues prior to establishing an NRF, including: low levels of information about existing mineral resources and their governance; managing expectations of citizens relating to job creation after resource discovery, improvements in infrastructure and improved access to services in the short and medium term while the necessary infrastructure to explore and extract mineral resources is set up; and preventing the capture of mineral resources by local political elites. In addition, the implementation of the Extractive Industries Transparency Index (EITI), which Afghanistan joined in 2013, should be strengthened.

**Myanmar:** Myanmar is one of South Asia's most resource rich countries. These natural resources include oil and gas, various minerals, precious stones and gems, timber and forest products, and water resources for hydropower. The country relies heavily on resource revenue for its budgetary and non-budgetary expenditures. However, despite its mineral wealth, Myanmar is one of the least developed nations in the world. Unsustainable and opaque management of natural resources is said to be one of the main reasons for this.

Given this context, there is a need to manage revenue from extractive industries effectively, both in terms of generation and utilization. An NRF established with the revenues from the extractive industries can be a useful tool in this regard. Such a fund could several benefits for Myanmar, including ensuring that public expenditure is not significantly affected by fluctuations in world prices and thus prevent a negative impact on exchange rates and inflation levels from a large influx of foreign currency. For Myanmar, an NRF could potentially play a role in bringing about equity in sharing and distribution of resource revenue, thereby reducing conflicts and promoting peace. In addition, it could strengthen federalism through the allocation of revenue from extractive industries to sub-national governments.

However, there are certain issues which should be addressed by the government to ensure that an NRF, if created, is able to function effectively. The country has witnessed some revenue windfalls from one-off measures which have enabled the government to rapidly increase spending, while maintaining fiscal deficits within 5% of GDP (Addison et al. 2015). Therefore, the limited fiscal space needs to be addressed at the outset. This could be done by various measures including widening the tax base, initiating a review of expenditures (including military expenditures) to identify potential efficiency gains, and reviewing investment practices and capital expenditure efficiency. Further, under the current system, revenue collection takes place through the state-owned enterprises (SOEs), MOGE (Myanmar Oil and Gas Enterprise) and the country's Internal Revenue Department (IRD). These SOEs can retain up to 55% of their net revenues for their own use, so the transfer of this revenue to the NRF could become a challenge.

As an important tool for improving transparency in the extractives sector, the implementation of the EITI needs to be strengthened. Myanmar's first EITI report has allowed key stakeholders insight into the natural resource sector. EITI data can support advocacy for reformed and responsible governance of the extractive sector including through improved accountability for SOE revenues, greater oversight of the extractive sector, and transparent rules pertaining to the disclosure of contracts, beneficial owners and other information with stakeholders and citizens. With professional

management and strong accountability mechanisms built into its functioning, along with appropriate public finance management practices, the NRF could be an effective tool for revenue management.

### 1.1 RATIONALE AND REVIEW QUESTIONS

Countries often do not see the expected returns of social and economic development from the discovery of natural resources. A key reason for this is the poor management of natural resource revenues. Further, countries with large natural resource reserves tend to suffer from the adverse effects of what is termed ‘Dutch Disease’, a phenomenon which occurs when resource exports grow leading to the exporting country’s exchange rate rising or appreciating (Auty 1993, 2001, Sachs and Warner 1995, Sala-i-Martin and Subramanian 2003, Smith 2004, Kaldor et al. 2007). As a result, other sectors that depend on exports, such as manufacturing, may shrink, leading to lower economic growth. Additionally, the shift of workers and investment to the resource sector can drive up overall prices and negatively affect other sectors important for growth. The presence of natural resources is also seen to contribute to conflicts, including civil wars, especially in developing countries with low institutional capacity, as various groups fight for control of the resources.

Natural resource revenue management (NRRM) refers to policies and techniques adopted by governments to manage and augment revenues from natural resources. This includes interventions to maximize the government’s share of the natural resource revenue (NRR); to optimize allocation of NRR; and to ensure transparency and accountability in the management and sharing (including sub-national sharing) of NRR.

For instance, governments use a variety of fiscal instruments including royalties, profit taxes, revenue- or volume-based fees or taxes, production sharing, explicit rent-capture mechanisms, bonuses, equity participation and competitive tenders to generate revenues from natural resources. NRRM also includes designing policies to optimize the allocation of NRR to promote inclusive growth, sustainable development, private sector growth and intergenerational equity. Building accountability and transparency in managing natural resources and revenues from these resources is also an integral part of NRRM.

The effective management of NRR is particularly challenging for countries experiencing fragile situations. These include the presence of prolonged conflict, but more generally refer to low institutional capacity manifested in elevated levels of corruption or limited transparency and accountability. It thus becomes important for these countries to consider their vulnerabilities, inefficiencies and challenges when designing and implementing policies for utilizing NRR.

In this context, this systematic review has tried to examine the effectiveness of interventions made by governments to manage natural resources, specifically mineral resources, through a study of the existing literature, and based on the evidence, to outline policy options for low- and middle-income countries (LMICs) experiencing fragile conditions. The review was carried out in two stages. In the first phase, the reviewers examined interventions for NRRM more broadly, including interventions related to generation, allocation, and transparency and accountability. Based on a mapping of the studies, in the second stage of the review, the focus was narrowed down to natural resource funds (NRFs) as an intervention to manage NRR. An NRF is a type of a sovereign wealth fund, and is a government-owned special-purpose investment vehicle whose principal source of financing is revenue from mineral resources such as petroleum, natural gas and coal. However, we will also provide an overview of other major interventions to manage NRR.

Contextualization of findings was done for two South Asian countries, Afghanistan and Myanmar, They are experiencing higher levels of political fragility, and the aim is to provide policy recommendations for managing NRR and indicate whether and how NRFs can help in this context.

Based on the key characteristics of studies identified in Stage I, a configurative synthesis was conducted to answer the three in-depth review questions:

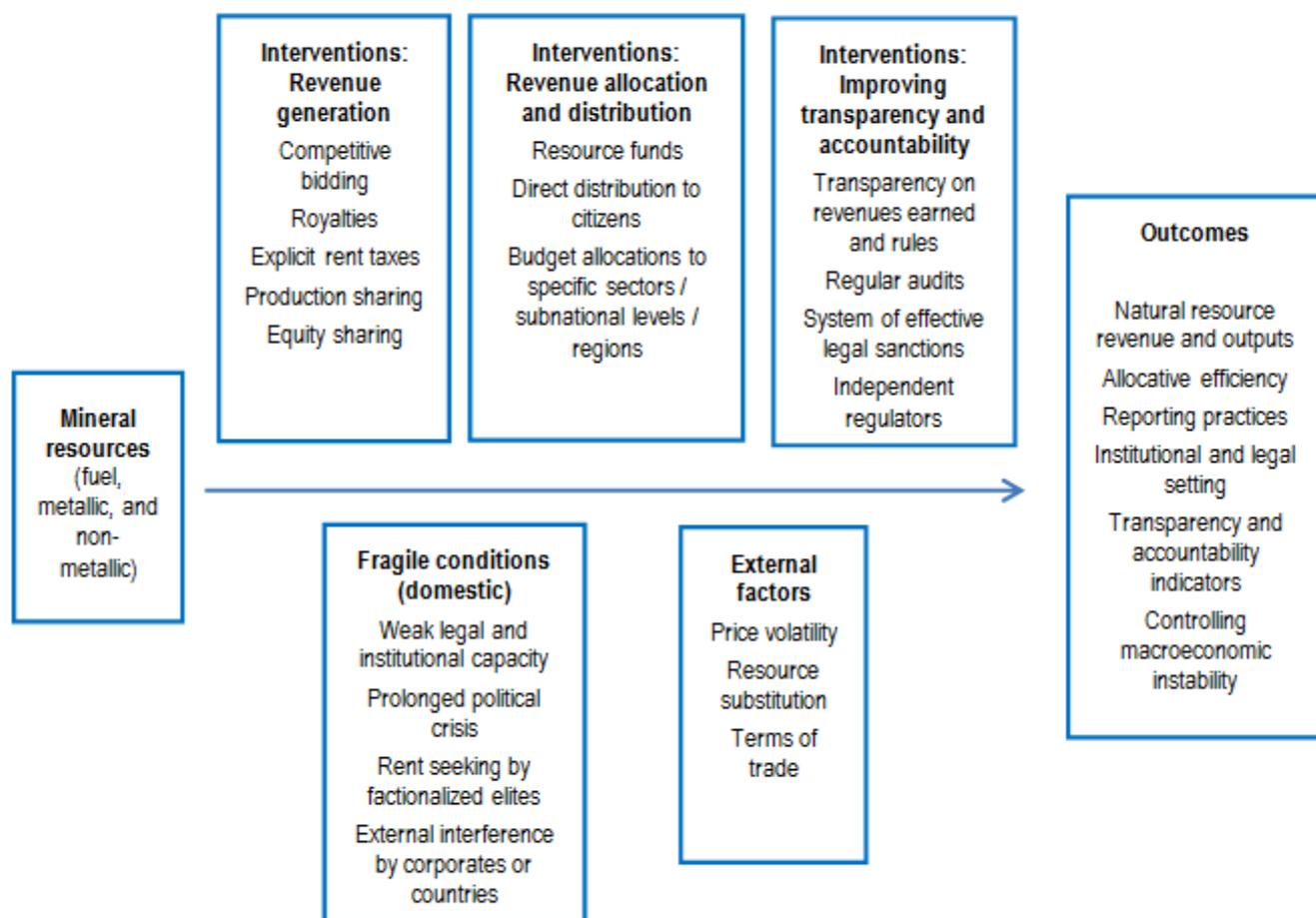
- How can NRFs be used to manage resource revenue by resource-rich countries experiencing fragile circumstances?
- What has been the effect of existing NRFs used to manage natural resource revenue?
- How can NRFs be made more effective, including the institutional support required and revenue-sharing arrangements between national and sub-national levels of government?

## 1.2 CONCEPTUAL FRAMEWORK

### STAGE I

The conceptual framework for Stage I sought to provide an outline of: (i) resources examined; (ii) possible interventions which may be made to manage revenue from natural resources; (iii) socioeconomic and political contexts within which these interventions take place (specifically political fragility); and (iv) key outcomes which are hoped to be achieved through effective natural resource revenue management. Figure 1.1 depicts this framework.

Figure 1.1: Conceptual framework: Stage I

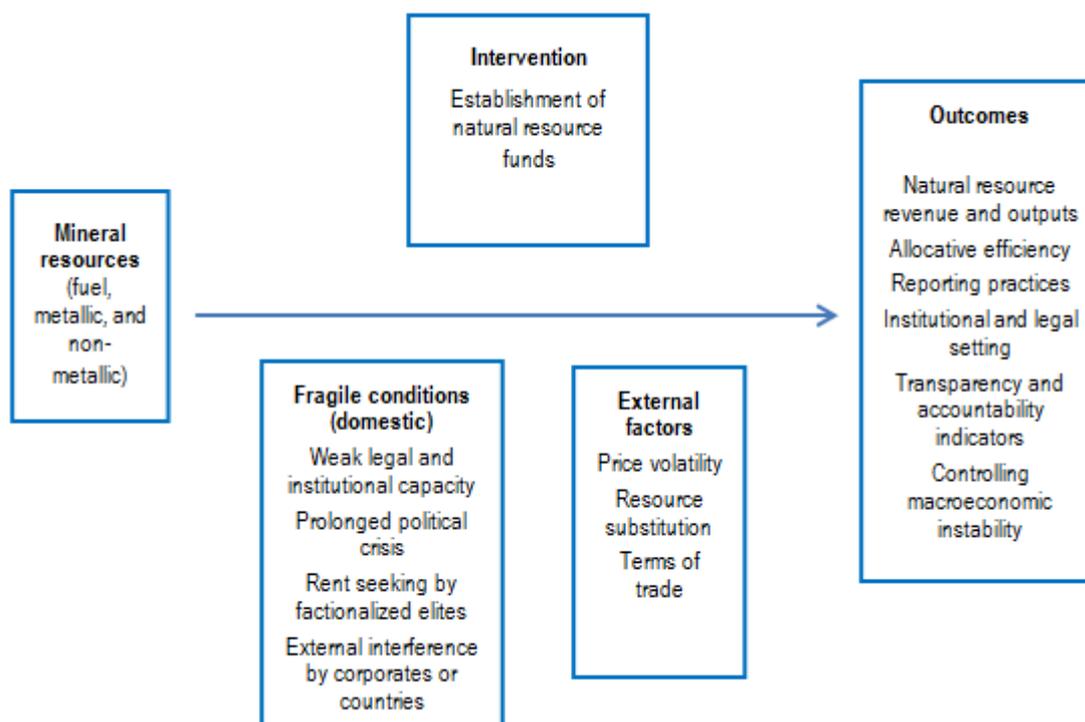


As can be seen in Figure 1.1, we examine the impact of specific interventions for managing mineral resource revenues on achieving certain desired outcomes. We also understand that these interventions are made in socioeconomic and political contexts which present certain challenges to achieving these outcomes.

## STAGE II

For stage II of the review, based on our mapping of the literature in the first stage of the review, we focused on NRFs as an intervention to manage NRR. The natural resources studied, the outcomes and the socio-political context within which the question is located remain the same. The conceptual framework, with a focus on NRFs, is detailed in Figure 1.2.

Figure 1.2: Conceptual Framework Stage II



## FOCUS ON MINERAL RESOURCES

We have restricted the scope of the review to mineral resources, defined here to include fuel, metallic, and non-metallic minerals. Non-mineral resources which include forests, agriculture, renewable resources such as solar, wind, and water resources are excluded from the purview of this review.

Our justification for focusing on mineral resources is based on the following: firstly, the focus of a large part of the existing literature is on mineral resources; secondly, the objective of this review is to examine natural resource funds, and these are largely composed of revenue from minerals; and thirdly, in terms of contextualization to South Asia, and to Afghanistan and Myanmar in particular, mineral resources form a large part of the natural resource base in these countries. For the purpose of the Systematic Review Programme for South Asia, which has been initiated by the South Asia Research Hub of the Department for International Development, UK, South Asia is understood to comprise Afghanistan, Pakistan, India, Nepal, Bangladesh and Myanmar.

Mineral resources are defined as a concentration of naturally occurring solid, liquid or gaseous material in or on the earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible (United States Geological Survey). These are non-renewable and are categorized into three types: metallic, non-metallic and fuel.

Metallic minerals contain metal in its raw form. These are of two types – ferrous (those which primarily contain iron) and non-ferrous (those which are not primarily composed of iron). Metallic

minerals include aluminium, antimony, barium, bauxite, beryllium, chromite, cobalt, copper, feldspar, fluorite, gallium, gold, gypsum, halite, indium, iron ore, lead, lithium, manganese, mica, molybdenum, nickel, perlite, platinum, phosphate, potash, rare earths, pyrite, silica, silver, soda ash, sulphur, tantalum, titanium, uranium, vanadium, zeolites and zinc.

Non-metallic minerals do not contain metals and include marble, granite, sandstone, porphyry, basalt, chalk, dolomite, limestone, gypsum, slate, chemical and fertilizer minerals, salt, clays, kaolin, sand and gravel.

There are also fuel minerals, such as coal, oil and natural gas, which account for a significant share of mineral production. This review will examine these three types of mineral resources.

## INTERVENTIONS

In the first stage of the review, we examined three major categories of interventions relating to natural resource revenue management. These were: (i) those made at the revenue generation stage; (ii) those made for effective allocation and distribution of revenue; and (iii) those which seek to increase transparency and accountability. A brief description of the interventions is provided below, and outlined in Tables 1.1, 1.2, and 1.3 respectively.

**Revenue generation:** Effective revenue generation interventions seek to maximise revenue without creating disincentives for production. Ideally governments should receive at least half the rents generated by mining, and at least two-thirds from petroleum. Rents which are lower than this can be a cause for concern, and governments may need to review their fiscal and policy regimes (International Monetary Fund 2012).

Table 1.1: Interventions at the revenue generation stage

Intervention	Description
Competitive bidding	At the stage of the initial public offering, sealed bids are invited and contracts are offered to the bidder with the best prices and contracts.
Royalty	A royalty is a payment made by a mining company to the government in return for permission to: (i) access and extract minerals and/or (ii) develop minerals. Royalties are either specific levies (based on the volume of minerals extracted) or ad valorem levies (based on the value of the minerals extracted). They may be imposed at the national or sub-national level of government. In addition, they may be fixed or variable. Variable royalties are those which are not fixed, based on the type of mineral, but may vary with changes in operating profits.
Resource rent tax	A resource rent tax is a tax on the profits generated from mineral extraction or development. It captures a share of the mineral rent, which is the return over and above the company's opportunity cost of capital. A resource rent tax is imposed only if the accumulated cash flow from the project is positive, that is, if the project is profitable.
Production sharing	More common for petroleum, production sharing is an intervention through which production at a surface delivery point is shared between a government and a private entity. Production sharing agreements determine how much revenue each entity will receive.

**Allocation and distribution of revenue:** Efficient and equitable allocation of natural resource revenue can be challenging for policy makers because of rent seeking by political elites and lack of transparency and accountability. On the other hand, if allocated efficiently and equitably, NRR can be an engine for socioeconomic development.

Table 1.2: Interventions at the stage of revenue allocation and distribution

Intervention	Description
Natural resource funds	A natural resource fund is a special-purpose investment vehicle owned by the government, and is constituted from revenue derived from mineral sales. The objectives may include saving for future generations, covering budget deficits, and allocating revenue for specific sectors.
Distribution to citizens	A small number of governments have sought to share revenue benefits directly with citizens through cash transfers, which may be conditional or unconditional. This form of distribution is intended to increase citizen engagement, stimulating consumption and reducing inequality in mineral-rich countries.
Budgetary allocations for specific sectors/ sub-national levels	Some national governments choose to allocate natural resource revenues to specific sectors, sub-national governments, or regions through budgetary allocations. More than 30 countries, including Indonesia, Peru and Nigeria, allocate a percentage of NRRs to sub-national governments. The amount distributed is often a measure of the fiscal federalism in the country.

**Transparency and accountability:** It has been observed that resource rents often create incentives for non-transparent and discretionary management of public revenue to support corrupt government practices (Mehlum et al. 2006). Governments are often unable or unwilling to create and enforce interventions to regulate extractive industries (Acosta 2013). Interventions to improve transparency and accountability in the extractive industries sector seek to make governments more accountable at the generation and allocation stages and contribute to optimal and equitable generation and use of revenues from natural resources.

Table 1.3: Interventions to improve transparency and accountability

Intervention	Description
Transparency in rules and revenue earned	These include: regular reporting of revenues earned from natural resources by government; establishing clear mechanisms and rules (including a legal framework and fiscal regime) through identifying rights and responsibilities relating to extraction and use of natural resources; requiring extractive industries (government and private) to disclose their extraction and trading activities; and maintaining a register of all natural resource rights holding.
Regular audits	Authorities are established to conduct and report on audits of extractive industries.
Effective sanctions	Sanctions can be at several levels: local, domestic or international. They can also be informal or legal.
Independent regulators	Establishing an oversight agency with the requisite financial, technical and political autonomy to function effectively.

Based on our mapping of the literature in the first stage of the review, in Stage II of the review, we focused specifically on the use of NRFs as an intervention to manage NRR.

## OUTCOMES

The outcomes which we have identified based on our mapping of literature in the first stage of the review pertain to: (i) natural resource revenue and outputs; (ii) allocative efficiency; (iii) reporting practices; (iv) institutional and legal setting; and (v) transparency and accountability indicators. In Stage II of the review, we undertook a more detailed mapping of studies relating to natural resource funds and identified the specific outcomes which were examined by the selected studies.

### 1.3 POLICY AND PRACTICE BACKGROUND

Governments can use a range of fiscal instruments to collect and manage revenues generated from mineral resources. Some major fiscal instruments are mentioned in Section 1.2, above. However, these instruments have been used with varying levels of success, partly because of the design of the fiscal instrument and partly because of a host of other factors, such as political will, technical ability and transparency and accountability measures.

In addition, certain characteristics which are particular to mineral resources mean that the fiscal tools used to manage these resources must be different from general fiscal tools used to manage other revenue. These characteristics include non-renewability, exhaustibility, price volatility, potential to generate windfall revenues, concentration in specific geographical regions, requirement of substantial capital investment and long development periods. It is also important to point out that the fiscal regime which is chosen (consisting of the entire range of fiscal instruments or tools used to manage mineral resources) must also depend on the nature of the mineral resource. For example, production sharing agreements are more commonly used for oil and gas resources than other mineral resources.

Thus, there is no one 'successful' model which may be used. Instead, each country must develop a fiscal regime suited to its unique conditions and requirements. The fiscal regime used by countries such as Norway, the UK or Canada, will differ from that used by countries such as Chad, Botswana, Afghanistan or Myanmar. However, countries can learn from the policies and practices of those countries which have managed to escape the resource curse and translate resource wealth into long-term social and economic development through effective management of mineral revenues. More immediate goals for resource-rich countries may include ensuring that the price volatility of mineral resources does not affect the larger economy, smoothing spending flows and ensuring fiscal sustainability.

On the issue of ownership, in some countries, such as Saudi Arabia, Kuwait and Mexico, the government has a monopoly over mineral resources (in this case, petroleum), while in others, such as the USA and the UK, there is only private enterprise. However, even in countries such as the UK and Norway, where ownership is granted to private companies, governments can retain control through establishing rules and regulations. Most countries fall somewhere in the middle of this spectrum, with a range of actors including international oil companies, government-owned or -controlled oil companies and other private players (Nakhle 2010).

In terms of fiscal arrangements at the generation stage, the two major types of systems of granting rights to investors are typically found, the concessionary system and the contractual system. The concessionary systems is found in countries such as the US, Canada, Norway, and the UK, while the contractual system, which developed more recently, in the 1950s, is typically found in developing

countries such as Angola, Nigeria, and Azerbaijan (Nakhle 2010). The latter usually involves more direct government participation. Within the contractual system, two major types are production sharing contracts and service contracts. Key differences between concessionary and contractual systems (specifically production sharing contracts – PSCs) are highlighted in Table 1.4.

Table 1.4: Key differences between concessionary and contractual systems

Parameter	Concessionary system	Contractual system (PSCs)
Ownership of nation's mineral resources	Sovereign state	Sovereign state
Title transfer point	At the wellhead	At the export point
Company entitlement	Gross production less royalty	Cost of extraction of oil or gas + profit from oil or gas
Entitlement percentage	Typically, 90%	Typically, 50–60%
Ownership of facilities	Held by company	Held by the state
Management and control	Typically, less government control than the contractual system	More direct government control and participation
Government participation	Less likely	More likely
Ring fencing	Less likely	More likely

Sources: Tordo, S. (2007); Johnston, D., (1994)

As mentioned in Section 1.2, some fiscal instruments which can be used to collect revenue include royalties, resource rent taxes, production sharing contracts and competitive bidding. In addition, other instruments, such as corporate income taxes, bonuses and withholding taxes, may also be used to collect revenue from mineral resources.

Once revenue is collected, governments must choose suitable mechanisms to manage this revenue. This could include spending the revenue (through either consumption or domestic investment) or saving it (through asset creation or debt reduction). Countries such as Norway, Ghana, Kazakhstan, Chile, Timor-Leste, Trinidad and Tobago, and the USA (Alaska) have set up natural resource funds to invest windfall revenues from mineral resources. Some governments have also established a system of sharing mineral revenue with sub-national governments (Cameron and Stanley 2017).

In terms of allocation of natural resource revenue to sub-national governments, depending on the system of government and the constitutional division of power, governments may choose varying levels and modalities of transfers. For example, at one end of the spectrum is a system wherein all taxes are collected by the central government without any special redistribution towards mining regions or communities. This system is followed in countries such as Chile and Tanzania. At the other end, fiscal systems may incorporate revenue sharing with sub-national governments, or allow for fiscal decentralization wherein sub-national governments can collect taxes as well. Various models of revenue sharing have been adopted in Ghana, Indonesia and Peru. In countries such as Canada and Australia, sub-national governments can also raise taxes themselves through a system of fiscal decentralization. Finally, some countries may allow for even more direct contribution to

communities. For example, in Papua New Guinea, a portion of the gross taxable income from mining projects can be used to build community infrastructure projects which are selected by the community (Andrews-Speed and Rogers 1999). Some governments, such as those of Alaska (USA) and Mongolia, have created mechanisms to share revenue directly with citizens through cash transfers.

However, granting taxation powers or giving local communities a greater say in decision making related to spending revenue or allowing local governments to raise taxes does not always lead to greater benefits for local communities. A transparent and accountable public finance management system, with clearly defined powers and responsibilities for both levels of government is important to improve the effectiveness of the allocation of resource revenues.

One option, which has been used by countries such as Norway, United Arab Emirates, Ghana, Kazakhstan, Russia, Botswana, Nigeria, Chile, Timor-Leste, Trinidad and Tobago, and the USA (Alaska), is to establish natural resource funds to invest revenue earned from mineral resources. These funds are governed by fiscal rules (to regulate deposits and withdrawals) which vary from country to country.

For example, some countries which need to finance development projects may choose to spend more than save, while others may wish to save more to safeguard against unexpected economic downturns or price volatility. Governments may also choose from a range of options in terms of where to invest deposits held in these funds. For example, they could be invested in low-risk low-return government bonds, high-risk high-return corporate bonds, stocks in domestic and/or international companies, or even real estate and infrastructure.

In this context, the review analysed existing approaches adopted to manage revenue obtained from natural resources by governments to understand which interventions have been most effective. This will hopefully be of use to policy makers, practitioners, researchers and academics, in low- and middle-income resource-rich countries. While synthesis was done for NRFs as an intervention, the review also examined the kind of arrangements that could exist for sharing the revenue of NRFs with the sub-national levels of government, and some particular challenges that sub-national governments face.

#### 1.4 RESEARCH BACKGROUND

The literature on NRRM has examined practices across geographical regions in both developed and developing country contexts. Most research has focused on Africa, Latin America, and to some extent East Asia, to understand the specific challenges facing developing countries.

There are no previous systematic reviews of studies examining effective management of natural resource revenue in politically fragile LMICs. A protocol for a systematic review was created to determine the effect of three types of revenue sharing and investment arrangements (such as public investment projects, sovereign wealth funds, and direct cash transfer) on economic growth and poverty reduction in resource-rich LMICs (Nguyen et al. 2012).

To assess the macroeconomic implication of investment surges in resource-rich developing countries, two models have been established, namely the Sustainable Investing Tool (Berg et al. 2012) and the DIGNAR model (Melina and Xiong 2013), and their application have been tested in various countries.

Van der Ploeg (2007), while not a systematic review, provides a comprehensive review of existing literature on the diverse experiences of resource-rich economies in managing revenues, including

those countries which have managed to convert natural resources into positive economic and social outcomes, such as Australia, Botswana, Canada and Norway, as well as those that have not experienced any significant economic or social benefits (and even experienced low or negative economic growth) despite being rich in natural resources, such as Nigeria, Iran, Venezuela, Libya, Columbia and Sierra Leone. In addition, the literature on natural resource revenue management practices in Papua New Guinea, Chile, Peru and Chad was examined.

Another impact of the resource curse or of poorly managed NRR which is discussed in the literature on the subject, is conflict relating to natural resources. According to a Guidance Note (2013) by the United Nations Development Group (UNDG) and the Executive Committee on Humanitarian Affairs (ECHA), at least 17 violent conflicts have involved the exploitation of natural resources. Research further suggests that over the last 60 years, at least 40 per cent of all interstate conflict have been linked to natural resources.

Collier and Hoeffler (2005) suggest that countries with an abundance of natural resources are more prone to violent conflict. Cuvelier et al. (2013), conducted a systematic review of literature on resources, conflict and governance. In a literature review of studies on natural resources and conflict (Mildner et al. 2011), the authors concluded that the main findings from the literature are often difficult to compare due to lack of adequate general definitions and measurements of resource scarcity, abundance and conflict.

Some studies have also been conducted to identify policies and frameworks which would be effective for specific countries. In 2014, a literature review was commissioned by the Revenue Watch Institute (RWI) to map existing research on extractive resource management and human development in Tanzania (Newcombe, H., (2014)). This review summarised the country-focused literature on key aspects of the extractive resource management process and identified areas where additional research could support the formulation of Tanzania's extractive industries' strategy. The review concluded that much of the Tanzania specific literature merely summarized opinions on topics or reported incidents, and there was a lack of technical analysis on Tanzania-specific extractive resource attributes.

In 2013, the Government of New Zealand's Ministry for the Environment conducted a literature review of natural resources frameworks, to provide insight into a range of frameworks found in the international literature that are conducive to natural resource and environmental policy making and that have inspired and aided the development of the natural resources framework.

A pioneer study by Sachs and Warner (1995) showed that throughout the world, in resource-rich countries, the per capita GDP has grown less rapidly than in resource-poor countries. Most of the resource-curse literature follows Sachs and Warner (1995) by assessing development outcomes in terms of GDP growth, with the linkages coming through the translation of exploitation of oil, gas and minerals into immediate GDP growth without considering the concomitant depletion of the natural capital base, in particular the reduction of national sub-soil wealth.

In 2006, Mehlum et al., in an extension of the theory, argued and provided evidence that institutions play a decisive role in the manner the resource curse manifests in a country. Resource-rich countries also suffer from poorly developed financial systems and from financial remoteness, and are therefore likely to experience bigger macroeconomic volatility (Rose and Spiegel, 2009). However, there is evidence of some natural resource-rich countries having performed far better than others in resource wealth management and long-term economic development. For instance, the United Arab Emirates, by investing heavily in infrastructure and modern education, managed to avoid the

resource curse (Fasano 2002). There are similar examples in Botswana (Acemoglu et al. 2003), and some other countries.

In a review of literature on the resource curse, Torres et al. (2013) found that the literature was closer to providing a more comprehensive and accurate answer to the curse paradox. This was especially in terms of estimation methods (by controlling for unobserved effects with panel data). However, the variety of results which arose from using different resource proxies and empirical approaches (e.g., cross-section versus panel analyses) made comparison more difficult. Overall, the quality of institutions and policies, especially fiscal policies, appeared to be the most credible explanation for the resource curse.

In fragile states, the economic rents from natural resources are often misappropriated and invested in patronage politics and political repression rather than in infrastructure, health services and education. In addition, a surge in natural resource revenue often leads political leaders to overspend on consumption and non-productive assets. These expenditures contribute to GDP growth but not necessarily to sustainable development.

Much of the literature has examined the effectiveness of country-specific interventions, given the challenges of designing interventions which suit varied country contexts. In China, for example, the local state agencies designed schemes to allow local communities to share resource wealth (Zeng and Zhan 2015); and a proposed solution for the resource curse in Nigeria involved directly distributing oil revenue to the public (Sala-i-Martin and Subramaniam 2013).

Rundquist (2014) examined the role played by civil society in the management of Ghana's oil resources. Another study shows how Timor-Leste successfully managed its natural resource revenue by establishing a sovereign wealth fund and ensuring transparency in its functioning (McKechnie, 2013). Fuentes (2010) outlined the detailed steps taken by Chile to lessen its vulnerability to commodity shocks. Cook and Hard (2013), in the context of Royal Bafokeng Nation in Africa, argued that direct benefits could be provided to local communities if the royalties and dividends from mineral resources were managed well.

An International Monetary Fund paper (2013b) presented an assessment of leveraging oil wealth for development in Kazakhstan. Iimi (2007) discussed how Botswana managed to overcome the resource curse. In 2013, an IMF report focuses on common policies for member countries of Central African Economic and Monetary Community (CEMAC) for managing revenue from natural resources (International Monetary Fund 2013b).

One aspect that has not been covered by a literature review of any type, is that of managing natural resource revenue in a country with federal structure. Sub-national distribution of revenue is one possible method to allow those most directly affected by resource extraction to have access to the revenue generated from extraction and use. The amount distributed is often a function of the degree of fiscal federalism in the country and of the political power of sub-national versus national governments. This aspect is extremely relevant to the South Asian context, given that there is a federal structure of government in most countries of the region.

### 2.1 SYSTEMATIC REVIEW AS A RESEARCH METHODOLOGY

Systematic reviews are a way to understand the direction of evidence, if any, on a certain issue or intervention, through examining the findings of existing studies. They differ from traditional literature reviews in several ways.

Firstly, the process followed to select studies for the review is explicitly outlined. Secondly, this process is standardized to some extent and involves key stages such as identifying inclusion and exclusion criteria, creating a search strategy, screening studies, coding and mapping studies, extracting data from studies, performing a quality assessment, and synthesizing the findings from selected studies to answer the review questions. Thirdly, potential users are involved in the process of conducting a systematic review. Fourthly, a protocol is made to specify the process to be followed while conducting the review. Specifying the process at an early stage helps reduce the bias that might emerge as researchers start identifying the results of the studies which they find. Finally, results of the studies are synthesized in the form of a structure narrative, summaries tables, and/or statistical meta-analysis to make the findings from the selected studies easily accessible to users.

### 2.2 STAGES OF THE REVIEW

This review was conducted in two stages. **Stage I** involved: (i) searching relevant databases for studies using the inclusion and exclusion criteria based on our primary review question: ‘how can mineral resource revenue be managed effectively in resource-rich, developing (low- and middle-income) countries, experiencing politically fragile conditions?’; (ii) screening (checking) studies to exclude those that do not meet the inclusion criteria; and (iii) coding key characteristics of the studies included for mapping based on the inclusion and exclusion criteria. These characteristics included details of the publication date, study aim and study design, geographical location and other descriptive detail to support analysis in Stage II.

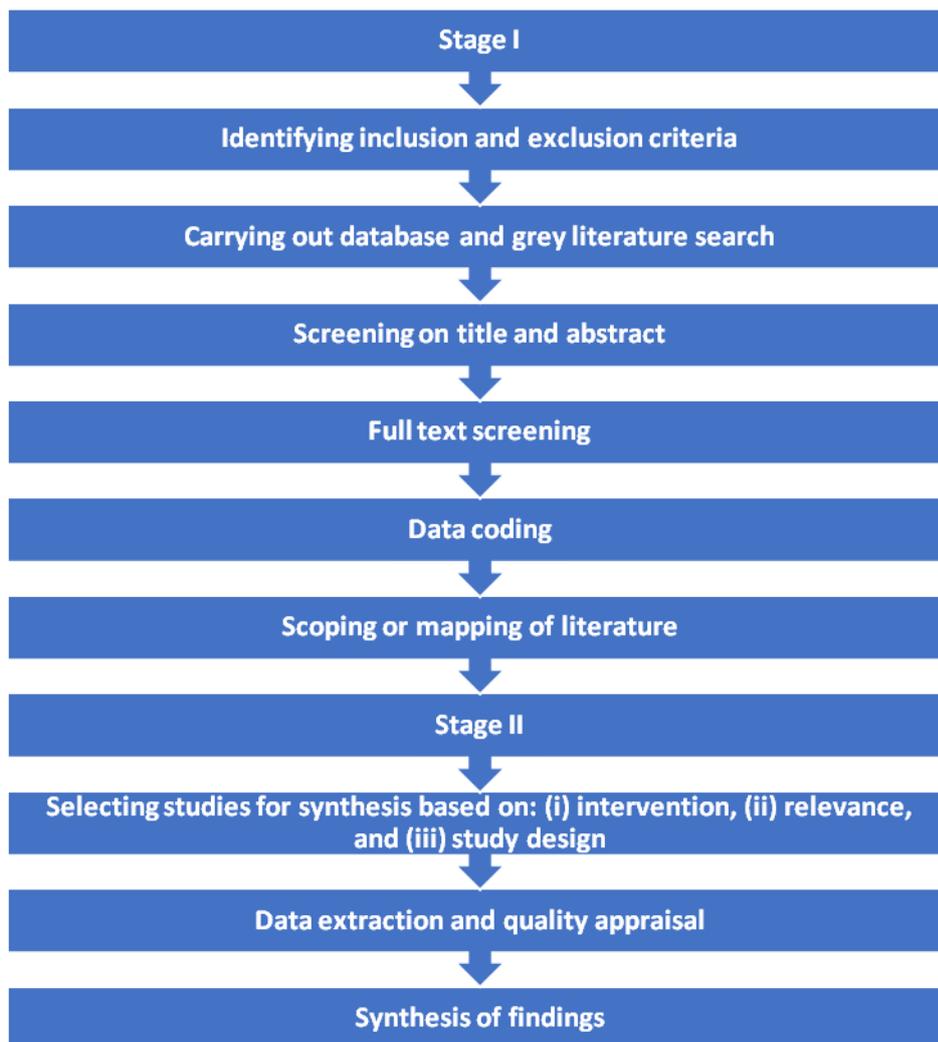
At this stage, the aim was to select and map studies which examined a range of interventions investigating the management of natural resource revenue, including those relating to revenue generation, revenue allocation and distribution, and transparency and accountability.

In **Stage II** of the review, we further narrowed the focus of the review to investigate the functioning of natural resource funds specifically as an intervention to manage revenue from natural resources. Based on the key characteristics of the studies identified in Stage I, 41 studies were selected for data extraction, quality appraisal and synthesis. Figures 2.1 and 3.1 describe the process of identifying studies for the in-depth review and synthesis. We conducted a configurative synthesis to answer the three in-depth review questions:

- How can natural resource funds be used for managing natural resource revenue by countries rich in natural resources but experiencing fragile circumstances?
- What has been the effect in countries that have already adopted natural resource funds for managing natural resource revenue?
- What are the ways to make natural resource funds more effective, including the type of institutional support required and the revenue sharing arrangements between national and sub-national levels of government?

While an aggregative synthesis involves a statistical meta-analysis of findings, a configurative synthesis involves a structured narrative outlining key findings (Sandelowski et. al. 2012). A total of 41 studies were used to answer the three review questions, and we used a larger pool of 127 studies<sup>2</sup> which examined natural resource funds (according to the coding done in Stage I) to also make recommendations on how to effectively manage natural resource revenue through NRFs and contextualize our findings for Afghanistan and Myanmar. Figure 2.1 presents an overview of the major steps followed as a part of the review process.

Figure 2.1: On overview of the process of record selection



More details about the record selection process can be found in Chapter III.

## 2.3 STAGE I: IDENTIFYING STUDIES

### INCLUSION AND EXCLUSION CRITERIA FOR STAGE I

The inclusion and exclusion criteria in the systematic review were organized according to the PICO framework (Population, Intervention, Comparison and Outcomes) and language. The PICO

<sup>2</sup> Those of the 127 studies that are specifically mentioned in this review can be found in Section 6.2.

framework is outlined in Table 2.1; the inclusion and exclusion criteria can be found in Appendix 2.2 and a list of included countries in Appendix 2.3.

Table 2.1: Detailed PICO Framework

	Population	Intervention(s)	Comparison	Outcomes
Definition	(i) Low- and middle-income countries (as defined by the World Bank) which are also classified as fragile (per DFID's Fragile States Index) (ii) resource rich (as defined in International Monetary Fund 2012)	<b>Generation:</b> (i) competitive bidding, (ii) royalties, (iii) explicit rent taxes, (iv) production sharing, (v) equity sharing <b>Allocation and distribution:</b> (i) resource funds, (ii) direct transfers to citizens, (iii) budget allocation to specific sectors or sub-national governments or regions <b>Transparency and accountability:</b> (i) transparency in rules and revenue management processes, (ii) regular auditing, (iii) independent regulators, (iv) effective legal sanctions	(i) Countries which have governance mechanisms for NRRM and those which do not, (ii) before and after: changes in revenue and other outcomes after a country introduces a new governance mechanism for NRRM, (iii) differential effects across population groups (gender, class, race, caste)	(i) Economic growth and stability, (ii) poverty reduction, (iii) impact on conflict, (iv) improved socioeconomic indicators, (v) specific benefits to local communities
Inclusion criteria	Studies conducted on countries that meet all the following criteria: (i) LMIC, (ii) experiencing political instability, and (iii) implementing NRRM policies	Studies conducted on interventions related to NRRM, including those mentioned above. This could be at the national or sub-national level	Studies which make any of these comparisons	Studies which document any of these outcomes
Exclusion criteria	Countries (across income categories) which are neither fragile nor resource rich	-	-	-

**Population:** We focused on studies situated in the following countries:

1. Fragile, low- and middle-income countries
2. Resource-rich countries.

We first made a list of countries which are both low- and middle-income countries (LMICs) and politically fragile. Next, we added those countries which are resource-rich to this list. This ensured that countries which have managed to move out of poverty or fragility are also included. In addition, interventions could then be studied across fragile and non-fragile contexts to examine their efficacy. Details for the selection of: (a) LMIC, (b) fragile, and (c) resource-rich countries are provided below. The list of countries under each category is provided in Appendix 2.3.

**LMIC:** Our definition of low- and middle-income countries was based on the World Bank definition of low-income countries as those with a per capita Gross National Income (GNI) of \$ 1,045 or less in 2014, and middle-income countries as those with a GNI per capita which is more than \$1,045 but less than \$ 12,736 in 2014.<sup>3</sup>

**Fragile:** DFID's Fragile States and Regions List is used to classify countries as fragile.<sup>4</sup>

**Resource-rich:** Our definition of resource-rich countries is based on the International Monetary Fund's classification of countries as resource-rich (International Monetary Fund 2012).

**Interventions:** Interventions at Stage I of the review were of three types: (i) relating to generation of mineral resource revenue; (ii) allocation and distribution of mineral resource revenue; and (iii) measures to improve transparency and accountability. The interventions may have been made at the national or sub-national level.

Some examples of interventions at the generation stage include competitive bidding, royalties, explicit rent taxes, production sharing and equity sharing. Examples of interventions at the allocation and distribution stage include natural resource funds, direct transfers to citizens and budgetary allocations to sectors or sub-national governments or regions. Finally, interventions to improve transparency and accountability include transparency in revenue management and rules and regulations, regular audits, legal sanctions against misuse of government funds and independent regulatory bodies.

**Comparison:** Studies which make before-and-after comparisons relating to NRR interventions were included. Studies which show differential effects across population groups (for example, class, gender, race, caste) were also included. Studies were not excluded on the basis of this criterion.

**Outcomes:** The review included studies which measured the impact of NRR methods on outcomes such as natural resource revenue and outputs, allocative efficiency, reporting practices, institutional and legal setting, transparency and accountability indicators and controlling macroeconomic instability. However, studies were not excluded based on the outcomes studied.

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## SEARCH STRATEGY

To find relevant research to answer the review question, we used a broad search strategy. The retrieved studies were screened to identify the core set of studies that could provide evidence on the effectiveness of selected interventions, and could be used to answer the review questions.

Key search terms were determined by the review questions, inclusion criteria and a preliminary survey of existing literature. Search strings were developed for each database using combinations of the main keywords and their synonyms. Boolean operators such as and, or, not were used to further refine the search. We also used truncation and wildcard operators for searching multiple forms of a word. The sources which were used for search and retrieval of potential studies are identified below.

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<sup>3</sup>See <https://datahelpdesk.worldbank.org/knowledgebase/articles/378834-how-does-the-world-bank-classify-countries>. (last accessed April 29, 2016)

<sup>4</sup>See <http://icai.independent.gov.uk/wp-content/uploads/Fragile-States-ToRs-Final.pdf> (last accessed June 6, 2016).

## **Bibliographic databases**

A detailed search strategy for electronic databases was developed using index and free-text terms. Search strings were developed for each database using combinations of the key terms and their synonyms. Key search terms and the list of subscribed and open access databases identified for searching are given in Appendix 2.4.

## **Other websites**

One of the key challenges of this review was to screen grey literature. Several websites and portals were searched using the search terms, and relevant studies were imported for analysis to EPPI-Reviewer 4 (Thomas et al. 2010). The details of websites are given in Appendix 2.4.

## **Hand search**

Library catalogues of the TERI Library as well those of relevant libraries in the region were hand searched. There were some studies which the team was not able to obtain so a hand search of library catalogues was done to try to identify them.

## **Reference management and screening procedures**

A database system (supported by the software EPPI-Reviewer 4) was set up to keep track of and manage studies found during the review. Titles and abstracts were imported or entered manually into these databases.

## **2.4 STAGE I ANALYSIS (SCREENING, CODING, MAPPING)**

### **APPROACH TO SCREENING STUDIES**

Once studies were identified using the search strategy, titles and abstracts were screened to exclude those which did not meet the inclusion criteria. This was done by a team of four researchers, divided into two groups with a member in one group also reviewing the studies screened by member of the other group. In case of disagreement on the inclusion of a study, a third reviewer decided if the study should be included. Where abstracts did not provide adequate information, the full text of the study was obtained and screened by one researcher.

### **APPROACH TO CODING AND MAPPING OF INCLUDED STUDIES**

The purpose of coding was to understand the key characteristics of the available literature. For example, to understand how many studies examine natural resource funds (intervention), or how many are based in a specific region of the world (location of study).

A pre-coding exercise was done for selected studies to ensure that all team members understood codes in a similar fashion. Coding was then done by team members independently. EPPI-Reviewer 4.0 was used to classify searches and categorize data (Thomas et al. 2010).

Coding was done for the following information:

- **Type of document:** Article in peer reviewed journal, article in non-peer-reviewed journal, grey literature, including documents of international agencies.
- **Year of publication**

- **Study aim/Type of intervention:** Generation, allocation, transparency, others, or not clear. Within interventions relating to allocation, we further examined if studies focused on natural resource funds, direct cash transfers, or transfers to sub-national levels of government.
- **Outcomes studied:** Natural resource revenue and outputs, allocative efficiency, reporting practices, institutional and legal setting, transparency and accountability indicators and controlling macroeconomic instability, among others.
- **Study design:** Qualitative, quantitative, mixed or other.

Qualitative study designs included: single country case studies, multiple country case studies, interviews or oral histories or other. Quantitative study designs included: time series, cross-sectional studies, panel data, descriptive/correlational or other. Mixed study designs included both methodologies outlined above.

- **Country/countries studied**

The coding sheet can be found in Appendix 2.5.

Based on the coding of 293 studies, graphs were generated to depict their key characteristics. Detailed findings from the mapping are provided in Chapter 3 (Section 3.2).

## 2.5 STAGE II ANALYSIS (EXTRACTION, QUALITY ASSESSMENT, AND SYNTHESIS)

In Stage II of the review, a more detailed review of the 127 studies which were categorized as studying an intervention related to NRFs was conducted.

### APPROACH TO NARROWING DOWN STUDIES FOR SYNTHESIS AFTER MAPPING

The 127 studies studying an intervention related to NRFs were further reviewed to understand whether they answered any of the review questions. These studies were distributed between four reviewers, and each study was reviewed by two reviewers. Studies which were marked for synthesis by both reviewers were automatically included. If there was a disagreement between the two reviewers, a third reviewer decided if the study was to be included.

### APPROACH TO DATA EXTRACTION OF THE STUDIES FOR SYNTHESIS

Based on the detailed review mentioned above, 41 studies were included for synthesis. Studies were divided among reviewers, and the following data were extracted:

- **Description of intervention:** While the name of the intervention was captured at the coding and mapping stage, at this stage, reviewers sought to capture more details about the intervention. For example, details about the natural resource fund, such as official name, year of established, saving and spending rules, any other details.
- **Institutional structure of NRFs:** Data were extracted on how NRFs have been used by various countries to manage resource revenue to answer review question 1.
- **Effect of establishing an NRF:** Data which measured or indicated effects of establishing NRFs, such as impact on Dutch Disease, price volatility, functioning of institutions, were extracted to answer review question 2.

- **Recommendations to improve the functioning of NRFs:** Several studies made recommendations on how to manage resource revenue effectively, including the establishment of NRFs. This information was extracted to answer review question 3.

## APPROACH TO QUALITY APPRAISAL OF THE STUDIES FOR SYNTHESIS

The critical appraisal tool shown in Table 2.3 was used to decide whether studies should be included in the synthesis.

Table 2.2: Questions for critical appraisal

Questions & Guidance	Answers
<p>1. Were steps taken to increase rigour in the <b>sampling</b>?</p> <p><i>Consider: Is the sampling strategy/methods of recruitment/choice of scope for data collection appropriate to the questions posed in the study (e.g. was the strategy well-reasoned and justified)</i></p> <p><i>*Is there an adequate description of the sample used in the study and how the sample was identified and recruited?</i></p> <p><i>*Were attempts made for the sample to reflect the population in question (think about who or what might have been excluded, who or what might have given different results)</i></p>	<p>A. Yes</p> <p>B. To some extent</p> <p>C. No</p> <p>D. Not reported</p>
<p>2. Do the <b>data collection</b> approaches used provide a trustworthy indicator of the phenomenon investigated?</p> <p><i>Consider: Is it clear how the data were collected and by whom? Have the authors given a rationale or justified the methods chosen · Have the authors made the methods of data collection explicit (e.g. surveys, panel data, economic outcome indicators)?</i></p> <p><i>If it is a quantitative outcome, do the authors describe any ways they addressed the repeatability or reliability of their data collection tools/methods, e.g. test–retest, standardized instruments?</i></p> <p><i>Do the authors describe any ways they have addressed the validity or trustworthiness of their data collection tools/methods? E.g. mention previous piloting or validation of tools, published version of tools, involvement of target population in development of tools, referencing previous authors to justify their approach .</i></p>	<p>A. Yes</p> <p>B. To some extent</p> <p>C. No</p> <p>D. Not reported</p>
<p>3. Has the <b>data analysis</b> been conducted rigorously such that you trust the results of the analysis?</p> <p><i>Consider: What rationale do the authors give for the methods of analysis for the study? For quantitative studies also consider which statistical methods, if any, were used in the analysis. For views studies also consider, how well has diversity of perspective and content been explored?</i></p> <p><i>Did the authors triangulate their findings? It may also be helpful to consider 'breadth' as the extent of description and 'depth' as the extent to which data has been transformed/analysed):</i></p> <p><i>*A range of issues are covered</i></p> <p><i>*The perspectives of participants are fully explored in terms of breadth (contrast of two or more perspectives) and depth (insight into a single perspective)</i></p>	<p>A. Yes</p> <p>B. To some extent</p> <p>C. No</p> <p>D. Not reported</p>

Questions & Guidance	Answers
<p><i>*Richness and complexity have been portrayed (e.g. variation explained, meanings illuminated)</i></p> <p><i>*There has been theoretical/ conceptual development.</i></p>	
<p>4. Is the analysis <b>valid</b> and are the inferences trustworthy and/or comprehensive?</p> <p>Consider: <i>If the authors theoretically or empirically make a justifiable link between the key concepts/variable in the analysis? Is there selective reporting of findings? For example, not reporting on all variables they aimed to study, as specified in their aims/research questions. Is there lack of positive or negative case examples?</i></p>	<p>A. Yes</p> <p>B. To some extent</p> <p>C. No</p> <p>D. Not reported</p>

If studies were marked as ‘yes’ on all our criteria they received a ‘high’ ranking , if they were marked as ‘no’ or ‘not reported’ on 3 or more criteria, they received a ‘low’ ranking, all others were classified as ‘medium’. The following table presents the results of the critical appraisal.

Table 2.3: Results of critical appraisal

Study	Quality assessment
Acosta (2012)	Medium
Afnas’ev (2004)	Medium
Ahmadov et al. (2011)	Medium
Aslanli (2015)	High
Azhgaliyeva (2014)	High
Bahl and Tumennasan (2002)	Medium
Bauer (2013)	High
Bauer (2014)	High
Chevrier (2009)	Medium
Claessens and Varangis (1994)	Medium
Drysdale (2008)	Medium
Ekeli and Sy (2011)	Medium
Etemad (2014)	Medium
Fasano (2000)	Medium
Gelb et al. (2014)	Medium
Hannesson (2013)	High
Havro and Santiso (2011)	Medium
Hjort (2006)	Medium
Johnson (2011)	High
Kalyuzhnova (2006)	Medium
Kemme (2012)	High
Korinek (2013a)	Medium
Korinek (2013b)	High

Study	Quality assessment
Korinek (2015)	High
Landon and Smith (2014)	Medium
Lassourd and Bauer (2014)	High
Lohmus and Ter-Martirosyan (2008)	Medium
Lücke (2011)	Medium
Mahmudov (2002)	High
McKechnie (2013)	Medium
Meggison and Fotak (2015)	Medium
Overseas Development Institute (2006)	Medium
Ploeg (2014)	Medium
Ramírez-Cendrero and Wirth (2016)	Medium
Rios-Morales et al. (2011)	High
Sovacool (2016)	High
Sugawara (2014)	High
Tsani (2013)	High
van Ingen et al. (2014)	High
Wills (2015)	High
Yücesoy (2013)	High

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## APPROACH TO SYNTHESIS OF FINDINGS

The 41 studies which were identified did not allow for an aggregative synthesis, and therefore a configurative synthesis of these studies was conducted to answer the three review questions:

- How can natural resource funds be used for managing natural resource revenue by countries rich in natural resources but experiencing fragile circumstances?
- What has been the effect in countries that have already adopted natural resource funds for managing natural resource revenue?
- What are the ways to make natural resource funds more effective including the type of institutional support required and the revenue sharing arrangements between national and sub-national levels of government?

As Sandelowski et al. (2012: 9) point out, the difference between aggregative and configurative syntheses is that configurative syntheses can be done when ‘instead of confirming each other (by virtue of repetition of what are judged to be the same aspects or associations), thematically diverse findings may contradict, extend, explain, or otherwise modify each other. Although their relationship may not necessarily be immediately evident, such findings are viewed as potentially related.’

Thus, a configurative synthesis allows reviewers to assimilate findings which measure outcomes which have varying degrees of similarity, but are not necessarily the same outcomes, as was the case in this review.

## 2.6 ADVISORY GROUP AND USER INVOLVEMENT

Potential users of the review include policy makers, practitioners and researchers working on issues surrounding natural resource revenue management. More details on potential users are provided in Appendix 2.6. We reached out to researchers within TERI, as well as other sector experts, to seek their inputs at various stages.

The advisory group for the review included retired senior officials from the Government of India (of the rank of Ex-Secretary, Government of India), and they were consulted at various stages of the review process to ensure that major interventions and policies were identified, and that the findings of the review were relevant for policy makers and other users. The conceptual framework was developed with feedback from members of the advisory group who had subject expertise on the topic of natural resource revenue management.

Similarly, while conducting the review we reached out to policy makers and practitioners through TERI's existing network. Discussions were held with diverse types of users. Prior to writing the technical report, the reviewers conducted brief discussions with experts on natural resource management who had worked on Afghanistan and Myanmar on key revenue management issues . The team plans to discuss the findings of the review with policy makers and practitioners in the South Asian region with the assistance of the SARH SR programme consortium (DFID, PwC, the EPPI-Centre and LIRNEasia).

The research findings have been disseminated among policy makers through stakeholder interactions, participation and sharing of review findings at training programmes and conferences. The team is working on writing a policy brief and finalizing a discussion paper targeted specifically at policy makers which will also, be submitted for consideration for publication in a peer reviewed journal.

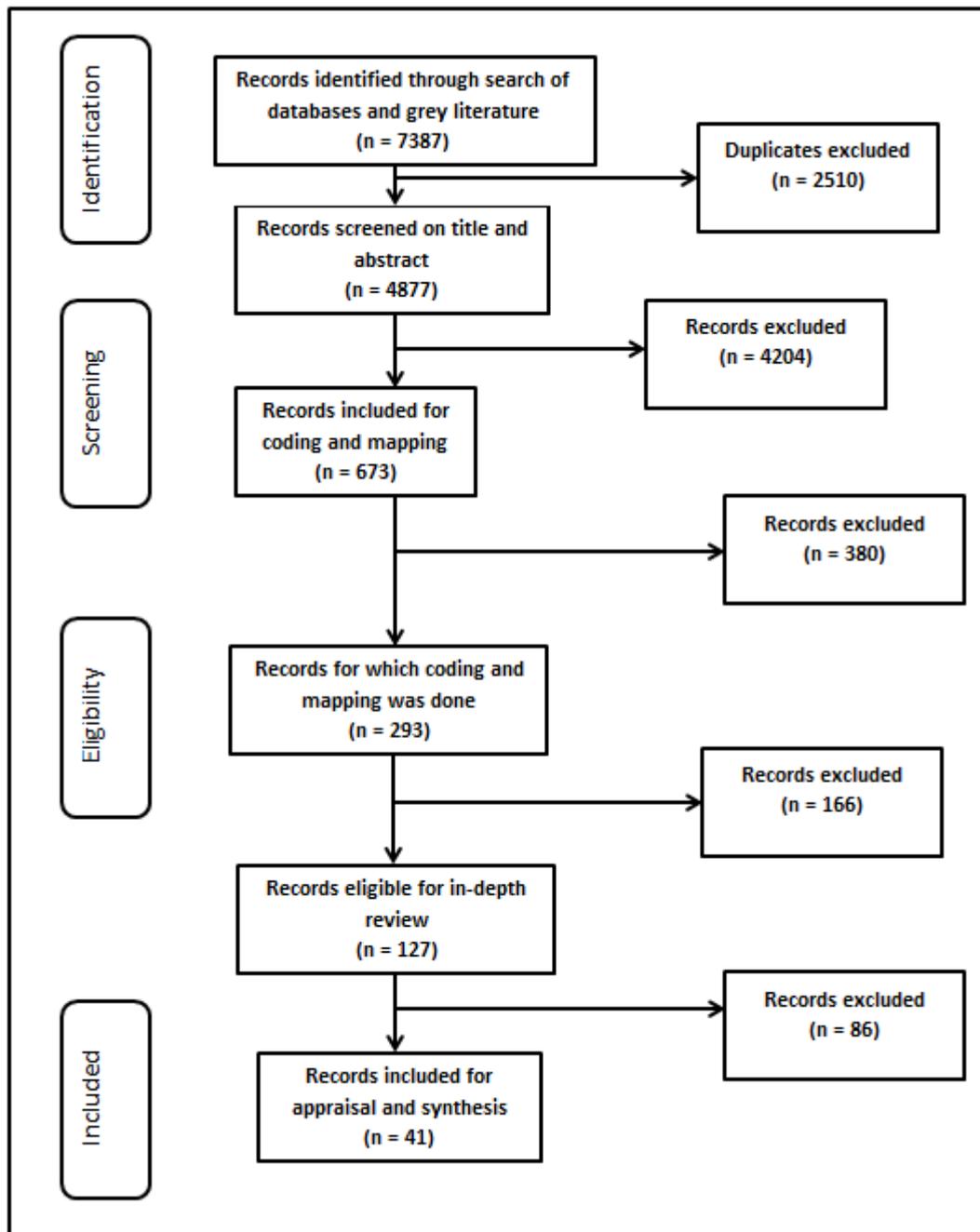
### 3 IDENTIFYING AND DESCRIBING STUDIES: RESULTS

This chapter discusses the key findings of the review in Stages I and II. The next section lists the steps followed to select studies for the in-depth review and synthesis, and Figure 3.1 depicts this process using a modified PRISMA flow chart.

#### 3.1 OVERVIEW OF THE REVIEW PROCESS IN STAGE I AND II

- Our searches identified a total of 7,387 studies. After removing 2,510 duplicates, the titles and abstracts of 4,877 studies remained.
- These studies were **screened** on the basis of their title and abstract, and 4,204 studies were excluded as they did not meet the inclusion criteria.
- The inclusion and exclusion criteria are detailed in Chapter II and Appendix 2.2. Briefly, those studies which examined a country or countries which were LMIC and fragile, or were resource-rich, were included. In addition, those studies which documented an intervention related to natural resource revenue management were included. Thus studies were excluded based on the following criteria: (i) country, (ii) evidence, (iii) intervention studied and (iv) language.
- Of the 673 studies which remained, 273 were selected directly for coding and mapping based on their title and abstract. studies
- A full-text screening was conducted of the remaining 400 studies, of which 123 studies were included for coding and mapping.
- Out of the remaining 396 studies (273 + 123), a further 103 studies were removed based on a reading of the full text, leaving 293 studies for **coding** and **mapping**. Thus, a total of 380 studies were excluded at the screening stage. The main criteria for excluding studies at this stage were: (i) country, (ii) evidence, (iii) nature of resource, (iv) intervention studied, (v) language, and (vi) full text not available.
- 127 studies studied NRF as a natural resource revenue management intervention. These were included for the in-depth review.
- At this stage, the reviewers screened these 127 studies and selected only those studies for synthesis which had data pertaining to any of the three review questions (see Section 2.5.4 for details of the review questions).
- On the basis on this in-depth screening, 41 studies were identified for **data extraction** and **synthesis** as relevant to any of the three review questions.

Figure 3.1: Modified PRISMA flow chart depicting record identification process



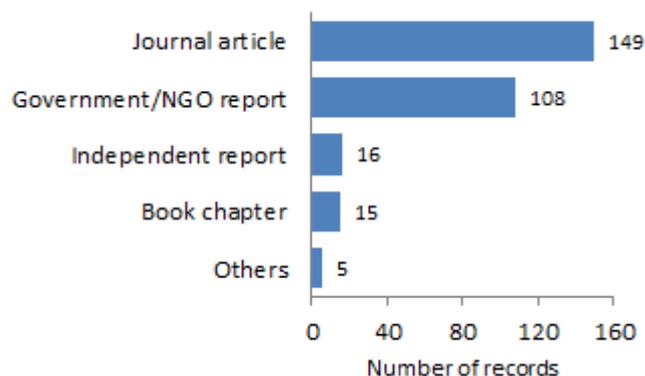
Note: Details of the inclusion and exclusion criteria can be found in Chapter 2 and Appendix 2.2.

### 3.2 KEY FINDINGS OF STAGE I: DESCRIBING STUDIES

This section details the findings of our coding and mapping exercise. Information about these studies was coded to understand what interventions, outcomes and countries these studies focused on (among certain other criteria), to be able to map them. We were then able to identify which studies examined interventions related to natural resource funds for the in-depth review in Stage II. Key findings from the coding and mapping are presented below.

## WHAT TYPES OF STUDIES WERE IDENTIFIED?

Figure 3.2: Types of studies (n=293)

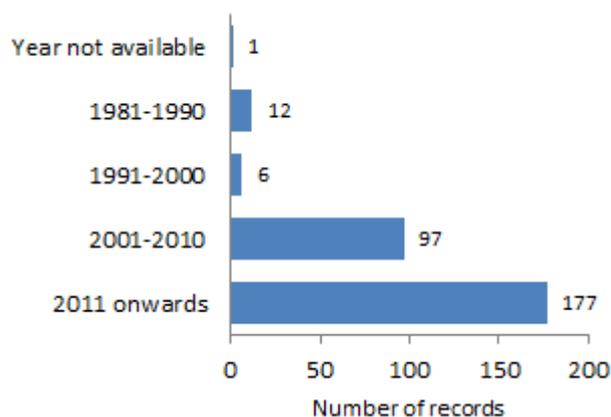


As shown in Figure 3.2, of the total number of studies mapped (n=293), the majority were journal articles (n=149), followed by reports by government and non-governmental organizations (n=108). Independent research reports (n=16) and book chapters (n=15) were also found. Others (n=5) include master's or doctoral theses, working papers etc. These studies are mutually exclusive.

## WHEN WERE THESE STUDIES PUBLISHED?

As shown in Figure 3.3, while there is a sudden increase in the number of studies published between 2001 and 2010 (n=97), there is a proliferation of studies in the last 6 years, from 2011 onwards (n=177). In addition, no studies were found prior to 1981. These studies are mutually exclusive.

Figure 3.3: Year of publication (n=293)



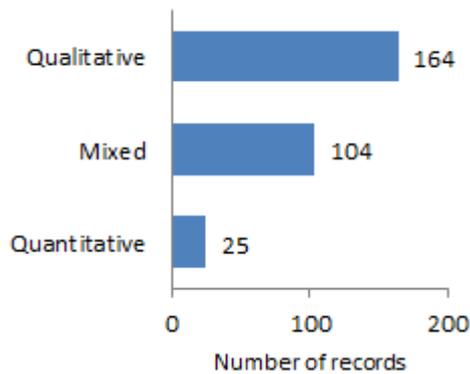
## WHAT WAS THE STUDY DESIGN OF THE SELECTED STUDIES?

The selected studies examined macro-economic interventions to manage resource revenue, and the following study designs were identified:

1. Observational quantitative
  - Time series
  - Cross sectional
  - Panel
2. Observational qualitative
  - Interviews/oral history
  - Case study single country
  - Case study multiple country

- 3. Observational mixed
  - Qualitative and quantitative data

Figure 3.4: Study design (all) (n=293)



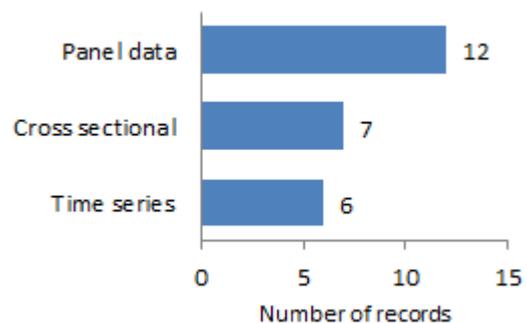
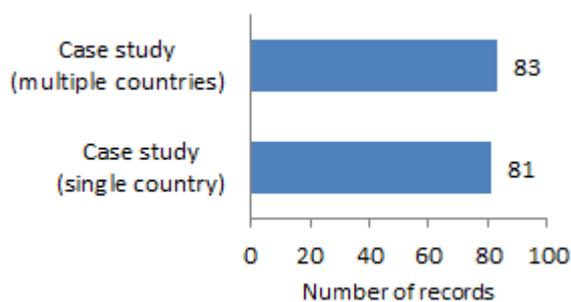
At the time of coding, the category of interviews/oral history was excluded as there were no studies found under this category.

As can be seen in Figure 3.4, the majority of the studies were of qualitative study design (n=164), followed by mixed (n=104), and then quantitative (n=25). These studies are mutually exclusive. The following graphs provide details about the type of quantitative and qualitative studies identified.

Studies assessing impact, such as randomized controlled trials or quasi-experimental studies designs, controlled before-and-after studies and interrupted time series were not expected in our mapping exercise. This is because experimental methods require conducting trials or establishing control groups, which becomes difficult with macro-economic interventions which are used to manage natural resource revenues. Some examples of these interventions include imposing taxes or fees on mineral extraction, creating a resource fund from this revenue for use for specific purposes. Similarly, observational studies such as cohort studies and case-controlled studies assessing harm or causation were also not expected. This is because cohorts cannot be followed to study the impact of the type of interventions we are looking at in this review for assessing natural resource revenue management interventions.

WHAT TYPES OF QUALITATIVE AND QUANTITATIVE METHODOLOGIES WERE USED?

Figure 3.5: Qualitative methodologies (n=164)    Figure 3.6: Quantitative methodologies (n=25)



As can be seen in Figure 3.5, studies which used qualitative methodologies were almost equally divided into two types, those which studied the experience of one country (n=81) and those which studied the experience of more than one country, either comparatively or as stand-alone case studies (n=83). Figure 3.5 shows that of the total number of studies which used a quantitative methodology (n=25), the majority used panel data (n=12), followed by cross-sectional (n=7) and time series data (n=6).

## WHICH COUNTRIES DID THE SELECTED STUDIES EXAMINE?

A list of included countries is given in Appendix 2.3. The selected studies often dealt with multiple countries, but in several cases, it was possible to identify one country when the studies examined one or a few countries specifically. The countries covered in the studies are listed in Table 3.1, and are not mutually exclusive.

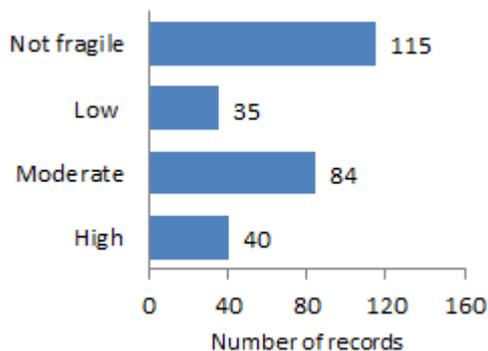
Table 3.1: Number of countries covered by selected studies

Country	Number
Multi country	126
Norway	24
Nigeria	22
Azerbaijan	18
Kazakhstan	17
Ghana	15
Russia	14
Indonesia	13
Chile	12
Botswana	11
Peru	11
Venezuela	8
Chad	7
Myanmar	7
Papua New Guinea	7
Zambia	7
Bolivia	6
Colombia	6
Iran	6
Mexico	6
Mongolia	6
Sierra Leone	6
Tanzania	6
Timor-Leste	6
United Arab Emirates	6
Algeria	5
Iraq	4
Sao Tome	4
Afghanistan	3
Angola	3
Ecuador	3
Egypt	3
Libya	3
Saudi Arabia	3
Cameroon	2

Country	Number
Guinea	2
India	2
Liberia	2
Mozambique	2
Trinidad and Tobago	2
Congo, Democratic Republic	1
Equatorial Guinea	1
Gabon	1
Kenya	1
Lao PDR	1
Lebanon	1
Mali	1
Niger	1
Oman	1
Pakistan	1
Qatar	1
South Sudan	1
Suriname	1
Yemen, Republic of	1

#### HOW MANY STUDIES EXAMINED FRAGILE COUNTRIES?

Figure 3.7: Fragility of countries in selected studies (n=230)



DFID's Fragile States and Regions List is used to classify countries as fragile.<sup>5</sup> In those studies where only one country was studied or where detailed case studies of a few countries were available, we were able to capture information on the fragility of the country studied, depicted in Figure 3.7. Multiple categories of fragility were selected in case more than one fragile country was studied in detail. Therefore, these codes are not mutually exclusive. In certain cases, where the record did not specifically mention any countries, none of these codes was selected.

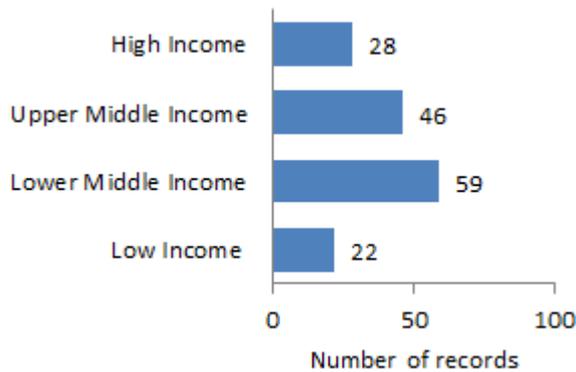
#### HOW MANY STUDIES EXAMINED RESOURCE-RICH COUNTRIES?

Our definition of resource-rich countries is based on the International Monetary Fund (2012) classification. Of those studies where only one country was studied or where detailed case studies of a few countries were available, 224 examined resource-rich countries, while 6 examined non-resource-rich countries.

<sup>5</sup>See <http://icai.independent.gov.uk/wp-content/uploads/Fragile-States-ToRs-Final.pdf> (last accessed June 6, 2016).

WHAT TYPES OF COUNTRIES WERE STUDIED ACROSS INCOME CATEGORIES?

Figure 3.8: Income categories of countries in selected studies (n=155)

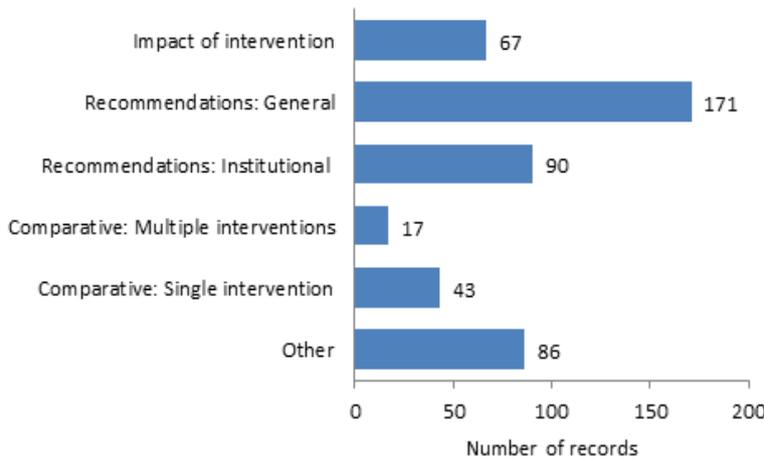


Of those studies which examined just one country (n=155), the largest number examined LMICs (n=59), followed by upper-middle-income countries (n=46).

Since in this case only single-country case studies were included, these codes are mutually exclusive.

WHAT WERE THE AIMS OF THE SELECTED STUDIES?

Figure 3.9: Research aims of selected studies (n=474)



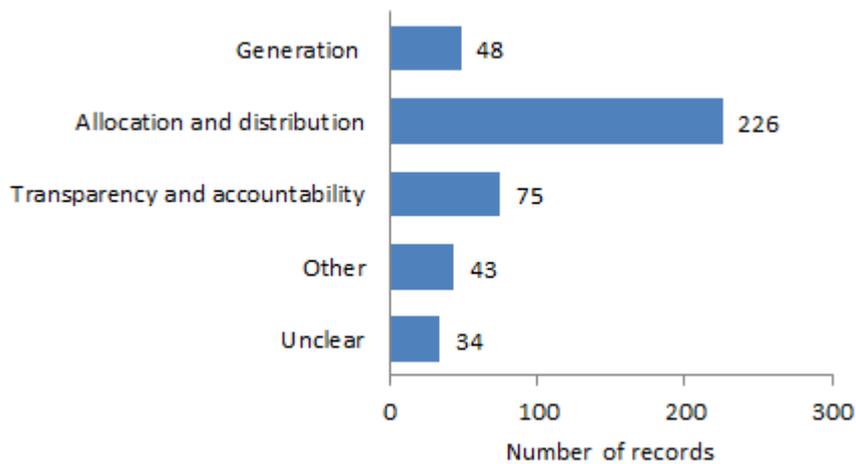
In this case, if reviewers judged a study to have multiple aims, all those applicable (according to the codes of the review) were selected. As a result, the codes are not mutually exclusive, and the total for this graph (n=474) is more than the total number of studies for which coding was done (n=293).

As can be seen above, the majority of the studies sought to make general policy recommendations based on a situational analysis (n=171). Several studies made recommendations specifically to improve institutional capacity (n=90), and this was therefore added as a separate code under the aims of the study.

Certain studies sought to compare the impact of an intervention across multiple countries (n=43) or to compare the impact of multiple interventions in one or more countries (n=17). A total of 86 studies had an aim other than those mentioned in the codes, such as outlining general principles of natural resource revenue management or general trends in revenue management.

## WHAT WERE THE MAJOR TYPES OF INTERVENTIONS EXAMINED IN STUDIES?

Figure 3.10: Types of interventions (all) (n=426)

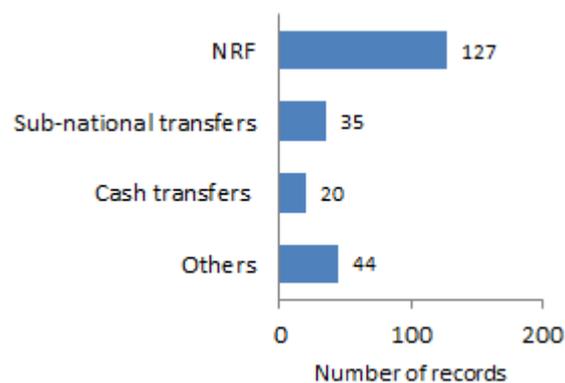


The largest number of studies examined interventions related to allocation and distribution of natural resource revenue (n=226). Others related to measures to improve transparency and accountability (n=75), and generation of revenue (n=48).

33 studies were not clear about the nature of intervention, while 43 were described as interventions other than the three mentioned above. In this case, the codes are not mutually exclusive as all possible interventions which were studied were coded, as some studies examined multiple interventions.

## OF THOSE STUDIES WHICH EXAMINED ALLOCATION AND DISTRIBUTION, HOW MANY EXAMINED NATURAL RESOURCE FUNDS?

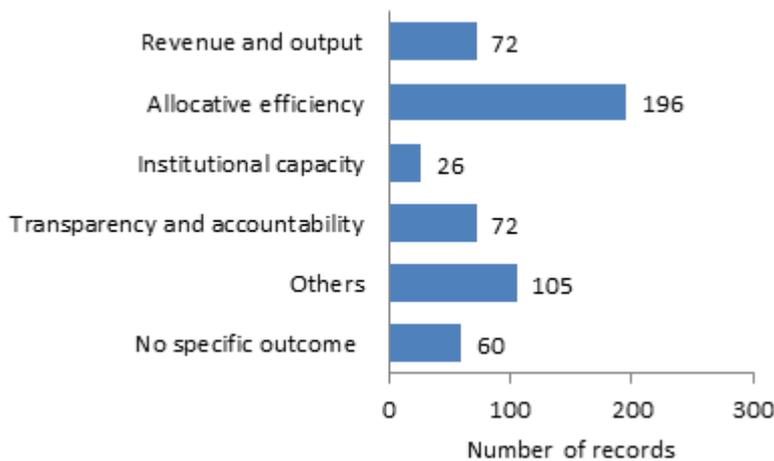
Figure 3.11: Types of interventions (allocation and distribution) (n=226)



As can be seen in Figure 3.11, 127 studies examined NRFs as an intervention, with others examining transfers to sub-national levels (n=35) and cash transfers (n=20). Some other types of interventions were not included in these three categories (n=44). The codes are not mutually exclusive, as some studies examined multiple interventions.

### WHICH OUTCOMES WERE EXAMINED BY STUDIES?

Figure 3.12: Types of outcomes (all) (n=531)



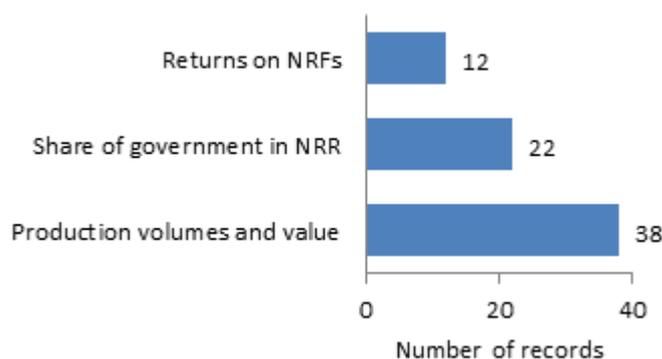
It was challenging to identify specific outcomes measured by studies, as most studies did not seek to assess an impact, but to make recommendations based on the context in which the interventions were implemented. These policy recommendations were either drawn from existing theory on the topic, or were based on the experience of other countries.

Thus, if a study mentioned an outcome of an NRRM intervention, it was marked as having referred to the outcome, even if that was not one of the major objectives of the study. As with interventions, if a study examined multiple outcomes, all possible outcomes were selected during coding. Hence the codes are not mutually exclusive.

Most studies examined outcomes relating to allocative efficiency (n=196). Studies also examined outcomes relating to changes in revenue and output (n=72) and transparency and accountability (n=72). A total of 105 studies examined other outcomes, while 60 did not study an outcome and largely made policy recommendations based on a description of the context. While institutional capacity outcomes were not originally included in the list of outcomes to be coded, several studies dealt with the impact of revenue management interventions on institutional capacity, or attempted to understand the inter-linkages between revenue management and institutional capacity, so this was included as a separate code (n=26).

### WHICH SPECIFIC OUTCOMES RELATING TO NATURAL RESOURCE REVENUE AND OUTPUTS WERE EXAMINED?

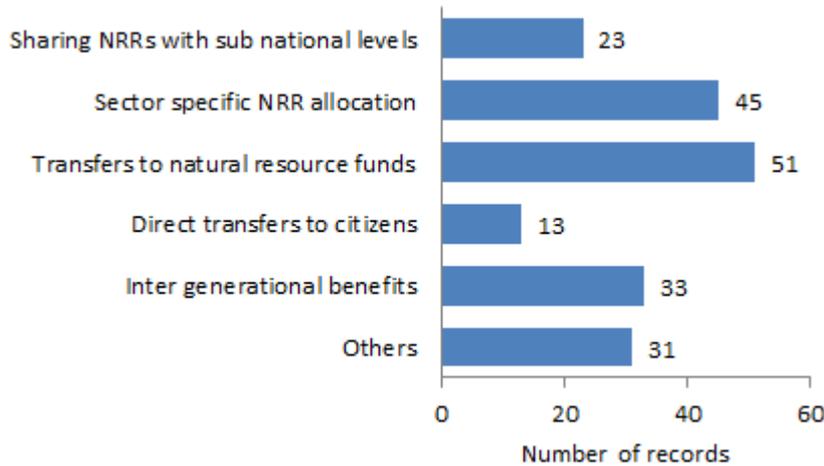
Figure 3.13: Outcomes relating to revenue and output (n=72)



Of those studies which studied outcomes pertaining to natural resource revenue and outputs, the majority examined changes in production volumes and value (n=38). Of the remaining studies, 22 studies examined outcomes pertaining to changes in the share of the government in natural resource revenue, while 12 studies examined outcomes relating to returns on NRFs. If a study examined multiple outcomes, all possible outcomes were selected during coding. Hence the codes are not mutually exclusive.

**WHICH SPECIFIC OUTCOMES RELATING TO ALLOCATIVE EFFICIENCY WERE STUDIED?**

Figure 3.14: Outcomes relating to allocative efficiency (n=196)



Of the studies examining allocative efficiency outcomes, most examined allocation of NRR to resource funds (n=51), as well as to specific sectors (n=45). Others studied sharing of resource revenue with sub-national government (n=23), direct transfers to citizens (n=13) as well as intergenerational allocative efficiency (n=33). Thirty-one studies also

referred to other outcomes. If a study examined multiple outcomes, all possible outcomes were selected during coding. Hence the codes are not mutually exclusive.

**WHICH SPECIFIC OUTCOMES RELATING TO INSTITUTIONAL CAPACITY WERE STUDIED?**

Figure 3.15: Outcomes relating to institutional capacity (n=26)

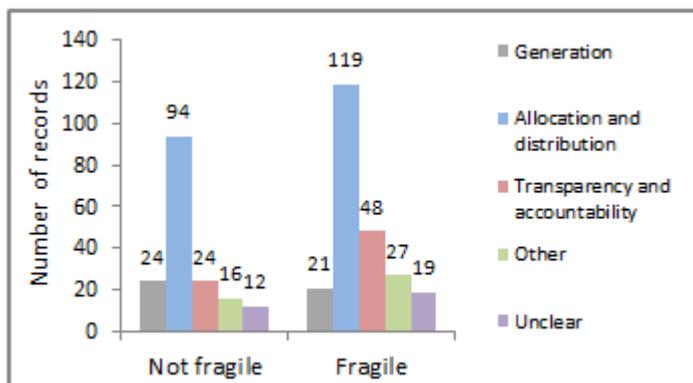


Of the studies examining outcomes relating to institutional capacity, five related to sub-national transfers, five related to revenue transfers, and 16 examined other institutional outcomes. If a study examined multiple outcomes, all possible outcomes were selected during coding. Hence the codes are not mutually exclusive.

**MEASURING INTERVENTIONS AND OUTCOMES BY COUNTRY TYPE**

**INTERVENTIONS AND FRAGILITY**

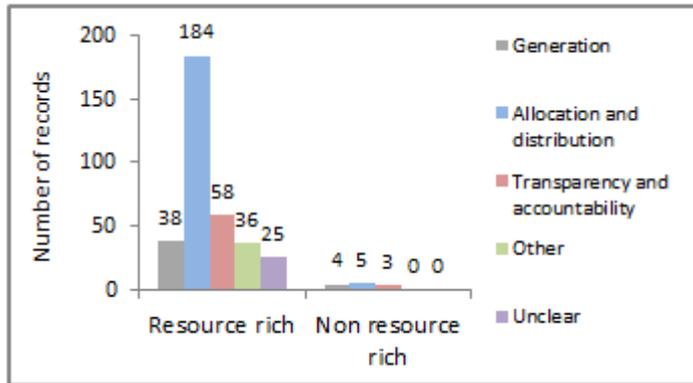
Figure 3.16: Interventions and fragility



Across fragility status, countries in the selected studies were implementing the largest number of interventions related to allocation and distribution, followed by interventions ensuring greater transparency and accountability in using mineral wealth. Codes are not mutually exclusive, as some studies examined multiple interventions.

## INTERVENTIONS AND RESOURCE-RICH NATURE OF COUNTRIES

Figure 3.17: Measuring intervention against resource-rich nature

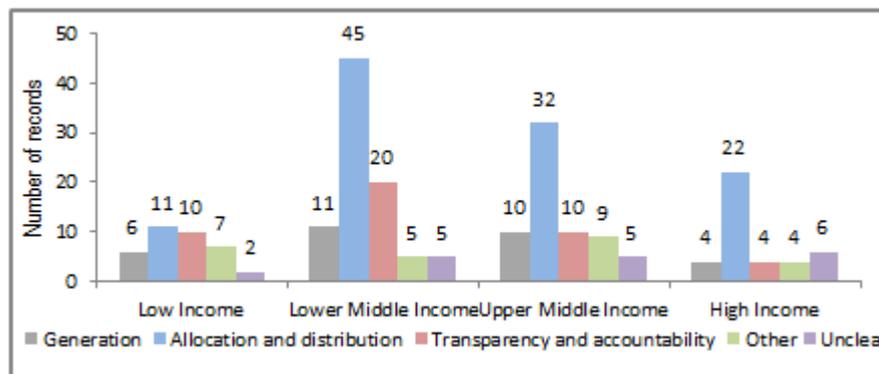


Interventions relating to allocation and distribution were largely examined in those studies which dealt with resource-rich countries, both because they are more likely to implement NRRM interventions for allocation and distribution of (large and volatile) revenues and also because they are more likely to face challenges in this regard. These challenges relate to both dependency on revenues from exhaustible resources, addressing needs

of the society and chances of mis-utilization of these revenues. Codes are not mutually exclusive, as some studies examined multiple interventions.

## INTERVENTIONS AND INCOME TYPE

Figure 3.18: Measuring interventions against income type

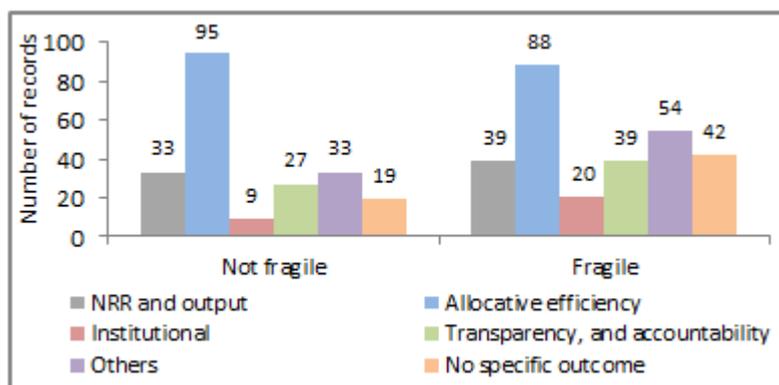


As with fragile and resource-rich countries, in the selected countries, across income categories, the largest number of studies dealt with interventions related to allocation and distribution. As earlier, codes are not mutually exclusive, as some studies examined

multiple interventions.

## OUTCOMES AND FRAGILITY

Figure 3.19: Measuring outcomes against fragility



Most of the NRRM interventions are aimed at enhancing allocative efficiency, smoothing the government expenditure path and bringing in transparency and accountability, irrespective of whether the intervention is implemented in fragile countries or not. If a study

examined multiple outcomes, all possible outcomes were selected during coding. Hence the codes are not mutually exclusive.

### OUTCOMES AND THE RESOURCE-RICH NATURE OF COUNTRIES

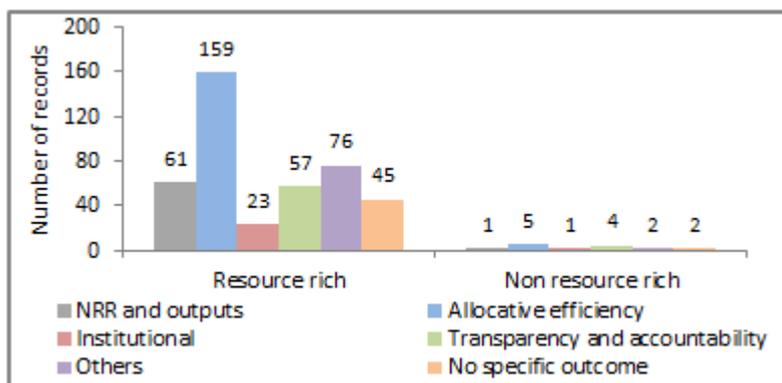


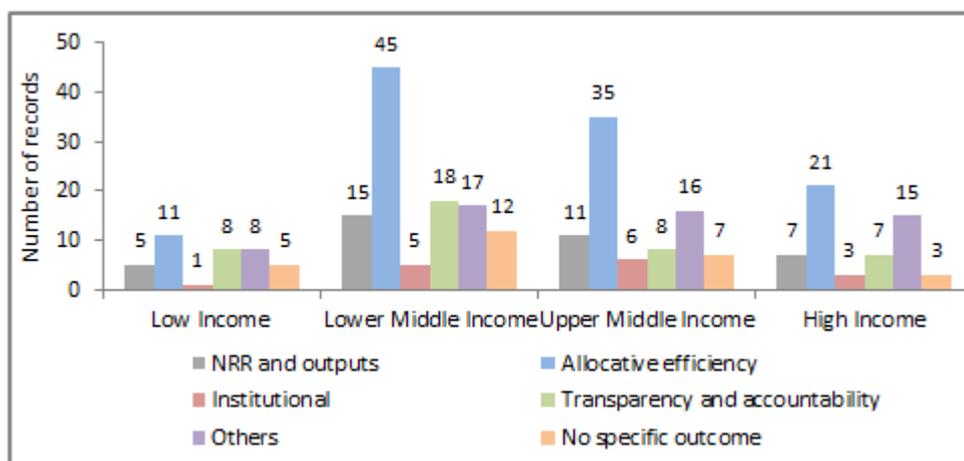
Figure 3.20: Measuring outcomes against the resource-rich nature of countries

The majority of the NRRM interventions in resource-rich countries are aimed at enhancing the allocative efficiency, smoothing government expenditure path and bringing in transparency and accountability. The

availability of fewer studies from non-resource-rich countries shows their limited dependence on resource revenues.

### OUTCOMES AND INCOME TYPE

Figure 3.21: Measuring outcomes against income type



Across income types, most NRRM measures are aimed at enhancing allocative efficiency, smoothing the government expenditure path and bringing in transparency and accountability. If a study examined multiple outcomes, all possible

outcomes were selected during coding. Hence the codes are not mutually exclusive.

Table 3.2: Summary of findings: Study design

Population	Quantitative	Qualitative	Mixed	All
Resource rich + fragile	8	78	36	122
Resource rich + not fragile	7	57	41	105
Others / multi-country* / non-resource rich	10	29	27	66
All	25	164	104	293

Note: \* In cases where information on specific countries was not available; 6 country specific studies were about non-resource-rich countries

Table 3.3: Summary of findings: Natural Resource Funds

Intervention	Quantitative	Qualitative	Mixed	All
Natural resource funds	5	70	52	127

Note: In Stage II, an additional 14 studies were classified as related to NRFs, making a total of 127 studies.

### 3.3 IMPLICATIONS OF MAPPING FOR STAGE II ANALYSIS

In Stage I of the review, evidence on the kinds of interventions that are being used for managing mineral resource revenues, in LMICs experiencing fragile conditions, as well as resource-rich countries was mapped.

As can be seen in the previous section, we found that 226 studies examined interventions pertaining to allocation and distribution, 75 studies examined interventions relating to transparency and accountability, while 48 studies examined interventions pertaining to revenue generation.

Further, of the 226 studies which examined interventions pertaining to allocation and distribution, the largest number (n=127) examined NRFs, while 35 examined sub-national transfers and 20 cash transfers. This allowed us to focus on NRFs as an intervention for natural resource revenue management in Stage II of the review.

In terms of outcomes examined, 196 studies examined outcomes related to allocative efficiency such as resource revenue sharing, cash transfers and intergenerational equity; 72 studies looked at outcomes relating to revenue and output; another 72 studies looked at outcomes relating to transparency and accountability; and 26 studies looked at outcomes relating to institutional capacity.

If a study examined more than one intervention/outcome, all relevant ones were coded. This implies that codes were not mutually exclusive, and the total number of interventions/outcomes examined is more than the total number of studies.

In Stage II, we conducted a more detailed mapping of those studies which pertained to NRFs, to understand which specific outcomes were examined by these studies.

### 3.4 KEY FINDINGS OF STAGE II

In Stage II, we conducted a synthesis of 41 papers to answer the review questions. The results do not lend themselves to a statistical meta-analysis, since all but four studies make policy recommendations without estimating a quantitative impact of the intervention. The remaining four studies estimate a quantitative impact for different outcomes (macroeconomic stabilization, Dutch Disease, savings and investment). Thus, while studies present evidence which contribute towards answering the review questions, this evidence does not allow for a statistical aggregation. The evidence, whether qualitative or quantitative, examines various aspects of NRFs, such as structure, impact, and recommendations to make them more effective.

All the 41 studies selected for synthesis present some evidence on or recommendations related to using NRFs for managing natural resource revenue. The level of detail varies across the studies, but

there is some (at times common) learning to be drawn from these studies. The synthesis in the following section attempts to present the findings structured along different themes, some looking at the use of NRFs in countries and other looking at the impact of the NRFs and how they can be made more effective.

Some of our key findings are:

- There were several countries that featured very prominently in the literature, including Azerbaijan, Kazakhstan, Norway, Venezuela and Chile.
- Mineral-rich countries establish NRFs for several reasons, chief among them being macroeconomic stabilization, sterilization against outcomes such as Dutch Disease, high returns from investments, and to promote intergenerational equity.
- One of the key issues examined by the selected studies is the impact of NRFs on price volatility and consequently on macroeconomic stabilization.
- Appropriate institutional and administrative structures, sound fiscal rules, oversight by independent agencies and the active role of citizens in holding fund management accountable, are necessary for the successful functioning of NRFs.
- However, these cannot be substituted for sound macro-economic management policies, as the wider political and economic context in which NRFs are created can play a significant role in preventing rent seeking or misuse of funds.
- In some countries, NRFs have not been able to accumulate reserves, largely because of strong political pressures to spend money in short-term investments.
- The type of fiscal rules a government applies should be determined on the basis of the objectives of the fund and the amount of savings or expenditures necessary to meet that objective in the country context.
- The studies selected for synthesis highlight the need to have clearly defined fiscal rules relating to deposit into and withdrawal of money from NRFs, developed through political consensus.
- Sound corporate governance (including aspects such as an independent board, professional staff, transparent reporting and independent audit) is another prerequisite for effective NRFs.
- Appropriate financial management of funds and creating an overall strategy for investments can be key drivers for the success of funds. Choosing how and where to invest (for example, choosing between foreign and/or domestic investment options) must be determined by investment rules.
- Initial investment choices of the NRF should be conservative, liquid and low risk, especially because investment expertise may not be developed in the early stages of the fund.
- For a developed economy, it may make sense to invest in global financial markets or use the fund to finance pension payments. However, for a low-income fragile country, NRFs could also be used to help develop infrastructure and promote industrial growth.

- Investment rules should also cover measures to enable the diversification of the investment portfolio. NRFs can be used to promote the diversification of the economy by funding the development of the non-resource sectors. This can allow countries to prepare for a time when non-renewable resources are depleted.
- Instituting transparency measures can encourage compliance with fiscal and investment rules by helping align public expectations with government objectives.
- They can also increase confidence in and a sense of ownership towards the NRF and generate and sustain popular support for a strategy to save substantial resource revenues to enable to the NRF to function in the long run.
- The availability of limited quantitative estimates estimating the impact of an intervention related to NRFs suggests that further research is required to evaluate the exact impact of the intervention on specific outcomes.

Twenty-two studies in the synthesis discuss the functioning of NRFs in fragile, resource-rich LMICs, such as Azerbaijan, Nigeria, Timor-Leste and Venezuela. However, since most studies examine LMIC contexts which are not necessarily fragile, we attempt to use the evidence and policy recommendations outlined in these studies and apply them to other LMIC contexts which are also experiencing fragile conditions.

Specifically, in chapter 5, we attempt to contextualize the findings of the synthesis for two South Asian LMICs experiencing fragile conditions: Afghanistan and Myanmar. This also clearly supports a need for additional empirical studies which examine ways to manage NRR using NRFs and assess the effectiveness of NRFs in countries experiencing fragile conditions. There is also a need for studies that focus on South Asia as a region, or South Asian countries which are resource rich but also experiencing fragile politico-economic conditions.

As mentioned earlier, based on the type of studies we found, we are conducting a configurative systematic review. This method precludes certain synthesis methods that are more appropriate for aggregating quantitative data. However, one key dimension that shapes the synthesis approach in a more mixed-method or qualitative review is the degree to which themes for grouping findings are inductive or deductive. In short, the main difference in synthesis approaches is, 'principally in terms of when in the process the distinguishing themes originate; whether they are determined at the outset of the review as part of its conceptual framework ("deductive"), derived from the studies themselves ("inductive"), or a combination of the two' (Thomas et al. 2012: 183). In this review, we find that the themes emerge more as a combination of the two. Further, there are also linkages between responses to the three review questions. For example, a recommendation to manage resource revenue through NRFs in one study may be identified as a factor behind effective natural resource management through NRFs in another study.

A quality assessment of the 41 studies was undertaken. Twenty-three studies were assessed as of medium quality and 18 as of high quality. Next, we briefly discuss NRFs and some common reasons why they are set up. In the sections that follow, we discuss the findings of our synthesis as they pertain to the three review questions.

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## WHAT ARE NATURAL RESOURCE FUNDS AND WHY ARE THEY ESTABLISHED?

All studies in the synthesis set have examined either NRFs or the broader category of sovereign wealth funds (SWFs). An SWF is a state-owned investment fund that is commonly established from balance of payments surpluses, official foreign currency operations, the proceeds of privatizations,

governmental transfer payments, fiscal surpluses and/or receipts resulting from resource exports.<sup>6</sup> The definition of SWFs excludes, among other things, foreign currency reserve assets held by monetary authorities for traditional balance of payments or monetary policy purposes, state-owned enterprises (SOEs) in the traditional sense, government-employee pension funds (funded by employee/employer contributions), or assets managed for the benefit of individuals.

An NRF, a type of sovereign wealth fund, is a special-purpose investment vehicle owned by a government, whose principal source of financing is revenue derived from oil, gas or mineral sales. Money can be placed in the fund from the various sources: through transfers of fiscal surpluses, export earnings and/or directly from resource payments. Most NRFs are set up with conditions on how money is deposited into these funds and how and when it can be withdrawn. NRF revenues can be used for various purposes including transfers to the state budget to meet budget gaps or cover non-resource revenue budget deficit, financing developmental programmes, and direct funding of social, infrastructure and human capital development programmes.

For this review, we refer to both SWFs and NRFs, depending on how they are defined by various studies. For example, some studies examine SWFs but restrict themselves to NRFs.

NRFs are primarily established to address challenges of fiscal and macroeconomic stability and to promote intergenerational equity.

**Aslanli (2015)** discusses the issue of fiscal sustainability in resource-rich countries and points out that a large revenue inflow from the export of oil, gas or minerals can lead to an increased dependence on a highly volatile source of income, creating two problems: income volatility and exchange rate distortions through the inflow of resource revenues. The high spending of current resource income converts income volatility into highly volatile expenditure, with macroeconomic consequences. One of the objectives of NRFs should therefore be to ensure fiscal stabilization by helping prevent excessive spending. NRFs can allow for effective revenue management and prudent intergenerational and intragenerational allocation of finite national mineral resources.

A study by the **Overseas Development Institute (2006)** discusses the NRFs in the context of management of natural resource revenues and how resource-rich countries have established NRFs to manage issues relating to expenditure and savings. The study looked at a sample of funds that were created for the management of revenue generated from oil resources. It points out that there could be a number of reasons for the establishment of the NRFs: (i) controlling the release of revenues to the government budget and helping regulate its use for that during changes in natural resource prices; (ii) providing a means for long-term savings and revenue stabilization (for example through investment on global capital futures markets); (iii) allocating revenues between consumptive and productive or investment expenditure to 'sterilize' against Dutch Disease effects; (iv) addressing the issue of intergenerational equity to ensure that future generations also benefit from the extraction of finite resources; (v) facilitating desired changes in exchange rates; (vi) suppressing expectations of spending by government departments and the public; and (vii) acting as an external institutional constraint allowing time for local institutions to strengthen.

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<sup>6</sup>The Sovereign Investment Laboratory defines these funds as: (1) an investment fund rather than an operating company; (2) that is wholly owned by a sovereign government, but organized separately from the central bank or finance ministry to protect it from excessive political influence; (3) that makes international and domestic investments in a variety of risky assets; (4) that is charged with seeking a commercial return; and (5) which is a wealth fund rather than a pension fund – meaning that the fund is not financed with contributions from pensioners and does not have a stream of liabilities committed to individual citizens. Refer <https://www.unibocconi.eu/wps/wcm/connect/fbd0c50e-0402-4992-9a2f-0a46d3105261/SWF-PPP-Palgrave-1.pdf?MOD=AJPERES>; (accessed on 7 December 2017)

**Meggison and Fotak (2015)** outline certain other factors which lead to the creation of SWFs: (i) discovery of a major new natural resource, (ii) restructuring of the administration of an existing resource base; and (iii) allowing for the channelling of 'excess' foreign exchange reserves held by the central bank away from static holdings of low-yielding sovereign bonds and into higher-return equity and corporate debt investments. The authors note that SWFs, especially those established in developed countries, have typically preferred to invest outside the country of origin rather than domestically. This investment could be made by the SWFs in publicly traded firms, which could also involve cross-border purchases of sizeable minority stakes (median around 20%) in target firms,<sup>7</sup> with a strong preference for investments in the financial sector.

**Drysdale (2008)** recognizes that NRRM is a challenge for poor countries dependent on the exploitation of their natural resources for achieving sustainable development. The author suggests five principles for managing resource revenue, based on a review of the literature: (i) defining the responsibility of revenue management; (ii) receipt of all natural resource revenue by the state; (iii) investing the NRR wisely; (iv) managing the IT transparently; and (v) ensuring some benefit from resource extraction for future generations. Using a case study of Timor-Leste, the author also notes that besides these five principles, institutions must be strengthened, and key stakeholders must take greater responsibility for managing revenue and upholding the rules pertaining to the operation of the fund. This is also emphasized in other studies included for synthesis and we present these findings in our response to the third review question.

NRFs may be classified into two broad types, depending on the objective they are expected to serve: (i) stabilization fund and (ii) savings fund.<sup>8</sup> The former seeks to reduce the impact of volatile revenue on the economy by using the natural resource revenue for non-resource sectors.<sup>9</sup> The latter allows the government to create a store of wealth for future generations so that they have access to income from NRR even after the resource is exhausted, thereby promoting intergenerational equity. A combination (and also different variations) of these two types of funds can also be put into practice. For example, in one type of fund, the capital in the fund increases through deposits and investment income, thereby maintaining the original capital (which can also be made available for future generations), and earnings can be used to finance the government budget or for non-budgetary developmental initiatives. This combination will then be able to convert the non-recurring income from non-renewable resource extraction into a renewable resource, and the investment earnings of the fund can replace the income stream from the natural resources after its depletion (**Mahmudov 2002**).

**Ploeg (2014)** discusses three types of NRFs that can help convert wealth from natural assets into long-term assets. This categorization is based on three principles for managing national wealth: (i) the permanent income hypothesis; (ii) the Hotelling rule; and (iii) the Hartwick rule. The author suggests: (i) an intergenerational fund to smooth consumption across generations (which is similar to a savings fund); (ii) a liquidity (or stabilization) fund to collect precautionary buffers to hedge against residual, non-diversifiable risk; and (iii) an investment fund to park funds until the economy is ready to absorb the new spending on investment projects (again much like a savings fund). He points out that for a capital-scarce country some part of the windfall should be spent on domestic investment, if the political and economic conditions are conducive.

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<sup>7</sup> The authors find that the SWF investment increases the stock price of the target firm by 1-3%. However, it is significantly lower than the 5% abnormal return documented for stock purchases by comparable privately owned financial investors in recent studies, indicating that there exists a 'sovereign wealth fund discount'.

<sup>8</sup>The general principle behind both stabilization and saving is the same as a policy of constant public expenditures, which would also enable saving for the future generations.

<sup>9</sup> And their common types are moving average fund, revenue band fund, rainy day fund, fixed deposit-fixed withdrawal fund.

**Afanas'ev (2004)** discusses stabilization funds and notes that in the long run, a stabilization fund should gradually accumulate enough resources to provide an appreciable income from the investments that the fund has made. The author tries to draw learnings for Russia from the experiences of the government petroleum fund in Norway, the copper stabilization fund in Chile, and the macroeconomic stabilization fund in Venezuela. He prioritizes appropriate financial management of funds and creating an overall strategy for investments as key drivers for the success of funds. The learning that the author presents for Russia in this context is given in Box 3.1.

A later study, **Chevrier (2009)** discusses the stabilization fund that was created in Russia in 2004 and reformed in 2008, when it was divided into two separate funds: the Reserve Fund and the National Welfare Fund. The Reserve Fund was supposed to carry out the functions of a stabilization fund, with a level to be maintained at 10% of the country's GDP. The National Welfare Fund was intended to be invested in stock shares and guarantee the level of profits from the oil rent in the long run, similar to the Norwegian model, and also to help finance the deficit of the retirement system.

However, after the financial crisis of 2008, amendments have been made to the rules governing the NRFs, and money from the funds is being used at an increasingly unsustainable rate. The National Welfare Fund is being used to fund the budget and to improve the functioning of the banking system and financial markets. Increased expenditure from the fund has led to falling levels of the reserve fund raising concerns related to its extinction in the future.

**Box 3.1: A stabilization fund for Russia: What should it look like?**

**Depositing money into the fund:** In the long term, a cut-off price of export commodities – international and base (average long-term) prices of oil – should be established as a criterion for the transfer of money from the budget to the stabilization fund. Beyond this price, export revenues should go to the stabilization fund. This allocation mechanism should provide for returning a certain amount to the budget if the price of oil drops during the year. Special rules should be adopted so that the fund accumulates additional revenues during favourable periods.

**Withdrawal of money from the fund:** The fund's money can be spent or invested. Investments should be made outside the country, with the exception of the rare cases when prices for the export commodities drop significantly below the cut-off price. Investment in foreign currency and in highly liquid, foreign financial assets will ensure safekeeping of the money, and also restrain the currency's real appreciation. The level of spending from the fund should correspond to the level of revenues at the base oil price. Reductions in allocations to the stabilization fund with a simultaneous increase in non-interest spending should not be permitted.

Source: Afanasiev (2004)

**Johnson (2012)** examines the political and economic factors leading to the creation of stabilization funds. He outlines challenges that face NRFs, in the form of rent seeking or institutional misuse in certain politico-economic contexts. The net result is a weak stabilization fund that cannot effectively shield the economy from intense fluctuations of rents. Stabilization funds which are created as a response to economic imbalances under the logic of developmental investment, have a capacity to greatly reduce the politically damaging effects of the resource curse, giving leaders an alternative motivation for the creation of these institutions. Thus it is important to prevent manipulation of institutional rules by political elites to ensure that stabilization funds are effective.

**Wills (2015)** presents seven principles for managing resource wealth using a stochastic model of precautionary savings combined with a deterministic model of a capital-scarce resource exporter. The author suggests the creation of smaller NRFs (which he terms volatility funds) in capital-scarce countries, as opposed to countries with a relatively higher access to capital. The fund should be built before anticipated windfalls, partially invested domestically, and used as a source of income rather than a buffer against temporary shocks. The fund principles he suggests for developing countries with limited access to capital, such as Ghana, Iraq and Nigeria are: (i) domestic investment as domestic returns are high and the fund is an alternative source of income; (ii) if investment cannot be absorbed, then a temporary parking fund should be used to hold revenues until they can be productively used; and (iii) if private capital is also constrained, then some resource revenues should be used to boost it.

Thus, stabilization funds can help smooth out budget expenditures and savings funds can set aside revenues until they can be spent more efficiently or create an endowment for future generations.

It is therefore important to consider evidence regarding how these NRFs have been used to manage NRR, either by saving, investing or providing for fiscal stabilization, particularly by countries rich in natural resources but experiencing fragile circumstances. This also constitutes the first of our three review questions.

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**QUESTION 1: HOW CAN NATURAL RESOURCE FUNDS BE USED FOR MANAGING RESOURCE REVENUE BY RESOURCE-RICH COUNTRIES EXPERIENCING FRAGILE CIRCUMSTANCES?**

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**DEPOSIT, WITHDRAWAL, SAVINGS, AND INVESTMENT RULES FOR NRFS**

Fiscal rules for NRFs determine government deposits into and withdrawals from the fund each year. The type of fiscal rules that a government applies should consider the overall fund objective and the amount of savings or expenditures necessary to meet that objective in the country context.

A report by the Natural Resource Governance Institute and the Columbia Center on Sustainable Investment analyses 22 NRFs from around the world to see how they are used to manage NRR (**Bauer 2014**). It suggests that the establishment of funds has benefited citizens in several countries and sub-national jurisdictions; however, certain conditions enable effective NRFs, including clear and functional operational fiscal rules, accountability and transparency, and political consensus around the use of NRFs.

The study finds that rules are being developed through legislation and regulations to determine which types of revenues must be deposited, what can be withdrawn, the kinds of investment risk that may be taken and the roles of different government agencies in managing funds. However, the study finds that when governments fail to establish clear and functional fiscal rules, they are at a greater risk of not fulfilling their macroeconomic objectives through establishing NRFs.

Governments such as those of Abu Dhabi (UAE), Azerbaijan, Botswana, Iran, Kuwait and Russia, for example, have been unwilling to impose withdrawal rules on their respective funds, while the governments of Abu Dhabi and Botswana have not imposed deposit rules. Additionally, in the 22 NRFs that the author has examined, most governments permit domestic spending directly through their funds' choices of asset holdings rather than through the budget process. This has undermined parliamentary accountability, democratic institutions and public financial management systems in some funds.

The author emphasizes developing rules and institutions governing NRFs through a process that generates broad political consensus. Other studies also argue that, in fragile contexts, defining

deposit and withdrawal rules with some flexibility (without imposing high day-to-day borrowing or other financial costs) can be encouraged. Governments may not comply with even the best rules unless key stakeholders, including citizens, agree with the need for government savings and actively monitor the functioning of NRFs.

**Ekeli and Sy (2011)** examine the manner in which Norway has managed its NRR to achieve sustainable economic growth and development. The authors discuss the Hartwick rule, which defines the amount of investment required in productive capital to offset declining stocks of non-renewable resources. The rule stresses the importance of effective revenue instruments, fiscal rules to limit discretion and effective public investment management, and requires that the proceeds of NRR be reinvested in productive assets. The authors point out that after several financial crises with macro-economic consequences, policy makers began structural reforms which led to the establishment of the NRF. According to the authors, the government collects taxes from all sectors of the economy, including petroleum, and transfers all these to the NRF, once budgetary expenditures are met. The NRF does not invest in domestic assets and is only invested abroad in financial assets to protect the domestic economy, diversify risks and maximize returns.

**Lohmus and Ter-Martirosyan (2008)** review the management of oil revenues in Kazakhstan and discuss key changes in rules governing the National Fund of the Republic of Kazakhstan since its establishment in 2001. From 2001 to 2006, there was no integration of the fund into the budget and the flow to the fund consisted of a savings component (equal to 10 per cent of the budgeted baseline revenue from the designated resource extraction companies, which was not linked to oil price changes) and a stabilization component that included all revenue from the designated companies in excess of receipts that were realized at a fixed oil reference price of \$19 a barrel. The fund was also allocated privatization receipts, special bonus payments, and royalties from certain natural resource companies and all the assets of the fund were invested abroad. Since 2006, all payments from the oil sector were allocated to the budget and the fund was integrated with the budget. As part of this integration, a guaranteed transfer from the fund to the budget is also earmarked to finance projects which can also be used by future generations.

**Sovacool (2016)** discusses the experience of Sao Tome and Principe, where a National Oil Account has been created that stipulates spending on public projects that reduce poverty and a Permanent Oil Fund has been created to save for future generations after the oil runs out. These two funds were supported by the creation of an independent National Petroleum Council and National Petroleum Agency, an Oil Revenue Management Law, and a commitment to the principles of the Extractives Industries Transparency Index. The Oil Revenue Management Law has also tried to address the potential problem of corruption in managing the oil revenue in the country by mandating that all oil payments be made directly into the fund, bypassing senior ministers and politicians, and that there can be only one annual transfer from the National Oil Account to the government budget.

The Oil Revenue Management Law also set limits on withdrawals from the National Oil Account, so that a significant amount of revenues accrue to a subaccount known as Permanent Oil Fund, which has restrictions on current spending and forms a 'national endowment' to 'foster development even after oil resources have been exhausted'. Furthermore, annual spending amounts from the National Oil Account must be spent in accordance with the priorities enshrined within the country's Poverty Reduction Strategy, and 10% given directly to local governments.

The author finds that these resource revenue management strategies have generated a significant amount of government revenue, helped diversify the economy, lowered inflation and rates of poverty, and minimized the corruption often associated with oil exploration and production. However, the author also argues that adequate governance structures, sound fiscal and

management policies and oversight by independent agencies are necessary for the successful functioning of NRFs.

One of the funds which is discussed to a great extent in the literature is that of Azerbaijan. The SWF of Azerbaijan was set up in 1999 and is called the State Oil Fund of the Azerbaijan Republic (SOFAZ). Over time, the fund has become a leading part of the country's public finance system. However, with recent unlimited and unconditional transfers from SOFAZ to the state budget, there have been threats to fiscal sustainability and overall macroeconomic equilibrium in the country. **Kalyuzhnova (2006)** discusses this fund and notes that its resources are used according to decrees by the President, and the fund can be used for socioeconomic development, developing infrastructure facilities of strategic importance. The day-to-day management of the fund is the responsibility of an Executive Director. Money from the fund is invested in foreign and domestic investments. There is a provision for the auditing of the fund as part of the regulatory framework.

Another country that has been discussed widely in the context of NRFs is Botswana, which has seen high economic growth over the last six decades. The creation and success of its NRF has been considered as one of the contributing factors. **Korinek (2013a)** discusses Botswana's NRF, the Pula Fund, created to: (i) save revenues from its minerals assets for future generations; (ii) contribute towards macro-economic stabilization; and (iii) act as a long-term investment facility. The fund invests only in foreign investments and the bulk of the Pula Fund is invested in bonds, with the second largest share in equities (71.5% bonds, 25.9% equities, and 2.6% other assets).

However, the fund is not an independent entity. Although it was established in its present form under the Bank of Botswana Act, 1996, it has no separate legal status or balance sheet of its own. The foreign exchange reserves are therefore divided primarily into two portions: the Pula Fund and the Liquidity/Transactions Tranche. The latter is analogous to the foreign exchange reserves that central banks hold for the purpose of financing short-term foreign exchange needs for imports of goods and services, among others. The amount to be transferred to the Pula Fund is the amount remaining after funds are allocated to the Liquidity/Transactions Tranche. Thus, there is no policy of maintaining a specific level of assets in the Pula Fund, and there are no other rules prescribing the level of payments into or withdrawals from the IT. The Bank of Botswana's Annual Report and Accounts provides some information on the asset composition of the Fund, its notional balance sheet and an income statement, but no information is provided on Fund transactions.

While examining the manner in which NRFs have operated, it is important to understand how the money from NRFs can reach the common citizen. **Hjort (2006)** examines a specific type of NRF, citizen funds, through which government revenue from petroleum is transferred to citizens using a direct revenue distribution mechanism. He notes that the direct macroeconomic effects of citizen funds in developing countries could be substantial, but are hard to predict. This is because any positive effects on inequality or private consumption may be offset by higher volatility and low provision of public goods necessary for economic growth. Low institutional and financial capacity may also hinder the successful operation of citizen funds in developing countries. Further, the specific features of citizen funds, choosing beneficiaries and determining the method by which profits should be shared, can also be contentious issues requiring the attention of policy makers.

#### SUMMARY:

There is sufficient high-quality evidence available which discusses ways to manage natural resource revenue using NRFs. We find that fiscal rules governing the deposit into and withdrawal of money from the NRFs and those pertaining to utilization of the money in the fund, particularly in terms of investment decisions, play an important role in determining the extent to which an NRF is able to meet its objectives.

The context in which rules operate is important, and governments should attempt to develop rules to enable NRFs to be free of excessive interference by political elites and to prevent the misuse of funds and unsustainable expenditure. One of the reasons for the success of Norwegian NRFs has been the clearly defined rules about how much to save and how to spend it.<sup>10</sup> However, the type of rules a country adopts, will vary. If a country requires financing for development projects and has the absorptive capacity to utilize investments effectively, the government may wish to spend more and save less. However, the government may also wish to save a significant fraction of resource revenues to create a buffer in case of an economic downturn. The rules should identify sources of revenue for the fund, such as royalties, taxes, bonuses, fines, sale of profit oil. Withdrawal rules should specify how often withdrawals can be made, where they must go and measures to ensure accountability and transparency in expenditure. The rules will need to be accompanied by an institutional set-up to encourage compliance with the rules.

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### COMPARING NRF FISCAL RULES ACROSS COUNTRIES

**Mahmudov (2002) and Fasano (2000)** make a qualitative comparative assessment of NRFs and experience across countries such as Norway, Kuwait, Oman, Chile and Venezuela. **Ramírez-Cendrero and Wirth (2016)** analyse the key features of the Norwegian oil and gas industry and the functioning of the NRF in the country, particularly the administrative set-up for managing resource revenue. Based on the discussion in these studies, Table 3.3 outlines the experiences of each of these countries.

We also provide details of some existing NRFs across the world across criteria such as fiscal rules and management structure in Appendix 3.3.

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### SUMMARY:

Countries have adopted a range of fiscal rules and management structures to operationalize NRFs. Fiscal rules typically address issues such as saving and spending rules and the extent to which the NRF is linked with the budget. As mentioned in the previous section, countries have varied priorities for saving and spending, depending on the political and economic context. We find that when NRFs are linked with budgets, and used for meeting budgetary expenditures, having clear and enforceable rules and restrictions on meeting budgetary expenditure from NRFs ensures a greater likelihood of success.

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<sup>10</sup> The amount to save is decided through the budget process every year. The central government issues guidelines regarding the process of expenditure from the fund. The maximum amount of money that can be transferred from the NRF to the central budget in order to cover the non-petroleum fiscal deficit (net state income excluding turnover and expenses related to petroleum activities; that is to say, the government petroleum net cash flow) is set, with the expectation of a neutral effect on economic activities. According to the rule, only the Fund's expected annual real return (estimated at 4%) could be transferred to the budget. Nevertheless, the rule allowed for some flexibility as it is applied to the structural non-oil deficit, which is adjusted to the economic cycle and not to the actual deficit. Utilization of the fund money is also made for investment, mostly abroad to avoid the transmission of price volatility on to the exchange rate and also be able to have a diversified portfolio with potentially higher returns.

Table 3.4: Qualitative comparative assessment of resource funds and the experience in selected countries

				Governance of NRFs	
Country	Name of NRF/SWF	Year created	Type of fund	Details pertaining to savings and spending rules	Fund management
Norway	State Petroleum fund (SPF) , renamed (in 2006) as Government Pension Fund (GPF)	1990	Savings and stabilization fund	<p>SPF accumulated only if there was a budget surplus (depending on oil prices and size of non-oil budget deficit).</p> <p>Financial reserves accumulated during times of stable or rising oil prices and increasing economic activity, which were then drawn upon either in the short run, as a financial buffer against revenue drops or in the long run as oil production decreased and social expenditure increased, thereby promoting intergenerational equity.</p> <p>Total accumulation dependent on transfers from the budget and investment income.</p> <p>Savings rules: Amount decided through the budget process every year.</p> <p>Spending rules: The amount used to finance government spending should not be more than the real rate of return of the Fund in order to preserve its real value for future generations. The real return is estimated at 4%. But the spending rule allows for a flexible response to the prevailing economic conditions: in periods of high economic growth, spending is less than the long-term target of 4%; in periods of economic downturn, spending exceeds the long-term target of 4%. Large changes in the fund value may be phased in over a few years. There is no direct earmarking of petroleum income for specific spending purposes. But the government has emphasised that growth enhancing measures – tax reductions, spending on innovations, research and infrastructure – should be given priority as the return from the fund is increased to finance government spending.</p>	Ministry of Finance. Operational management is delegated to the central bank of the country <sup>11</sup>
Kuwait	<ol style="list-style-type: none"> <li>1. General Reserve Fund (GRF)</li> <li>2. Reserve</li> </ol>	<ol style="list-style-type: none"> <li>1. 1960</li> <li>2. 1976</li> </ol>	GRF is more like a stabilization fund, RFFG more a	<p>Initially, the purpose and operating rules for the GRF were not specified; it encompassed all government investments. For example, there were no clearly defined mechanisms in the GRF to accumulate during rising oil revenue periods.</p> <p>Transfers to RFFG are made independently of budget and oil market developments (part of</p>	Kuwait Investment Authority (KIA)

<sup>11</sup>Norwegian Bank Investment Management, which invests all the cash in foreign currency-based assets: 60–65% in equity, 35–40% in bonds, and 0–5% in real estate in the most exclusive areas – London, Paris, New York.

Governance of NRFs					
Country	Name of NRF/SWF	Year created	Type of fund	Details pertaining to savings and spending rules	Fund management
	fund for future generations (RFFG)		savings fund	<p>GRF's resources, part of oil and non-oil revenue).</p> <p>Nearly all holdings are in foreign assets.</p> <p>Assets of the fund were invested in stocks of reputable international companies, first-grade bonds, deposits in major currencies, and various economic investments under the supervision of economic and financial experts in Kuwait and first-rate international consultants.</p>	
Oman	<ol style="list-style-type: none"> <li>1. State General Reserve Fund (SRGF)</li> <li>2. Oil stabilization fund (OSF)</li> </ol>	<ol style="list-style-type: none"> <li>1. 1980</li> <li>2. 1993</li> </ol>	<p>SGRF is more of a savings fund</p> <p>OSF is a stabilization fund</p>	<p>SGRF resources are used for budget support during external shocks.</p> <p>The modus operandi of SRGF has gone through several modifications (for example, the share of oil receipts allocated to the fund has been reduced).</p>	Ministry of Finance
Venezuela	Macroeconomic Stabilization fund (no longer operational)	1998	Stabilization fund	<p>Saving and spending rules: Part of oil revenues are saved if the oil revenues (or prices) are higher than the reference value and withdrawals are made if they are higher than this value.</p> <p>The Fund initially had transparent saving-spending rules, but modifications made in 1999 allowed presidential discretion for withdrawals, and made the reference values low. This has compromised feasibility and viability.</p> <p>Investments of the Fund reserves were only in foreign assets that were managed by the country's central bank.</p>	Central bank of the country

Governance of NRFs					
Country	Name of NRF/SWF	Year created	Type of fund	Details pertaining to savings and spending rules	Fund management
Chile	Copper Stabilization Fund <sup>12</sup>	1985	Stabilization fund	<p>Saving and spending rules were based on estimated long-term copper prices determined annually by the authorities, albeit in an opaque manner.</p> <p>Saving rule: transfers to the fund were dependent on the size of the positive gap between the benchmark and the actual copper price.</p> <p>Spending rule: Government could withdraw if the price differential was negative.</p>	

Source: Mahmudov (2002), Fasano (2000)), Ramírez-Cendrero and Wirth (2016)

<sup>12</sup> Other studies, not included in the synthesis, discuss Chile's Fiscal Responsibility Law, 2006 which involved the creation of two new sovereign wealth funds, the Pension Reserve Fund (PRF) and the Economic Social Stabilization Fund (ESSF) that replaced the CSF. The ESSF is oriented towards dampening the effects of changes in international copper prices and copper demand on domestic economic activity (output, investment, and employment), the balance of payments and the fiscal budget. (<https://www.swfinstitute.org/fund/chile.php>; accessed on 7 December 2017)

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## QUESTION 2: WHAT HAS BEEN THE EFFECT IN COUNTRIES THAT HAVE ALREADY ADOPTED NATURAL RESOURCE FUNDS FOR MANAGING NATURAL RESOURCE REVENUE?

Countries have experienced a diverse set of effects after adopting NRFs for managing NRR. As discussed earlier, the reasons for establishing NRFs include smoothing consumption of income from natural resources (which may be for achieving intergenerational equity and/or managing short- and medium-term volatility in prices), avoiding Dutch Disease and the resource curse, maximizing returns from natural resource wealth, and encouraging domestic industries. The second review question attempts to synthesize the evidence to understand whether the NRFs have met these objectives and the kind of impacts they have generated.

It is important to note here that these studies have used both quantitative and mixed methods to measure the effects of NRFs. However, since most studies have not produced numerical measures to measure impact, it becomes difficult to conduct an aggregative synthesis. Instead a configurative synthesis is attempted, with major themes brought together.

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### IMPACT ON DUTCH DISEASE

One of the key benefits of establishing NRFs has been shown to be avoiding Dutch Disease (a phenomenon which occurs when resource exports grow and the exporting country's exchange rate goes up or appreciates due to increased foreign exchange inflows), especially through stabilization of exchange rates and reduction of price volatility ((**Havro and Sanitso 2011**, **Ramírez-Cendrero and Wirth (2016)**, **Etemad (2014)**, **Ekeli and Sy (2011)** and **Korinek (2013a)**).

**Havro and Sanitso (2011)** discuss the functioning of NRFs in Norway and Chile within the context of policies adopted by both countries to effectively manage resource revenue. While they do not discuss the functioning of NRFs in detail, they point out that the presence of NRFs in both countries has helped them avoid Dutch Disease. For example, Norway was able to limit the severity of the fiscal crisis in 2009, and Chile was able to carry out a fiscal stimulus and support employment despite falling copper prices by using their respective NRFs.

**Ramírez-Cendrero and Wirth (2016)** discuss the key aspects of Norway's management of resource revenue, including the institutional structure, Statoil, and its NRF, the Government Pension Fund. They state that Norway's NRF has helped avoid appreciation of the Norwegian kroner, excessive spending and pro-cyclical spending. They add that monetary policy and fiscal policy measures have in conjunction helped avoid pressures on price levels and the exchange rate.

**Etemad (2014)** finds that there is a decrease in volatility in consumer prices and broad money after the establishment of NRFs, but an increase in the volatility of government spending. This volatility seems to decrease as the size of the fund increases. The authors also suggest that the GDP growth rate increases after the establishment of NRFs. They also find that the real exchange rate increased as compared to the period before the establishment of the funds in the selected countries.

**Ekeli and Sy (2011)** describe the functioning of Norway's petroleum fund and state that it has helped the country achieve financial and macroeconomic growth and stabilization. **Korinek (2013a)** examines the policies adopted by Botswana to manage its mineral resource revenue and finds that the fact that the Pula Fund invests offshore in foreign denominated assets prevents pressure on the national currency, thereby avoiding the phenomenon of Dutch Disease. However, **Yücesoy (2013)** and **Azhgaliyeva (2014)** have shown that the NRFs have had no impact on addressing exchange rate volatility and Dutch Disease.

## SUMMARY

There is enough high- and medium-quality evidence available to show a positive impact of NRFs on avoiding Dutch Disease and contributing to macroeconomic stabilization. Norway, Botswana and Chile are a few examples. However, two studies also show that there is no impact of NRFs on Dutch Disease.

## IMPACT ON GOVERNMENT EXPENDITURE

Smoothing of government expenditure that is linked to NRR is an important objective of NRFs. **Tsani (2013)** uses country-level aggregate data from 27 resource-rich countries to perform a regression analysis to demonstrate that the presence of resource funds may be associated with an improved ability of countries to deal with the 'resource curse' and improve governance and institutional quality. This has been assessed to be high-quality evidence. **Havro and Sanitso (2011)** discuss the functioning of NRFs in Norway and Chile within the context of policies adopted by both countries to effectively manage resource revenue. While they do not discuss the functioning of NRFs in detail, they point out that the presence of NRFs in both countries has helped them ensure fiscal prudence. For example, Norway was able to limit the severity of the fiscal crisis in 2009, and Chile was able to carry out a fiscal stimulus and support employment despite falling copper prices by using their respective NRFs.

**Sugawara (2014)** uses data from a set of 68 resource-rich countries and analyses the relationship between establishing NRFs and spending volatility. He finds that spending volatility in countries which have established stabilization funds is 13% lower than countries without funds.

**Azhgaliyeva (2014)** finds that while the oil revenue fund in Kazakhstan stabilized government expenditure, it did not have an effect on stabilizing real effective exchange rates. **Kemme (2012)** in a discussion of the two sovereign wealth funds of Kazakhstan, the National Oil Fund and Samruk Kazyna, finds that these funds helped promote short-term stabilization as well as long-term development in the country. The funds are also able to shift between their functions of stabilization and savings. The National Oil Fund played a critical role in the government's response to the financial crisis. Once the crisis was resolved, the 'savings' function for intergenerational equity was expanded.

In their analysis of the impact of rule-based revenue stabilization funds **Landon and Smith (2014)** find large potential gains from the use of a stabilization fund to smooth government expenditure. They also find that the low durability of some stabilization funds is probably due to instability embedded in their design.

**Hannesson (2013), Etemad (2014) and Aslanli (2015)** find that NRFs have led to unsustainable government spending or volatility in government spending. However, **Hannesson (2013)** finds that while the Norwegian petroleum fund has adhered to its saving and spending rules, expenditure on disability and sickness leave has risen more than expenditure on transportation. This, according to the author indicates unsustainable increases in welfare expenditure. This study has been assessed to be of high quality. **Etemad (2014)** notes that though there was a decrease in volatility in consumer prices and broad money, there was also an increase in volatility of government spending after the establishment of NRFs. This volatility seems to decrease as the size of the fund increases. The author also suggests that the GDP growth rate increases after the establishment of NRFs and finds that the real exchange rate increased as compared to the period before the establishment of the funds in the selected countries. **Aslanli (2015)** examines the functioning of Azerbaijan's NRF (SOFAZ), and points out that SOFAZ's unconditional transfers to the state budget, in contravention to the 'constant real

expenditures' principle adopted in 2004, have impeded effective revenue management in the country.

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#### SUMMARY

There is mixed evidence of high and medium quality around the impact of NRFs on smoothing and stabilization of government expenditure. Some studies have highlighted the positive impact, but there also seems to be some evidence that NRFs have led to unsustainable government spending or increased volatility in government spending. The case of Azerbaijan is an example of state policies leading to unconditional transfers from the fund and undermining its stabilization role. Excessive interference by the executive in the management of the fund could hinder compliance with the rules. While elected representatives have the mandate to make decisions regarding public spending, investment (and other spending and saving) decisions relating to NRF fund utilization require a high amount of financial expertise and if managed incorrectly can also lead to the loss of large amounts of resource revenues

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#### IMPACT ON WELFARE OUTCOMES

Studies have also looked at improvements in welfare or socioeconomic development outcomes (**Landon and Smith (2014)** and **Yücesoy (2013)**).

**Yücesoy (2013)** argues that while the NRF has contributed to the socioeconomic development of Azerbaijan through transfers to the state budget, the institutional structure of the fund has led to corruption, making the goal of economic diversification more difficult to achieve. The increased dependence on oil has caused exchange rate appreciation in the form of Dutch Disease. Further, the lack of independence of the NRF from the political executive and lack of consultation with civil society have made it less accountable to the public.

**Landon and Smith (2014)** examine the impact of rule-based revenue stabilization funds in maximizing welfare. The authors find that there are potentially large welfare, but they also note that some funds yield poor outcomes. In fact, some fund types yield lower welfare than a policy of spending all revenue as it is received. The main reason for poor fund performance is the excessive accumulation of assets, which entails the sacrifice of current for future consumption, which is costly in terms of welfare since a more stable consumption path is preferred. The more successful funds are those that stabilize expenditure while limiting the accumulation of assets and debt. Finally, they suggest that the best fund could have fixed deposit and withdrawal rates; this would be relatively robust to changes with respect to the yield on assets, the discount rate, the proportion of revenue derived from resources, the degree of risk aversion and the pattern of depletion.

In Sao Tome and Principe, though the NRF cannot take all of the credit, its implementation has coincided with a tenfold increase in per capita GDP from 2003 to 2014, with inflation dropping, with the government reaching a balanced budget, and with numerous economic indicators and performance on transparency and governance indices steadily improving (**Sovacool 2016**).

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#### SUMMARY

There is enough high- and medium-quality evidence available to show a positive impact of NRFs on the welfare of the economies and their socioeconomic development. However, studies also show that some funds yield poor outcomes, mainly because of prioritization of the accumulation of assets

over spending on welfare outcomes. Welfare impacts may also be limited by low stakeholder involvement and fund mismanagement.

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#### UNDERSTANDING THE VARIED EFFECTS OF NATURAL RESOURCE FUNDS

**Fasano (2000)** discusses effects in six countries, Norway, Chile, Venezuela, Alaska, Kuwait and Oman. In Norway, the NRF has been successful in meeting increased pension outlays and facilitating the adoption of a countercyclical fiscal stance. In Chile, the success of the NRF has been that budget expenditures have not closely followed revenue availability, as was the case prior to establishing the NRF, and that the fund has accumulated substantial reserves.

In Alaska, the fund's assets have grown and provide an income to every Alaskan resident. In Kuwait, the main positive outcome has been that government spending is not driven by revenue availability. In addition, investment income from the funds had become the main source of income after oil (35% of total revenue).

The two countries with more mixed outcomes were Venezuela and Oman. In Venezuela, while authorities managed to accumulate resources into the funds according to the 1999 rules, it was financed through government borrowing. (Note: This article was written in 2000, when the fund was still operational). In Oman, fund allocations have been declining since 1992, reflecting the government's withdrawals to finance budget deficits.

**Johnson (2012)** compares the functioning of NRFs in Venezuela and Chile. He finds that Chile's NRF has been successful in meeting its objectives, while Venezuela's has not. In Venezuela, fiscal rules governing the NRF were changed, allowing the political executive to have a greater say in its functioning, leading to immediate spending of petroleum income, increasing Venezuela's dependence on petroleum revenue. Spending on social programmes increased, but at an unsustainable rate. Rules were changed to allow for discretionary withdrawals. The fund was largely dormant from 2002 to 2011, when payments due to it were cancelled, and in 2011, the remaining balance from the fund was withdrawn. In Chile, both the objectives of the NRF have been met, of smoothing expenditure in the short run and reducing Chile's dependence on copper revenue in the long run, along with promoting macroeconomic stability.

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#### QUESTION 3: WHAT ARE THE WAYS TO MAKE NATURAL RESOURCE FUNDS MORE EFFECTIVE, INCLUDING THROUGH INSTITUTIONAL SUPPORT AND REVENUE SHARING ARRANGEMENTS BETWEEN NATIONAL AND SUB-NATIONAL GOVERNMENTS?

Making NRFs more effective, where effectiveness may be measured through achievement of objectives and impact as discussed in the previous review question, requires certain key enablers. In this section, we attempt to aggregate certain enablers identified by the studies selected for synthesis. **Bauer (2014)** recommends six enablers that promote good NRF governance:

1. Set clear fund objectives, for example, saving for future generations, stabilizing the budget and earmarking NRR for development priorities.
2. Establish fiscal rules for deposit and withdrawal that align with selected objectives.
3. Establish investment rules, for example, a maximum of 20 per cent can be invested in equities, that align with selected objectives.

4. Clarify a division of responsibilities between the ultimate authority over the fund, the fund manager, the day-to-day operational manager, and the different offices within operational management, and set and enforce ethical and conflict of interest standards.
5. Require regular and extensive disclosures of key information, for example, a list of specific investments, names of fund managers and audits.
6. Establish independent oversight bodies to monitor fund behaviour and enforce the rules.

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#### APPROPRIATE FISCAL RULES

This has been identified as an important enabler for the success of NRFs by studies selected for synthesis. Fiscal rules are required for the earmarking and utilization of the money in the fund in line with its objective. However, it is important to note that fiscal rules governing NRFs operate within a wider economic and political context, and cannot be considered substitutes for fiscal discipline and sound macroeconomic management policies more broadly.

Fiscal rules may be operationalized through deposit and withdrawal rules on the funds determined by legislation, regulation or a binding policy document.<sup>13</sup> There is no single rule appropriate for every country. National objectives and country contexts should determine the design of fiscal rules and there must be political consensus on their suitability, or they may not be enforced. These rules may impose constraints on government finances, limit the government's debt level and bind successive governments to stable macroeconomic policies. One of the best-performing funds from a welfare perspective, the Norwegian NRF, has a fixed contribution rate out of resource revenue and a fixed withdrawal rate out of accumulated assets. However, even with this type of fund, a deposit rate which is too large and/or a withdrawal rate which is too small can result in the accumulation of a large quantity of assets and, thereby, yield low welfare (**Landon and Smith 2014**).

Fiscal rules can be broadly categorized into three types: (i) balanced budget rules with limits on overall, non-oil primary or current budget deficit, for example, in Chile, Mongolia and Norway; (ii) expenditure rule with limits on total, primary or current spending, either in absolute terms, growth rates or per cent of GDP for example, in Botswana, Mongolia and Peru; and (iii) revenue rules with limits on how much oil revenue may be appropriated into the annual budget in any given year, for example in Botswana and Ghana.

One example of a revenue rule is the Permanent Income Hypothesis (PIH) Rule, which determines limits on oil revenue spending based on current as well as future incomes in the context of diminishing oil revenues as oil production declines over time. Another example is the Hartwick Rule, which outlines the amount of investment which is required in productive capital such as infrastructure to offset declining non-renewable resources. It recommends that all rents from natural resources should be invested and only returns from investments should be used for consumption.

The more successful NRFs are those that stabilize expenditure while limiting the accumulation of assets and debt. They usually follow a price-contingent rule, that the fund will accumulate resources so long as the current commodity price is above a stipulated threshold (at times called the reference value) and spend if it is below a second threshold. The thresholds are pre-announced and could be based on the average of the last few years' price (**Mahmudov 2002**).

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<sup>13</sup> For example, Norway has not legislated fiscal rules; rather, the major political parties have agreed to a fiscal rule by consensus. This political commitment to its fiscal rule works because the country has a stable and democratic political system with a high degree of government and parliamentary transparency.

The absence of clearly defined fiscal rules is said to present significant risks. In a study of NRFs in selected countries including Norway, Chile, Venezuela, Alaska, Kuwait and Oman, **Fasano (2000)** finds that frequent changes in fiscal rules and deviation from intended purposes (especially those relating to spending) have resulted in some funds (Venezuela's Macroeconomic Stabilization Fund and Oman's State General Reserve Fund and Contingency Fund) being less effective.

In Azerbaijan, for instance, the lack of a withdrawal rule has led to discretionary withdrawals from the NRF. While the money from the NRF has been utilized for investments in health, education and productive infrastructure, it has also been spent on projects with questionable returns, for example, infrastructure and businesses with low performance but high maintenance costs. Money from the fund has also been used for salary increases, pensions and debt payments. This type of utilization has prevented economic diversification and the development of a sound fiscal system in the country.

Venezuela's NRF, the Macroeconomic Stabilization Fund, has come under criticism for modifying initially transparent saving-spending rules which linked saving and spending with a reference value of oil. In 1999 rules governing the NRF were changed to allow presidential discretion for withdrawals. In addition reference values were made unrealistically low, compromising the transparent, accountable and effective functioning of the NRF.

**Korinek (2013b)** discusses the Chilean experience of managing natural resource revenue. She points out that Chile's Fiscal Responsibility Law (FRL) has provided a predictable, formula-based policy framework for managing tax revenue and lowered the possibility of capture of resource revenues for short-term political gain. The FRL provides for a structural balance rule which involves estimating the fiscal income that will be obtained net of the impact of the economic cycle, and in particular, commodity price cycles, and spending only the amount compatible with that of the longer-term level of income. Government revenue collected during periods of economic booms is invested in two sovereign wealth funds: the Pension Reserve Fund, to provide for old-age and disability-related pensions and the Economic and Social Stabilization Fund (ESSF), to access revenue during times of lower growth.

Choosing how and where to invest (for example, choosing between foreign and/or domestic investment options) must also be determined by investment rules. Investments may include stocks, bonds, derivatives, real estate or even infrastructure. The decision to invest depends on the appetite for risk and the desired return, which in turn are determined by the objective of the fund. For example, a stabilization fund, which is typically used to meet short-term budget requirements, should hold liquid assets that are more readily available.

In terms of choosing between investing domestically and externally, one reason that countries choose to invest externally is to avoid the volatility in the economy that could be generated if volatile oil revenues are invested in domestic assets. Investing abroad also helps dampen the appreciation of exchange rates because of increases in oil export revenues, which support the stabilization objective. For example, the Norwegian NRF invests largely in foreign financial assets, including fixed-income instruments and equity.

**Gelb et al. (2014)** point out that when investments are made in domestic assets, the extent of investments should not be fixed at a certain portfolio share, but rather determined on a competitive basis with foreign assets. Investing with private investors, pooling with other SWFs and co-financing with international financial institutions may be used by the SWF to reduce risk, bring in additional expertise and enhance the credibility of the investment decision.

Investment rules should also cover measures to enable the diversification of the investment portfolio. **Yücesoy (2013)** argues that inadequate diversification of the investment portfolio can lead

to a failure of the NRF in meeting its objectives. **Mahmudov (2002)** suggests that in order to enable the growth of the non-oil sectors and diversification of the economy, a mechanism to issue loans and credits from the oil fund to the non-oil sectors should be created.

Initial investment choices of the NRF should be conservative, liquid and low risk, especially because investment expertise may not be developed in the early stages of the fund. The Kuwait Investment Authority lost approximately \$5 billion from poor investments in foreign companies in the early 1990s due to a combination of lack of oversight and lack of investment rules. Chile, Norway and Timor-Leste have codified comprehensive investment rules that limit the risks fund managers can take and, in Norway's case, impose ethical investment guidelines on fund investments<sup>14</sup>.

It is also important to measure the effectiveness of NRFs through analysing the kind of expenditure or investment that has been made by the fund. For a developed country such as Norway, it may make sense to invest in global financial markets or use the fund to finance pension payments. However, for a low-income fragile country lacking in infrastructure and industrial growth, the focus of the fund could be on addressing these deficiencies. The creation of a mechanism to issue loans and credit facilities for the non-resource sector using resource revenue, subject to returns on these sectors being higher than the potential returns from investing abroad, could help stimulate the growth of these sectors and diversify the economy. As mentioned previously, the diversification of the economy can allow countries to prepare for a time when non-renewable resources are depleted<sup>15</sup>.

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#### SUMMARY

To be effective, NRFs must have clear objectives, and their deposit, withdrawal and investment rules must be aligned with those objectives. Potential objectives can include smoothing expenditures, savings, mitigating Dutch Disease, earmarking for public investment, and ring fencing. The literature tends to support following a price-contingent rule, which requires that the fund accumulate revenues when commodity prices are above a stipulated threshold and spend if needed, when prices are below a chosen threshold.

Appropriate financial management of funds and creating an overall strategy for investments can be key drivers for the success of funds. Choosing how and where to invest (for example, choosing between foreign and/or domestic investment options) must be determined by investment rules. Initial investment choices of the NRF should be conservative, liquid and low risk, especially because investment expertise may not be developed in the early stages of the fund. For a developed economy, it may make sense to invest in global financial markets or use the fund to finance pension payments. However, for a low-income fragile country, NRFs could also be used to help develop infrastructure and promote industrial growth. Investment rules should also cover measures to enable the diversification of the investment portfolio. This can allow countries to prepare for a time when non-renewable resources are depleted.

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<sup>14</sup> [https://resourcegovernance.org/sites/default/files/NRF\\_RWI\\_Complete\\_Report\\_EN.pdf](https://resourcegovernance.org/sites/default/files/NRF_RWI_Complete_Report_EN.pdf)

<sup>15</sup> *ibid*

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## INSTITUTIONAL STRUCTURE FOR MANAGEMENT AND OVERSIGHT

The creation of an effective institutional structure for management and oversight can play an important role in ensuring that the NRF is able to meet its objectives.

**Acosta (2012)**, in a wider study on NRRM, examines the potential of NRFs to improve social investments, especially in education, using evidence from Botswana, Zambia, Nigeria, Indonesia, Peru, Mongolia, Ghana and South Sudan.<sup>16</sup> The author outlines key factors for the success of saving and stabilization funds, including the presence of effective institutions, with an independent bureaucracy to prevent unsustainable spending and the capture of resource revenues by the political elite.

Further, he finds that stabilization funds perform better in a context where there are greater constraints on the discretionary use of executive power, and usually where there is greater party competition and increased participation of citizens in the monitoring and enforcement of transparency and accountability mechanisms such as regular reporting, auditing and press releases.

When there is greater uncertainty regarding adherence to rules, such as when the executive power concentrates discretionary decision-making power with itself, or when existing rules change frequently with changes in government, the effective functioning of NRFs, especially stabilization funds, may be undermined. Factors which enable the success of saving funds include: (i) disassociating the decision on how much should be saved from what is to be saved; (ii) creating a separate account to directly deposit all NRR and ensuring transparency and accountability in the management of the fund, and (iii) controlling and minimizing excessive changes in rules governing transfers and disbursements out of the fund.

The author finds that stabilization and saving funds have not been able to accumulate reserves over time in countries such as Zambia and Nigeria, largely because of strong political pressures to spend money in short-term investments.

**Gelb et al. (2014)** suggest that sound corporate governance (including aspects such as an independent board, professional staff, transparent reporting and independent audit) is a prerequisite for the effective and sustainable performance of SWFs.

Several studies discuss the example of Norway, to suggest that the role and mandate of the NRF should be clearly outlined in law or policy. The governance of the NRF in Norway is based on an Act passed by its Parliament and regulation issued by the Ministry of Finance. The Ministry of Finance has a separate asset management department with responsibility for managing the fund. It establishes its strategic asset allocation, both benchmarks and risk limits, and monitors and evaluates operation management. It is also responsible for investment practices and reports to Parliament. The central bank, as the operational manager of the fund, has a separate entity within its organizational structure (Norges Bank Investment Management), implements the investment strategy and actively manages part of the fund to ensure returns. There are strong internal controls, including regular and publicly available internal audits, ethical guidelines for fund employees, effective monitoring of external managers, and independent oversight at every level, including over the board of directors, managers and staff. Establishment of a strong independent oversight can also determine the effectiveness of NRFs.

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<sup>16</sup> Stevens 2003; Bagattini 2009; Dumas 2011

If we compare this with the case of Azerbaijan, we find that the direct control of the President over its NRF, SOFAZ, and limited participation by citizens in oversight led to corruption and limited the effectiveness of the NRF.

Studies also show that resource-rich countries with weak institutional structures may not have the capacity to establish institutions such as NRFs, and international donors may be able to address this gap. Finally, institutional capacity development may be closely linked with resource revenues and may follow the discovery of resources. However, successful cases of mineral revenue management including through NRFs as seen in the case of Chile and Norway, seem to be associated with initial good institutional quality, built up even before the revenues from the resources start to come in.

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#### SUMMARY

Although Norway's NRF is often cited as an example of a successful NRF, it is not clear that it would work in resource-rich countries with poor institutional capacity accompanied by rent seeking. A clear allocation of roles and responsibilities for fund management and vigilant oversight can play an important role in the success of NRFs.

NRFs also seem to perform better in a context where there are greater constraints on the discretionary use of executive power, greater party competition and active participation of citizens in the monitoring and enforcement of transparency and accountability mechanisms. Sound corporate governance (including aspects such as an independent board, professional staff, transparent reporting and independent audit) is another prerequisite for effective NRFs.

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#### FUND-RELATED TRANSPARENCY AND ACCOUNTABILITY MEASURES

Creating and enforcing measures to ensure transparency and accountability in the functioning of an NRF play a critical role in the effectiveness of the fund as it not only limits the possibility of misuse of public funds by those in power but also ensures that the citizens needs are aligned with objectives and functioning of the fund.

Instituting transparency measures can also encourage compliance with fiscal and investment rules by helping align public expectations with government objectives. Ensuring access to information relating to NRFs can reduce the likelihood of misuse of funds.

According to the Natural Resource Governance Institute, transparency in NRFs is associated with: (i) clear roles and responsibilities for managers and policy makers; (ii) publicly available information; (iii) open decision-making processes; and (iv) regular reporting. Review of the details of the NRFs in Chile, Ghana, Norway and Timor-Leste show that these countries have built-in transparency measures either through legislation or policy, and regularly share with citizens details related to their NRFs such as size, transactions, deposit and withdrawal amounts, types of assets and returns on investments. Ghana even discloses the names and location of investments, and their currency composition.

In a study on Chilean management of NRR, **Korinek (2013b)** discusses transparency and accountability measures for the two Chilean NRFs. Chilean authorities publish monthly reports on the size and portfolio composition of both funds, and quarterly reports on the performance of the funds in the context of financial market developments and established benchmarks. Fund

management authorities allow public discussion on the strategies of the funds. In addition, asset income and use of assets are included in the annual budget reports of the funds.

**Aslanli (2015)** notes that in Azerbaijan, while the NRF (SOFAZ) has become a leading part of the public finance system, limited transparency relating to expenditure has threatened fiscal sustainability and macro-economic equilibrium in the country.<sup>17</sup> A high dependence on oil revenue and less dependence on other fiscal sources such as income tax has created a disconnect between taxpayers and the government, with limited incentives for citizens to hold the government accountable. However, the country became a member of the Extractive Industries Transparency Initiative (EITI) in 2003, signalling a move towards greater transparency.

**Kalyuzhnova (2006)** analyses the evolution of two NRFs, SOFAZ in Azerbaijan and the National Fund for the Republic of Kazakhstan (NFRK) in Kazakhstan, comparing their fiscal rules relating to saving, spending, deposits and withdrawals. She highlights the importance of transparency for the success of oil funds and emphasizes the need to establish periodic monitoring of the performance of NRFs.

Some countries have adopted the Santiago Principles, which were launched in 2008 with the aim of fostering confidence among recipient and investor countries. These are a set of 24 principles covering 4 key areas: (i) legal and institutional frameworks; (ii) objectives and coordination of macroeconomic principles; (iii) governance structures and codes of conduct; and (iv) risk management frameworks (**Rios-Morales et al. 2011**). However, the Santiago Principles may not be enough. In a study of 22 NRFs, **Bauer (2014)** points out the despite subscribing to the Santiago Principles, a number of countries, including Botswana, Equatorial Guinea, Iran, Kuwait, Mexico, Russia and Qatar, do not provide adequate amounts of information regarding the use of money from NRFs.

A study by **Ahmadov et al. (2011)** analyses SWFs in Azerbaijan, Kazakhstan, Russia and Norway, and makes a strong case for instituting measures to ensure transparency and accountability in SWFs. SWFs tend to be more successful if their operations are integrated into the national development goals of their sponsoring governments. To ensure that this occurs, it is important for SWFs to provide adequate information to all stakeholders (particularly citizens, civil society groups and the media) and be accountable to public oversight bodies (national parliaments and audit institutions).

**Lücke (2011)** compares the operational rules and performance of the NRFs of Kazakhstan, Azerbaijan and Norway and argues that instituting transparency measures can increase confidence in and a sense of ownership towards the NRF, and generate and sustain popular support for a strategy to save substantial resource revenues to enable to the NRF to function in the long run. He recommends establishing a system of checks and balances that will limit discretionary control over the use of resource revenues by small groups of decision makers.

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<sup>17</sup> Unconditional transfers to the state budget from SOFAZ, which have increased substantially from 2008, have violated the principle of saving a minimum of 25% of SOFAZ's revenue between 2005 and 2025.

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## SUMMARY

Transparency is an important enabling factor to make NRFs effective. It also leads to greater accountability from those who are responsible for the fund management. Transparency measures can reduce the possibility of misuse of funds and encourage compliance with fiscal rules governing saving, spending, deposits and withdrawals. Instituting transparency measures can also encourage compliance with fiscal and investment rules by helping align public expectations with government objectives. NRFs tend to be more successful if their operations are integrated into the national development goals of their sponsoring governments. Finally, instituting transparency measures can inculcate a sense of ownership towards the NRF and generate and sustain popular support for a strategy to save substantial resource revenues to enable the NRF to function in the long run.

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## OTHER ENABLERS

**Claessens and Varangis (1994)** have highlighted the importance of complementing NRFs by using market-based risk management tools. They emphasize the need to smooth out price volatility using the market tools and argue that these can help hedge oil price exposures and therefore hold advantages over non-market schemes like NRFs.

The Norwegian case presents certain other enabling factors to make NRFs effective. These include stability-oriented macroeconomic policies, flexible and competitive product markets, a high degree of exposure to foreign trade, flexible labour markets, adequate education and training, a low level of taxation, and significant public spending on research and development. However, it is important to point out that some of these may not be feasible for low-income fragile countries, which face a different set of structural barriers.

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## SUB-NATIONAL GOVERNANCE ISSUES LINKED TO RESOURCE REVENUE MANAGEMENT

In the context of NRRM, sub-national governance issues are central for resource-rich countries which seek to ensure that the largest number of citizens are able to benefit from the mineral wealth of their country.

Revenue sharing arrangements with sub-national governments are an important determinant for realizing the effectiveness of the NRFs in a federal context. However, of the set of studies that have been shortlisted for synthesis in this review, only four address this issue.

**Korinek (2015)** discusses the Colombian and Peruvian experience with sub-national transfers. In Columbia, from 2011, the system of sub-national transfers distributes revenue from royalties more evenly across regions as compared to the previous system. This has improved the effectiveness of investment and infrastructure spending funded by royalties. However, some regions and municipalities have threatened to close down or refuse entry to mining operations, since they no longer have direct access to a large share of the revenue from royalties.

In Peru, revenue from the mining sector, including corporate tax, royalties and special mining taxes and levies, is distributed among the different levels of government. However, over 70% of the revenue distributed to the sub-national level goes to just six of Peru's 25 regions. In 2014, nine out of Peru's 25 regional presidents were accused of corruption, mostly for misappropriation of public funds involved in irregular concessions and public expenditure. This has raised concerns and calls for

bringing about reforms toward a more balanced distribution of revenue, such as that undertaken in Colombia.

**Bahl and Tumennasan (2002)** discuss ways to share NRR amongst the different tiers of the government in Indonesia's federal context. He notes that the legal distribution of natural resource revenue is based primarily on tax sharing, where specified percentages of the tax revenue raised from each extractive activity are divided between central and local governments, with different vertical shares for different components of the natural resource sector. For example, the sharing rate is 85/15 for oil revenues and 70/30 for natural gas. The actual base that is shared is somewhat more complicated. Distribution among local governments is accomplished in two steps: (i) a share goes to the local government where the extraction takes place; and (ii) a share goes to all eligible jurisdictions in the province. Sub-national governments can receive payments of resource revenues through three main mechanisms (Warner and Alexander 2006):

1. Intra-governmental (or inter-governmental) revenue assignment: Natural resource revenues are collected at national level and then assigned to sub-national levels in the form of grants, matched funding or soft loans.
2. Internally generated revenue: This includes royalties from sub-national ownership of resources, surcharges on the national tax base (for example, corporate income tax), local business taxes, registration fees and other levies.
3. Intra sub-national level governmental transfers: These include transfers from a federal or provincial account to district government authorities, or from district levels to community levels.

Transfer of revenues collected at the sub-national level and then shared upwards with national government for subsequent redistribution is rare. The United Arab Emirates is one example of this. Sub-national governments have full ownership over subsoil resources and collect royalties, company profit transfers and income tax receipts. The transfers are negotiated yearly to smooth the budget (Ahmad and Mottu 2002).

**Bauer (2013)** discusses sub-national resource revenue management and highlights the various challenges faced by the sub-national resource-rich governments in this context. These challenges include unpredictable and discretionary resource revenue transfers between national and sub-national governments which, combined with poor forecasting capacity, can undermine development planning. Over the short to medium term, resource revenue volatility can lead to unsustainable spending, poor-quality investments, an unpredictable business environment and ultimately slow non-resource sector growth. Over the longer term, the finite nature of oil, gas and mineral revenues can lead to an extended period of economic growth followed by a depression, and difficulty in scaling up public investment efficiently when experiencing a revenue windfall.

To address these challenges, he suggests smoothing expenditures by delinking revenues from expenditures and fiscal rules that can constrain government spending decisions and compel government bodies to adopt a long-term perspective on public finances even at the sub-national level.

In a survey of 58 resource-rich countries, he finds that 31 of these countries have resource revenue sharing systems. These are Angola, Bolivia, Brazil, Cameroon, Canada (some regions), Chad, China, Colombia, the Democratic Republic of the Congo (DRC), Ecuador, Ethiopia, Ghana, Guinea, India, Indonesia, Iraq, Italy, Kyrgyzstan, Madagascar, Malaysia, Mexico, Mongolia, Niger, Nigeria, Papua New Guinea, Peru, the Philippines, South Sudan, Uganda, the United States (some regions) and Venezuela. In countries like Nigeria and Peru, more than 80 per cent of some regional governments'

budgets depend on resource revenue transfers from central governments. Some countries, such as Ghana and the Philippines, also share resource revenues with other local entities, like indigenous groups and kingdoms.

The responsibilities shared with local governments are often significant and a ‘derivation-based’ intergovernmental transfer system for all or part of their mineral, oil or gas revenues is used. Bauer outlines 10 key recommendations for designing and implementing efficient, fair and stable resource revenue sharing systems. These are:

1. Insist on clear objectives, whether compensation for extractive activities, sharing benefits with producing regions, or prevention or mitigation of conflicts.
2. Align the revenue sharing system with its objectives.
3. Keep expenditure responsibilities in mind. One way is to align the decentralization of fiscal revenues with the costs of public service delivery given sub-national expenditure assignments.
4. Choose appropriate revenue streams and fiscal tools, including royalties, corporate income taxes and property taxes.
5. Smooth out intergovernmental transfers to local governments or allow them to address resource revenue volatility autonomously through debt management or through saving a portion of their revenues in a sovereign wealth fund.
6. Make any revenue transfer formula simple and enforceable, as this will help verify compliance.
7. Build a degree of flexibility into the system, so that if political circumstances and economic conditions change, it should also be possible to make small adjustments to any revenue sharing formula.
8. Achieve national consensus on the formula in order to ensure its stability and to meet the regime’s objectives, especially in politically contested and ethnically diverse environments.
9. Codify the formula in law.
10. Make revenue sharing transparent and formalize independent oversight.

We summarize the findings from our main review questions in the following table.

Table 3.5: Compilation of major findings review questions

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
Acosta (2012)	Resource- rich countries-Botswana, Zambia, Nigeria, Indonesia, Peru, Mongolia, Ghana, South Sudan	Stabilization and saving funds have been ineffective in Zambia or Nigeria to accumulate wealth over time due to strong political pressures to spend money in short terms investments	Mixed	<p>For Stabilization funds,</p> <ul style="list-style-type: none"> <li>• presence of solid state institutions</li> <li>• independent civil service to prevent politically motivated revenue management and unsustainable spending</li> </ul> <p>For Savings funds,</p> <ul style="list-style-type: none"> <li>• creation of a separate account to directly deposit all natural resources revenues</li> <li>• ensuring proper transparency and governance principles to account for those deposits</li> <li>• controlling and minimizing the discretion for determining the level of transfers and disbursements out of the fund.</li> </ul>
Afanasiev (2004)	Russia, Norway, Chile and Venezuela	Stabilization funds impose a limit on the growth of noninterest budget spending, even under favorable terms of trade conditions	Positive	<p>For Stabilization fund,</p> <ul style="list-style-type: none"> <li>• transfer of money from budget to this fund based on a cutoff price of export commodities- international and base (average long-term) oil prices</li> <li>• special rules for accumulation of additional revenues during favorable periods</li> <li>• level of spending from the stabilization fund should correspond to the level of revenues at the base oil price</li> <li>• money investment abroad, except when prices for the export commodities drop significantly below the cutoff price.</li> <li>• reductions in allocations to the stabilization fund with a simultaneous increase in noninterest spending not permitted</li> </ul>
Ahmadov (2011)	Azerbaijan, Kazakhstan, Russia and Norway	Fostering of the control of revenue management and the prudent intergenerational and intra-generational allocation of	Positive	<ul style="list-style-type: none"> <li>• Transparency and accountability (Santiago principles is a good benchmark) , complemented by public oversight over resource revenue management</li> <li>• Operations of the fund to be integrated into the national development goals of their sponsoring governments.</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
		the finite national wealth; weather the global financial crisis		<ul style="list-style-type: none"> <li>• Provide adequate information to all stakeholders (particularly citizens, civil society groups and the media)</li> <li>• Accountability to public oversight bodies (national parliaments and supreme audit institutions).</li> </ul>
Aslanli (2015)	Azerbaijan	NRF has helped achieve financial and macroeconomic growth and stability	Positive	<ul style="list-style-type: none"> <li>• Transparent governance structure and a mechanism integrated with fiscal policy;</li> <li>• Appropriate fiscal rules and investment rules for the earmarking and utilization of the money in the fund in line with the objective of the fund</li> </ul>
Azhgaliyeva (2014)	Kazakhstan	While SOFAZ has become a leading part of country's public finance system, unlimited and unconditional transfers from SOFAZ to the state budget have threatened fiscal sustainability, effective revenue management and the overall macroeconomic equilibrium, despite adoption of the 'constant real expenditures' principle in 2004.	Mixed	<ul style="list-style-type: none"> <li>• Appropriate fiscal rules and investment rules for the earmarking and utilization of the money in the fund in line with the objective of the fund.</li> <li>• Transfers from the fund to the state budget guided by the principle of maintaining the real value of government wealth</li> <li>• Deposit and withdrawal rules defined by the laws that establish the arrangement</li> <li>• Flexible asset allocation strategies of and between various portfolios using the money from the resource fund</li> </ul>
Bahl and Tumennasan (2002)	Indonesia	While the oil revenue fund stabilized government expenditure, it did not influence real effective exchange rates.	Mixed	<ul style="list-style-type: none"> <li>• Establishing appropriate fiscal rules and investment rules for the earmarking and utilization of the money in the fund in line with the objective of the fund</li> </ul>
Bauer(2013)	Multiple countries	-	-	<ul style="list-style-type: none"> <li>• Sub-national governments to use a fiscal rule that smoothens annual expenditures- pay down debt in good times, borrow in tough times or saves revenues in a fund in good times and drawing on that fund in tough times</li> <li>• Pay special attention to enacting strong transparency and oversight</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
				<p>requirements and prevent mismanagement</p> <ul style="list-style-type: none"> <li>• Subnational governments and public are provided adequate information to forecast revenues, such as project-by-project payments, production volumes and contracts;</li> </ul>
Bauer (2014)	Multiple countries (analysis of 22 funds from across the world)	Source of savings; helped mitigate budget volatility, improving development planning and public investment decisions; helped sterilize large inflows of foreign capital in order to prevent destabilization of the economy and of domestic power structures (avoidance of resource curse)	Positive	<ul style="list-style-type: none"> <li>• Political consensus based rules and institutions to govern natural resource funds</li> <li>• Flexible deposit and withdrawal rules (that does not impose high day-to-day borrowing or other financial costs ) in case of adverse conditions</li> <li>• Key stakeholders and the broader citizenry should buy in the need for government savings and encourage following of rules</li> </ul>
Chevrier (2009)	Russia	Build up reserves; legislative amendments have led to bolstering of the budget and to use the resources of the National Welfare Fund in order to improve the functioning of the banking system and the financial markets; Expansionary budgetary policies have led to falling levels of the reserve fund raising concerns related to its extinction in coming future.	Mixed	<ul style="list-style-type: none"> <li>• <b>Reserve Fund</b> which was supposed to carry out the functions of a Stabilization fund with a level to be maintained at 10% of the country's GDP</li> <li>• In order to reduce the financial risks, National Welfare Fund (which was intended to be invested in stock shares and guarantee the level of profits from the oil rent in the long run similar to the model of Norway and also to help finance the deficit of the retirement system) holdings not to exceed 5% of the capital of any one company.</li> <li>• Resources remain on deposit at the Russian Central Bank and are managed by the Ministry of Finance and the general conditions governing their use are set in the Budgetary Code</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
Claessens and Varangis (1994)	Venezuela	None studied.	NA	<ul style="list-style-type: none"> <li>• Use market based risk management tools where the OSF particularly helps to manage the remaining inter-period oil price risk to the extent considered necessary</li> <li>• Financial instruments may be more effective in hedging of oil price exposures compared to OSF</li> </ul>
Drysdale (2008)	Timor-Leste	No clear information; Though the Petroleum fund law is said to provide a guide to enable some saving of revenue for the future generations	-	<ul style="list-style-type: none"> <li>• Petroleum Fund Law that sets parameters for operation and management of the Petroleum fund, governs the collection and management of receipts associated with petroleum wealth, regulates transfers to the state budget, provides for government accountability and oversight and encourages transparency</li> <li>• Strengthening of the institutions and need for stakeholders to take responsibility for managing the revenue and upholding the rule of law for its operation</li> <li>• Investment manager for the fund</li> </ul>
Ekeli and Sy (2011)	Norway	None studied.	NA	<ul style="list-style-type: none"> <li>• Practicing fiscal discipline.</li> <li>• Legal distribution of natural resource revenue amongst the different tiers of the government based primarily on tax sharing, where specified percentages of the tax revenue raised from each extractive activity are divided between central and local governments, with different vertical shares for different components of the natural resource sector</li> </ul>
Etemad (2014)	Iran, Kuwait, Norway, Algeria, Mexico, Qatar	There was a decrease in volatility in consumer prices and broad money after the establishment of NRFs. However, there was an increase in volatility of government spending after the	Mixed	No details

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
		<p>establishment of NRFs. This volatility seems to decrease as the size of the fund increases. The authors also suggest that the GDP growth rate grows after the establishment of NRFs. Finally, they find that the real exchange rate increased as compared to the period before the establishment of the funds in the selected countries.</p>		
Fasano (2000)	Norway, Venezuela, Alaska (USA), Chile, Kuwait, Oman	<p>Norway: It has helped meet increased pension outlays and has facilitated the adoption of a counter cyclical fiscal stance.</p> <p>Chile: Budget expenditures have not closely followed revenue availability, as was the case prior to establishing the CSF, and secondly, the fund has accumulated substantial reserves.</p> <p>Venezuela: While authorities managed to accumulate resources into the funds per the 1999 rules it was financed through government borrowing. (Note: The NRF has</p>	Mixed	<ul style="list-style-type: none"> <li>• Appropriate fiscal rules and investment rules for the earmarking and utilization of the money in the fund in line with the objective of the fund</li> <li>• Avoid frequent changes in fund rules and deviation from intended purposes (especially that relating to spending)</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
		<p>been defunct since 2003)</p> <p>Alaska: (1) APF: The fund's assets have grown and provide an income to every Alaskan resident. (2) CBRF: While there are some issues with functioning, on the while budget expenditure has not closely followed revenue availability.</p> <p>Kuwait: Government spending is not driven by fluctuations in revenue availability. Further, investment income from the funds is the main source of income after oil.</p> <p>Oman: Allocations towards the fund have declined since 1992 reflecting the government's withdrawals to finance budget deficits</p>		
Gelb et al. (2014)	Multiple countries	No impact measured	Positive (subject to certain considerations being met)	<ul style="list-style-type: none"> <li>• Investment should be supported by sound corporate governance</li> <li>• Checks and balances to help ensure that the SWF does not undermine macroeconomic management or become a vehicle for politically driven "investments"</li> <li>• SWF should be allowed to operate as a professional expert investor</li> <li>• Government should set an overall target return on investment for the SWF's portfolio and the threshold minimum rate of return for all investments</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
				<ul style="list-style-type: none"> <li>For clear accountability, it is also important to separate the below-market portion from the market-based portfolio</li> </ul>
Hannesson (2013)	Norway	While the NRF has managed to adhere to its saving and spending rules, expenditure on disability and sickness leave has increased more than expenditure on transportation.	Mixed	<ul style="list-style-type: none"> <li>Appropriate fiscal rules and investment rules for the earmarking and utilization of the money in the fund in line with the objective of the fund</li> <li>Emphasis on the savings rule in the petroleum fund as a guideline, which would also include controlling public expenditure</li> </ul>
Havro and Santiso, (2011)	Norway, Chile	None studied.	NA	<ul style="list-style-type: none"> <li>Other countries' experiences can provide benchmarks for consideration, but structural differences between countries need to be considered</li> <li>Rule based approach to fiscal policy along with a transparent savings and stabilization fund</li> <li>In a low-income country like Nigeria, priority may have to be given to capital and public investments by making them more important in gross government expenditure</li> </ul>
Hjort (2006)	Botswana, Indonesia, Norway	Positive effects on inequality or private consumption; but these could be offset by effects generated by higher volatility and less provision of the public goods that poor countries are dependent on if growth is to accelerate;	Mixed effects	<ul style="list-style-type: none"> <li>Institutional capacity to adopt and operate a citizen fund (which is meant for transferring of revenue from natural resources to citizens)</li> <li>Financial development is also needed</li> </ul>
Johnson (2012)	Venezuela and Chile	Fixed withdrawal – fixed deposit type funds (with rules	Mixed	<ul style="list-style-type: none"> <li>Fixed deposit and withdrawal rates</li> <li>Relatively robust to changes with respect to the yield on assets, the discount</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
		<p>which allow the deposit of a fixed proportion of resource revenue each year as well as the withdrawal of a fixed proportion of the assets of the fund each year, before that year's deposit) yield the highest welfare benefits (in both resource depletion and non-resource depletion scenarios). Those funds which require the accumulation of large stocks of asset of debt have a negative effect on welfare in the earlier period during which there is less expenditure due to the accumulation of assets.</p>		<p>rate, the proportion of revenue derived from resources, the degree of risk aversion and the pattern of depletion</p>
Kalyuzhnova (2006)	Kazakhstan and Azerbaijan; reference to multiple other countries including Norway and Alaska	<p>Based on experience in countries, various positive and negative impact listed. Positive effects include avoidance of rent seeking and corruption, improvement of fiscal policy impact when prices are high, saving for future generation if protected from political pressures, prevention of exchange rate appreciation</p>	Inconclusive	<ul style="list-style-type: none"> <li>• Defining transparently the goals and communicating them to build public support</li> <li>• Rule of the fund to be defined and they should guarantee accountability</li> <li>• Ensuring efficient and transparent management of the fund</li> <li>• Periodic auditing and analysis of management performance</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
		through investment of of fund's assets abroad. Negative impact include creation of an artificial sense of security causing the need for real fiscal discipline to be abandoned, could encourage corruption and fraud		
Kemme(2012)	Kazakhstan	Funds have played for short term stabilization when needed and long term development programs for the country. The funds are also able to shift between their functions of stabilization and saving	Positive	<ul style="list-style-type: none"> <li>• Transparency and corporate governance</li> <li>• Ownership interests of the government need to be separated from the economic activities of the fund</li> </ul>
Korinek (2013a)	Botswana	None studied.	NA	Following a price contingent rule - that the fund will accumulate resources so long as the current commodity price is above a stipulated threshold (also at times called the reference value) and spends if it is below a second threshold; thresholds are pre announced and could be based on average of the last X years price
Korinek (2013b)	Chile	Stabilization of its government Expenditure including curbing excess spending during boom years ; Managing the exchange rate of the peso; Avoidance of crowding out other industries and exports ; diversification of risk.	Positive	<ul style="list-style-type: none"> <li>• Sovereign wealth funds: the Pension Reserve Fund, to fund future old-age and disability solidarity pensions and solidarity pension contributions arising from the pension reform</li> <li>• Economic and Social Stabilization Fund (ESSF), to ensure stable government spending during times of lower growth.</li> <li>• Strong institutions and regulatory oversight</li> <li>• Building incentives that prevent the political leaders from mis (using) the funds</li> </ul>
Korinek (2015)	Peru and Colombia	No information	-	Emphasis of oversight and monitoring of the expenditure made using the fund

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
Landon and Smith(2015)	Focuses on Petroleum producing regions; with examples from Venezuela and Chile	<p>In Venezuela, fiscal rules governing the NRF were changed allowing the political executive to have a greater say in its functioning, leading to immediate spending of petroleum income, increasing Venezuela’s dependence of petroleum revenue. While spending on social programmes increased, they did so at an unsustainable rate. Rules were changed to allow for discretionary withdrawals. The fund was largely dormant from 2002 to 2011 when payments due to it were cancelled, and in 2011 the remaining balance from the fund was withdrawn from the fund.</p> <p>In Chile, both the objectives of the NRF have been met, of smoothing expenditure in the short run and reducing Chile’s dependence on copper revenue in the long run along with promoting macroeconomic stability.</p>	Mixed	Limit on political manipulation of the institutional rules related to the fund

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
Lassourd and Bauer (2014)	Uganda	None studied	NA	<ul style="list-style-type: none"> <li>Fiscal rules must be adjusted by setting the right limit between savings and consumption and creating the adequate transparency and oversight measures.</li> <li>Should be complemented by reforms to improve the quality and delivery of public projects</li> <li>Important to recognize presence of bottlenecks in absorptive capacity</li> <li>For Uganda, Ghana-type “benchmark revenue” rule is suggested (revenue rule 1): 70 percent of an 11-year average of oil revenues is spent; the rest is saved. If actual revenues are lower than 70 percent of an 11-year average of oil revenues, money is withdrawn from the fund to make up for the shortfall.</li> </ul>
Lohmus and Ter-Martirosyan (2008)	Norway, Alaska, Kazakhstan, and Azerbaijan	Stabilization effect and savings for the future generation	Positive	<ul style="list-style-type: none"> <li>Transparency in the operations of the fund</li> <li>Integration of the fund with the budget and a guaranteed transfer from the fund to the budget earmarked solely for the financial of spending under budget development programs that provide for investment in projects that will also be used for future generation.</li> </ul>
Luecke (2011)	Kazakhstan, Azerbaijan and Norway	Generating long-term savings; asset accumulation in the oil fund ;	Positive	<ul style="list-style-type: none"> <li>Acquire mostly foreign assets and thereby sterilize the potential impact of resource revenues on demand for (domestic) non-tradables</li> <li>Appropriate rules of operation</li> <li>Greater transparency to limit discretionary control over the use of resource revenues by small groups of decision-makers.</li> </ul>
Mahmudov (2002)	Kazakhstan, Azerbaijan	There is a stock price increase of 1-3% of firms after investment by SWFs. However, this is lower than the 5% return seen in investments by comparable privately owned investors.	Mixed	--

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
McKechnie (2013).	Timor Leste	Responded positively to the shocks in financial markets ; returns from more risky investments	Positive	<ul style="list-style-type: none"> <li>• Democratic governance of the fund including checks and balances</li> <li>• Strong leadership</li> <li>• Core transfers to the budget little more than a few percentage points above the estimated sustainable income of the fund, and no more than experience in budget execution would indicate</li> <li>• Independent expertise for management</li> </ul>
Meggison and Fotak (2015)	25 countries which have employed SWF since 2008	Spending volatility in countries which have established stabilization funds is shown to be 13% lower than countries without funds. In addition, political institutions and fiscal rules are significant in reducing volatility in spending.	Positive	Political institutions and fiscal rules
Overseas Development Institute (2006)	Multiple countries (Kazakhstan, Timor L'Este, Nigeria, Norway, Russia, São Tomé and Príncipe, Vietnam)	No information	-	<ul style="list-style-type: none"> <li>• Adopt longer-term asset investment strategies- assets invested to maximize returns whilst minimizing risk, most likely via a diversified, balanced, portfolio.</li> <li>• Rules determining the utilization of the money from the fund ; need to balance inter-generational equity and returns to society of productive public investment</li> <li>• Price hedging can help in inflation proofing and help maintain the purchasing power of the 'principal' part of a fund</li> </ul>
Ploeg (2014)	Multiple countries			<ul style="list-style-type: none"> <li>• An intergenerational fund to smooth consumption across generations (similar to a savings fund)</li> <li>• A liquidity (or stabilization) fund to collect precautionary buffers to hedge against residual, non-diversifiable risk</li> <li>• An investment fund to park funds until the economy is ready to absorb the</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
				<p>new spending on investment projects (like a savings funds)</p> <ul style="list-style-type: none"> <li>• For a capital scarce country a positive part of the windfall should be spent on domestic investment</li> <li>• Need to tackle political economy problems</li> </ul>
Ramírez-Cendrero and Wirth (2016)	Norway	Norway's NRF has helped avoid appreciation of the Norwegian kroner, excessive spending, and pro-cyclical spending.	Positive	Fixed percentage to determine the transfer of money from the resource fund to the government's budget (4 percent fiscal rule) in order to cover the non-petroleum fiscal deficit
Rios-Morales et al. (2011)	Gulf oil producing countries	SWFs are playing a role as a source of foreign investment. They are reducing the impact of liquidity pressures in the international banking system.	NA	<ul style="list-style-type: none"> <li>• Discusses 24 principles covering 4 key areas-legal and institutional framework, objectives and coordination on macroeconomic principles, governance structure and code of conduct and risk management framework that can provide a clearer understanding of the management of SWFs</li> <li>• Effective international cooperation to bring about greater transparency and accountability for SWFs, among financial market participants</li> </ul>
Sovacool (2016)	Sao TomePrincipe (STP)	Generated much needed government revenue, helped diversify the economy, lowered inflation and rates of poverty, and minimized corruption and the exploitation often associated with oil exploration and production	Positive	<ul style="list-style-type: none"> <li>• Creation of an independent National Petroleum Council and National Petroleum Agency</li> <li>• Oil Revenue Management Law (ORML) that set limits on withdrawals from the National Oil Account so that a significant amount of revenues accrue to a subaccount known as the "Permanent Fund for Future Generations" or the "Permanent Oil Fund," which cannot be spent now and forms a "national endowment" to "foster development even after oil resources have been exhausted."</li> <li>• Commitment to the principles of transparency stipulated by the EITI</li> <li>• Annual spending amounts from the National Oil Account must be spent in accordance to the priorities enshrined within the country's Poverty Reduction Strategy, and 10% given directly to local governments</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
Sugawara (2014)	Data from 68 countries	NRFs have helped avoid Dutch disease and ensure fiscal prudence in both countries, especially around 2009 and 2010.	Positive	<ul style="list-style-type: none"> <li>• Implementation of fiscal rules</li> <li>• Help from international community for institutional strengthening</li> </ul>
Tsani (2013)	Sample of 27 countries rich in non-renewable resources such as fuels, ores, metals and minerals	The presence of resource funds may be associated with an improved ability of countries to deal with the 'resource curse' and improve governance and institutional quality.	Positive	<ul style="list-style-type: none"> <li>• Need to identify short term measures to improve governance</li> <li>• Identify policies and appropriate tools for appropriate insulation against shocks induced by changes in commodity prices</li> </ul>
van Ingen et al (2014)	Norway and Nigeria	The Pula Fund has contributed towards avoiding Dutch disease	Positive	<p>Successful practices of the Pula Fund - Botswana's Sovereign Wealth Fund (SWF)</p> <ul style="list-style-type: none"> <li>○ need for greater transparency in the management of SWFs could be considered</li> <li>• foreign exchange reserves in the Pula Fund invested entirely offshore and the bulk of the Pula Fund is invested in bonds, with the second largest share in equities</li> <li>• fund has no separate legal status or balance sheet of its own</li> </ul>
Wills (2015)	Capital Abundant and developed economies like the UAE, the Netherlands, Norway and Australia and Capital scarce and developing	None studied.	NA	<ul style="list-style-type: none"> <li>• NRF in capital scarce country should be built before anticipated windfalls, partially invested domestically, and used as a source of income rather than a buffer against temporary shocks.</li> <li>• Investment from the fund should give domestic investment first priority</li> <li>• If investment cannot be absorbed, then a temporary Parking Fund should be used to hold revenues until they can be productively used</li> <li>• If private capital is constrained, then some resource revenues should be used to boost it</li> </ul>

Study	Country/s	Effects of managing natural resource revenue through NRFs	Positive or Negative	Suggestions on ways to manage natural resource revenue through NRFs more effectively
	economies like Ghana, Iraq, Nigeria			
Yücesoy (2013)	Azerbaijan	The NRF has not contributed towards the diversification of the economy.	Mixed	<ul style="list-style-type: none"> <li>• Money from the fund could be used for- (1) transfers to state budget (2) funding of social, infrastructure, and human capital development programmes (3) administrative expenses</li> <li>• Economic diversification needs to be encouraged</li> <li>• Transparency in the expenditure side for fiscal sustainability and macro-economic equilibrium.</li> <li>• Important to incorporate the civil society and NGOs into the decision-making body of the oil fund</li> </ul>

### 3.5 FINDINGS FROM ADDITIONAL REVIEW STUDIES NOT INCLUDED IN THE SYNTHESIS

In this section, we discuss thematically, the findings from some studies which make recommendations for NRRM but have been excluded from the synthesis either because they did not specifically discuss an NRF or because they have been assessed to be of low quality. The studies mentioned here are listed in Section 6.2.

#### STRENGTHENING INSTITUTIONS AND TRANSPARENCY MEASURES

**Dixon and Monk (2011)** discuss the importance of governance of management NRR in the context of resource-rich countries. They argue that SWFs can be a useful tool for managing resources revenues and facilitating long-term economic development only if policy makers pay attention to institutional and governance issues such as institutional coherence, availability of trained professionals, and inclusive and representative decision-making processes.

In addition, the objectives of the SWF should align with national development objectives within a broader institutional framework. Human capital is paramount to the success of an SWF and can be ensured by appropriate resourcing. Finally, the process by which investment decisions are made is of the utmost importance and portfolio managers must be free of external influences; if the prevailing political and institutional conditions are rife with corruption or political instability, there is a higher probability of the SWF facing continual challenges to its legitimacy and operational freedom.

Strengthening transparency measures is another important aspect of managing resource revenue and avoiding the resource curse. **Alex Vines (2010)** discusses oil sector development in Sao Tome e Principe. He examines lessons learnt from the failures of its early oil deals, especially those relating to transparency and accountability, such as previous oil licensing rounds organized jointly with Nigeria in 2003 and 2005, and assesses Sao Tome's prospects for moving forward in the light of the failure of its earlier submission for EITI candidacy.

The author suggests that an oil revenue management law should be enacted for the transparent management of oil wealth, to ensure that financial transactions related to oil licensing are made public. Provisions should be made for: (i) sharing information on all oil transactions; (ii) publishing of independent audit reports; (iii) declaration of assets by government officials followed by verification; and (iv) review of oil contracts. Finally, sub-national governments should be consulted in policy making and independent oversight of the banking sector should be strengthened.

#### SHARING RESOURCE REVENUE WITH SUB-NATIONAL GOVERNMENTS AND CITIZENS

Distribution and sharing of revenue arising from natural resources is an important part of managing resource revenues. There can be several ways to distribute and share resource revenue. **Palley (2003)** uses the example of Iraq and recommends creating a revenue distribution fund. He argues that the distribution of revenue to the citizens will give them a sense of ownership, and create an incentive for them to support resource-development projects. Creating a fund that will also distribute resource revenues to provincial and state governments could ensure a fair regional distribution of revenues, thereby reducing the potential for grievances at the regional level, which have been shown to lead to civil war if unchecked. The author recommends that to promote transparency and accountability in the oil sector, all oil companies, whether state-owned or private, should be obliged to publish oil production contracts and publish what they pay governments.

**Bishop and Shah (2008)** examine the manner in which petroleum revenues may be distributed to sub-national levels and how NRFs may be established nationally or regionally in the context of Iraq.

They argue that the federal government should provide national standards for resource management, collect revenues from profit-sharing or resource rent taxes centrally, distribute revenues according to an equitable formula and provide insurance against volatile revenues. The stabilisation of revenues requires competent medium-term budgeting at the federal level.

Further, the federal government must safeguard against unsustainable spending of windfalls where sub-national governments lack the capacity to absorb revenues. They suggest that investment in financial assets may not be the most suitable use of resource revenues. If governments aim to save for future generations, funding investing in domestic infrastructure, human resources may be a better use of resource revenues. This will also help build the absorptive capacity of the economy. The most successful funds are those with explicit budget integration, coherent objectives, clear performance measures and strong public accountability for the fund's management.

The next issue that then arises relates to the mechanism for distribution of the resource revenue to citizens. Direct distribution to citizens will result in freeing up of revenues for the provision of critical public services.<sup>18</sup> However, direct distribution should be carried out in a controlled manner initially to limit the impact on the labour supply. **Gupta et al. (2014)** argue that to make distribution more equitable, limits could be required on direct transfer to citizens, targeting the poorest segments of the population may be required, or transfers may be made conditional on meeting certain welfare outcomes such as school attendance by children of families. However, corruption could be a characteristic of direct distribution, and to prevent this, the fund should not be established outside the budget.

In a case study of Nigeria, **Sala-i-Martin and Subramanian (2003)** suggest distributing resource revenue to women in particular and note that development outcomes are strongly correlated with the degree of empowerment of women within a household. **Rodríguez et al. (2012)** suggest that if citizens who are identified as beneficiaries for direct distribution continue to be taxed, this can both increase transparency and foster a healthy citizen-state relationship, thereby creating a situation in which the state depends on the citizens and not vice-versa.

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## INVESTING WISELY

A third aspect which merits discussion is the manner in which NRFs invest their money, the types of asset they typically invest in and whether these are domestic or foreign. The investment portfolio of NRFs can play a key role in their success. NRFs often choose to invest in foreign assets, and **Pedro (2006)** points out that these foreign assets typically comprise commodity loans, bonds, swaps, and derivative markets to manage revenue volatility. **Abdelal (2009)** discusses the investment portfolio of Abu Dhabi's SWF, which has invested abroad for over 30 years and is believed to be the world's largest SWF and institutional investor today. Its investment portfolio consists of stocks in developed markets and emerging markets, small-capital stocks, government bonds, corporate and other bonds, alternative investments, real estate, private equity, infrastructure and cash.

On the other hand, as **Heuty (2009)** argues, a weak investment portfolio has been shown to hamper the functioning of NRFs and even the achievement of wider macro-economic objectives such as economic diversification. It has also been pointed out that excessive saving of the oil revenue has jeopardized the banking sector in some countries as is the case in Russia and Kazakhstan. As a result of favourable sovereign ratings due to growing oil fund assets, banks in these countries were able to

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<sup>18</sup> The investments in public goods for the provision of public services enhances the chances for successful economic diversification (Mendoza R.U. et al (2015), <https://doi.org/10.1108/IJDI-01-2014-0005>) (accessed 7 December 2017) Mcarthur et al.)

borrow heavily from the international credit market to invest in the construction and real estate sectors. However, when returns did not materialize, governments had to use money from NRFs to bail out banks and non-bank borrowers with large foreign currency obligations, making a large dent in NRF savings.

**Ibadoglu (2015)** suggests the following means to improve the effectiveness of public investment made out of the NRFs: (i) conducting a cost-benefit analysis of all projects, including social and environmental costs and benefits; (ii) prioritizing projects that will have the largest impact; (iii) monitoring the progress of projects, and (iv) budgeting for the operation and maintenance of investment projects. **Turkisch (2011)** discusses key barriers to SWF investments in the African context, including structural barriers such as: (i) small size, low liquidity and fragmentation of markets; (ii) bad sovereign ratings; and (iii) a weak regulatory framework which requires attention in the long term. He discusses the need for the international community and major financial institutions to play an increasingly active role in channelling SWFs investments into Africa. This should be accompanied by African countries designing strategies to ensure that the largest possible number of people are able to benefit from the inflow of investment.

There are two approaches to investing oil revenue, a 'spend-as-you-go' approach as practised in Angola, which assumes that revenue windfalls must be allocated between government consumption and public investment and the 'gradual scaling-up' approach, as practised in Chile and Columbia, which scales up public investment gradually allowing for the creation of a fiscal buffer which can enable stable spending. **Richmond et al., (2013)** have carried out a simulation modelling of a small open, real economy that has three production sectors: non-traded goods, (non-oil) traded goods and oil, and find that the gradual scaling-up approach is more suited to managing oil revenue volatility, and on average delivers better growth outcomes, especially in the medium and long term. More aggressive scaling-up may yield more economic growth, but an economy without a fiscal buffer is prone to fluctuating government spending paths driven by volatile oil revenues.

In this chapter, we attempt to contextualize the findings of the review to two South Asian countries, Afghanistan and Myanmar. Since there is limited literature on natural resource revenue management specifically pertaining to these two countries, we attempt to use learnings from other countries and apply them to the political, economic and social contexts of Afghanistan and Myanmar to understand whether NRFs could operate effectively in these countries and the possible challenges which might arise in the management of these funds.

#### 4.1 AFGHANISTAN

##### KEY MINERAL RESOURCES AND THEIR REGULATION

Afghanistan has large deposits of minerals, such as iron ore, copper, cobalt, gold, lithium, niobium, uranium, chromite, graphite and marble. It is reported to have 2,400 million tonnes of iron ore reserves and 57 million tonnes of copper reserves, some of the highest in the world (Hall n.d.). In 2010, the US Geological Survey estimated in 2010 that the country's geological resources may be approximate \$908 billion, based on remote sensing surveys from 2005 to 2009.

Table 4.1 presents an overview of the key mineral deposits in the country.

Table 4.1: Reserves of key mineral resources in Afghanistan (2011)

Commodity	Resources
Copper	57.8 mt
Iron Ore	2438 mt
Gold	2698 kg
Barite	151.5 mt
Bauxite	4.5 mt
Rare Earth Elements	4.88 mt
Oil and Natural Gas Liquids	1596 mmbbls
Natural Gas	15.7 tcf

**Sources:** Ministry of Mines and Petroleum, Government of Islamic Republic of Afghanistan (2011): Available at <http://mom.gov.af/Content/files/Afghan%20Presentation%20-%20Sg%20Conf%20Consolidated%20v1.pdf>; (accessed on 7 December 2017)

**Notes:** mt: million tonnes, kg: kilograms, mmbbls: million barrels, tcf: trillion cubic feet

These resources have remained largely undeveloped due to security concerns and lack of infrastructure needed for mineral development, such as power, mining, mineral processing facilities

and roads (Renaud 2015). As of 2015, mineral rents contributed less than 1 per cent to the GDP of the country, growing from 0 per cent in 2012 to 0.008 per cent in 2015.<sup>19</sup>

However, if developed appropriately, the resources provide an opportunity for the country to grow economically and improve the quality of life of its citizens. The Ministry of Mines and Petroleum (MoMP) estimates that mineral resources may contribute 42–45% to Afghanistan's GDP by 2024 (Jackson (2012)). It is expected that the development of the minerals sector to generate jobs, reduce dependence on international aid, and help the economy both diversify and grow (Brown and Blankenship (2013)).

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## INSTITUTIONS, LAWS, AND POLICIES REGULATING THE MINERALS SECTOR

The MoMP is responsible for the regulation of the mineral sector, including exploration and extraction. The Ministry of Finance collects taxes and revenues from the sector. Major laws which govern the mineral resources to achieve these objectives include the Hydrocarbons Law 2009 and the Minerals Law 2014. In addition, the Hydrocarbons Regulations 2009 and the Mining Regulations 2010 outline rules relating to bidding, exploration, exploitation, royalties and fees, and the environmental and social safeguards to be provided.<sup>20</sup>

Policies which govern the minerals sectors in the country include the National Mining Policy, National Coal Policy (2011), Industrial Mineral Policy (2012), Metals Mining Policy (2012), Rare Earth Elements and Metals Policy (2012), Radioactive Minerals Mining Policy (2012), CNG Policy (2012), Artisanal and Small Scale Mining Policy (2012), Gemstone Policy, Construction Mineral Policy (2012), Dimension Stone Policy (2012), among others relating to social policies, environmental protection and occupational health and safety.<sup>21</sup>

In 2013, Afghanistan became of a member of the EITI, which mandates that companies publish what they pay, and the government discloses the revenue it receives and the two numbers are being reconciled by an independent administrator.<sup>22</sup>

However, as pointed out by Natural Resources Governance Institute in its 2013 Resource Governance Index (RGI), while Afghanistan has comprehensive mining legislation, there are serious challenges to effective mineral governance in the form of lack of government data on the mining sector, limited oversight of licensing processes and state owned companies, high levels of corruption, and limited application of rule of law.<sup>23</sup> For example, according to the 2013 RGI, while the law requires that environmental and social assessments be made before starting mining operations, no such assessments had been completed or released as of 2013. In addition, while rules bar government officials from receiving mineral licences, there have been allegations of contracts

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<sup>19</sup>World Bank: <http://data.worldbank.org/indicator/NY.GDP.MINR.RT.ZS?locations=AF&page=1> (accessed 29 November 2017).

<sup>20</sup><http://mom.gov.af/Content/files/Afghanistan-%20Minerals%20Law-19-May-2015%20English.pdf>, [http://mom.gov.af/Content/files/Hydrocarbons\\_Law\\_2009-\(Unofficial\\_English\\_Translation\\_dated\\_March\\_2014\)-Final.pdf](http://mom.gov.af/Content/files/Hydrocarbons_Law_2009-(Unofficial_English_Translation_dated_March_2014)-Final.pdf), [http://mom.gov.af/Content/files/Mining\\_Regulations.pdf](http://mom.gov.af/Content/files/Mining_Regulations.pdf), [http://mom.gov.af/Content/files/Hydrocarbons\\_Regulations\\_2009-\(Unofficial\\_English\\_Translation\\_dated-April-13\\_2014\).pdf](http://mom.gov.af/Content/files/Hydrocarbons_Regulations_2009-(Unofficial_English_Translation_dated-April-13_2014).pdf) (all accessed 29 November 2017).

<sup>21</sup>Ministry of Mines: <http://mom.gov.af/en/page/3993/7664> (accessed 29 November 2017).

<sup>22</sup><http://aeiti.af/en/page/eiti-profile/what-is-eiti>. (accessed 29 November 2017). The country is yet to be assessed against the 2016 EITI Standard.

<sup>23</sup>[http://www.resourcegovernance.org/sites/default/files/country\\_pdfs/afghanistanRGI2013.pdf](http://www.resourcegovernance.org/sites/default/files/country_pdfs/afghanistanRGI2013.pdf) (accessed 29 November 2017).

being awarded to family members of government officials.<sup>24</sup> The country ranks a low 169 out of 176 on Transparency International's Corruption Perceptions Index 2016.<sup>25</sup>

One of the requirements of the Minerals Law 2014 is that the Ministry of Finance should allocate 5 per cent of the revenue from a mine to a special budget code or a wealth fund for the economic, social and environmental development of mining regions. This is in addition to its annual national budget allocation.<sup>26</sup> The National Mining Policy (2011-12) also states that the government is in the process of creating a wealth fund: 'The Fund will allocate revenues through public financial management system for infrastructure development, education (including higher education and vocational training), health, community development, and will also provide a measure for fiscal stabilization due to economic shocks such as commodity price changes.'<sup>27</sup> Therefore, while there seems to be some interest in the creation of a wealth fund, no such fund has been created till date.

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## CONTEXTUALIZATION OF THE REVIEW FINDINGS

In this section, we attempt to contextualize the findings of the review to Afghanistan. We discuss firstly, whether an NRF ought to be established in the country; secondly, if yes, then the appropriate institutional structure for the NRF; and finally, what the spending priorities of the NRF ought to be, given the high requirement for domestic investment on account of local discontent, a lower standard of living, low access to public services, poor infrastructure and high unemployment, unlike several other countries which have established NRFs.

We argue that an NRF ought to be established in Afghanistan, but only if certain conditions are established to ensure that it is able to function effectively. These include well-functioning public finance institutions with appropriate accountability and transparency mechanisms, established and stable fiscal rules, clearly defined rules for investment, decision-making bodies for the funds with adequate representation by experts in wealth management, and independent oversight of the fund. In addition, if an NRF is created, the government must create fiscal rules to both address immediate developmental needs, which will require spending, especially on sub-national regions where resources are extracted, as well as concerns relating to intergenerational equity, which will require saving.

NRFs may be established to: delink expenditures from volatile resource revenue; promote intergenerational equity; reduce dependence on mineral revenues and prevent de-industrialization of non-mineral sectors (what is often termed 'Dutch Disease') through diversifying the economy by channelling funds towards non-mineral sectors such as agriculture or manufacturing; and allow countries hold capital abroad till domestic absorptive capacity increases or enable higher returns on investments than domestic investments allow.

Countries such as Norway, Chile and Botswana are cited as examples of countries where NRFs have contributed to effective revenue management through meeting some of the objectives stated above. However, as the experience of countries such as Azerbaijan, Kazakhstan, Oman, Libya, Russia,

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<sup>24</sup>Ibid.

<sup>25</sup>[http://www.transparency.org/news/feature/corruption\\_perceptions\\_index\\_2016](http://www.transparency.org/news/feature/corruption_perceptions_index_2016) (accessed 29 November 2017).

<sup>26</sup> <http://mom.gov.af/Content/files/Afghanistan-%20Minerals%20Law-19-May-2015%20English.pdf> (accessed 29 November 2017).

<sup>27</sup>National Mining Policy, [http://www.mom.gov.af/Content/files/Policies/English/English\\_National\\_Mining\\_Policy.pdf](http://www.mom.gov.af/Content/files/Policies/English/English_National_Mining_Policy.pdf) (p. 5) (accessed 29 November 2017).

Angola, Nigeria, Trinidad and Tobago and Venezuela shows, NRFs are not always successful in meeting these goals.

We discuss the experiences of other countries, outlined in other parts of the report, to detail these conditions for Afghanistan.

**Objectives:** The government must first define the objectives for which the fund is to be established, as this will determine its institutional and fiscal structure. As mentioned above, objectives may include saving resource revenue for future generations, fiscal stabilization and consequently smoothing of expenditures, diversifying economies and planning for sustained development once resources are exhausted.

The National Mining Policy indicates that the objectives of establishing an NRF would be to: fund infrastructure development; achieve socioeconomic objectives relating to health, education and community development; and promote fiscal stabilization. In addition, the Minerals Law 2014 states that the objective of the NRF would be to promote the economic, social and environmental development of communities affected by mining.

This indicates that if the Government of the Islamic Republic of Afghanistan's (GIROA) decides to establish an NRF, it would be to ensure fiscal stabilization and socioeconomic development. However, while the Minerals Law 2014 seems to suggest that the funds be used largely for the development of local communities, the National Mining Policy indicates that the fund should be used to promote the socioeconomic development of the nation, including local communities. Further while the National Mining Policy mentions fiscal stabilization as a goal, the Minerals Law 2014 does not. Lack of clarity at the stage of setting objectives of establishing an NRF may create operational issues at a later stage, and allows for greater discretion by fund managers.

**Fiscal rules:** Fiscal rules establish guidelines for the way funds are transferred into and out of the NRF. For example, as Lücke (2010) points out, some considerations for designing these rules may include: (i) how much of resource revenue is used for current government consumption and how much is to be transferred to the NRF; (ii) if the fund is to perform a stabilization function, how money is to be withdrawn from the fund if revenues fall short of expectation; (iii) how should the capital stock of the fund be invested; and (iv) how should investment income from the fund be spent?

Diverting a larger share of resource revenue from current consumption may be easier in a high-income context than in an LMIC with immediate consumption needs. In addition, as the experience of Azerbaijan and Venezuela shows, ensuring compliance with the established fiscal rule for transfers can be more challenges in countries with weak public finance institutions. For example, in Azerbaijan, while the 'Long term strategy on the management of oil and gas revenues' for the State Oil Fund of the Azerbaijan Republic mandates that between 2005 and 2025 at least 25 per cent of revenue from oil and gas should be saved when revenues from these resources peak, in practice SOFAZ's transfers to the state budget have increased to an extent that the 25% saving rule has been violated (Aslanli 2015).

When revenues fall short of expectations, government should not arbitrary withdraw from the NRF to meet shortfalls. For example, in Venezuela, when the fund was initially established in 1998, the rules provided that resource funds could be withdrawn, with the approval of Congress, if: (i) oil revenues were lower than the reference values; and (ii) resources in the fund were more than 80 per cent of the average annual oil revenues in the preceding five years. Further, it was specified that fund balances at the end of a fiscal year should not be less than one-third the balance at the end of the previous year. However, in 1999 modifications were made to these rules allowing for

Presidential discretion for withdrawals. The gradual weakening of rules eventually led to the fund becoming defunct in 2003.

Thus, as can be seen from the examples of Azerbaijan and Venezuela, compliance with fiscal rules is as important as establishing rules on how much to transfer to the NRF and how to withdraw funds from it.

On the third and fourth considerations relating to establishing fiscal rules, capital stock of the fund can be invested either domestically or abroad, in a range of assets including government bonds, equities and foreign direct investment. While certain countries such as Norway may choose to invest the entire amount of their fund abroad and in financial markets, others such as Angola, Kazakhstan and Nigeria, allow for domestic spending as well. It is argued that low-income countries may have more compulsions to invest in creating domestic infrastructure, and this can be fulfilled through NRFs. On the other hand, others point out that investing domestically may exacerbate Dutch Disease. Further it is pointed out that domestic investment may be routed through transfers from the NRF to the state budget, as this allows for a greater amount of scrutiny on investment decisions (Bauer 2014).

It is recommended that initially the investment portfolio of an early stage NRF should be conservative, with high liquidity and low risk (Aslanli 2015). Poor investment decisions and lack of oversight resulted in losses of \$1.2 billion for the Libyan Investment Authority in 2008, while the Kuwait Investment Authority lost \$5 billion for similar reasons between 1980 and 1992 (Bauer 2014).

Thus, as can be seen, clearly defining the objectives of the NRF, establishing fiscal rules and investment rules, ensuring oversight of the fund's activities and promoting transparency and accountability in its operations, can all contribute to ensuring effective management of resource revenues through NRFs. However, in Afghanistan's context, establishing a robust institutional framework will play a key role whether the NRF contributes to sustained economic growth or conversely worsens conflict in the country.

Brown and Blankenship (2013:40) note:

developing a successful extractives sector that does not create or exacerbate conflict relies on the government being able to address four core challenges: minimising the negative social, human rights and environmental impacts of mining; ensuring mining benefits all Afghans by managing revenue effectively and diversifying the economy; strengthening transparency and accountability to reduce corruption and providing responsible security around mine sites.

While an NRF can contribute to minimizing the negative impacts of mining, ensuring that mining benefits all citizens, diversifying the economy and improving transparency and accountability, it will operate in a broader context of low legal and institutional capacity, prolonged political crisis, rent seeking by political elites and interference by external countries and corporations.

The enactment of a comprehensive set of laws relating to the regulation of extractive industries, and the fact that Afghanistan became an EITI member country in 2013, are steps towards improving governance of the extractives sector in the country. However, if it is to meet the goals set out in the National Mining Policy and the Minerals Law 2014, there is a need to address a range of issues including low levels of information about existing natural resources and their governance, and managing expectations of citizens relating to job creation, improvements in infrastructure, and improved access to services in the short and medium term while the necessary infrastructure to explore and extract mineral resources is set up. Realizing these benefits would also depend on the

institutional framework and political will of the executive and legislature. A third issue to address is preventing the capture of mineral resources by local political elites to enable effective community development.

In terms of operationalizing an NRF in the country, evolving public consensus on the usefulness of an NRF also becomes central to its success. National and community-level stakeholder discussions can provide important insights in the process of formulating a natural resource fund which can meet immediate and long-term goals of the citizens of the country.

## 4.2 MYANMAR

### KEY MINERAL RESOURCES IN MYANMAR

Myanmar is one of South Asia's most resource-rich countries. Its natural resources include oil and gas, various minerals, precious stones and gems, timber and forest products and water resources with hydropower potential.<sup>28</sup> Of these, natural gas, rubies, jade and timber are the most valuable, and currently provide a substantial proportion of the national income. Myanmar dominates production of jade and is the source of approximately 90% of the world's rubies. In the minerals sectors, the oil and gas sectors generate the most revenue for the government.

Mining activities in the country can be traced back as early as the 15th century. During the British rule, the government granted mining leases mainly to British private companies for producing lead, zinc, silver, tin, gemstones and gold. After independence, the government of Myanmar entered into joint ventures with British companies in the early 1950s and 1960s. Private companies were subsequently nationalized, following which mining was carried out mainly by the government and only certain mining activities were permitted for cooperatives and private individuals. While Myanmar's official production value of minerals and gemstones was estimated at USD 1.5 billion, the total output from the mining sector is generally considered to be much higher (NRGI (2016)).

The government relies heavily on resource revenue, and thus budgetary and non-budgetary expenditure is largely dependent on resource revenues. However, despite its mineral wealth, Myanmar is one of the least developed nations in the world as it has not been able to optimize generation and allocation of resource revenues, largely on account of illegal mining and military control of the extractive sector. During the late 1980s and early 1990s, the extraction of natural resources increased in the ceasefire areas, such as mining and logging in the Kachin, Shan and Kayin states. In many cases, NRR were used to reinforce the power of local elites.

The country has witnessed a civil war lasting over the last 60 years. State and regional governments were created by the 2008 constitution, which came into force in 2011. The 2008 constitution provides for limited sub-national involvement in revenue collection and management. The year 2016 marks a historical power shift, with a civilian majority government coming into power, led by the National League for Democracy (NLD).

The extractive sector accounted for 39% of exports in 2010 and the national government collected MMK 442 billion (approximately USD 460 million) in mineral revenues in 2013-14 (NRGI 2016). Independent sources place the value of mineral exports and production much higher than the officially reported USD 1.15 billion in exports in 2013-14 (NRGI 2016). However, the collection of

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<sup>28</sup>The natural gas reserves estimated at 10 trillion cubic feet. (See. <https://www.indexmundi.com/energy/?product=gas&graph=reserves&display=rank>, accessed on 7 December 2017).

revenue in the country is said to be challenging, as payments from extractive industries often go unrealized (NRGI 2016). Many resource rents are appropriated by local elites, diverted to military enterprises, or escape taxation altogether through illicit markets. Revenue collection related to much of the trade in jade and other precious minerals is not accounted in official estimates.

Lack of transparency during decades of military rule has raised many questions about the potential for misappropriation of resource revenues in the current context. Revenues were used to meet the needs of the government, including to ensure the military's continued control. In addition, while natural resources were sold to neighbouring countries, the local population did not get any share of the revenues generated. The infamously opaque extractive industries and the unfair sharing of resource benefits have also been drivers of conflict in multi-ethnic areas. Unregulated and illegal mining has also had adverse impacts of the extractive activities on the society and the environment, through deforestation, land and water pollution, and loss of livelihoods. The Vice President of the country in 2014 said:

environmental degradation has become noticeable across the country due to exploration of natural resources, and that plans should be made to reduce the impacts and to conserve the environment [and] that these measures require educative programmes, persuasion, rules and regulations.<sup>29</sup>

Further, initiating resource extraction projects in these conflict-ridden areas is difficult and at times is seen to increase conflict given competition for benefits among ethnic groups.

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## INSTITUTIONS, LAWS AND POLICIES REGULATING THE MINERALS SECTOR

The responsibility for overseeing the management of natural resources including oil and gas, minerals, and water resources for hydropower, is divided between ministries by sector.

In 1989, Myanmar embarked on a policy of encouraging foreign investment and invited foreign companies to invest in the mineral sector. It offered to provide raw materials and existing facilities as its participation in joint ventures with foreign partners which sought to ensure fair returns for both foreign investors and the government. The most common type of contract between the government and foreign investors in Myanmar is the production sharing contract (PSC). Under a PSC, the government continues to own the resource, while sharing profits with a company or consortium of companies that conducts exploration, development and production activities. The contract generally involves payment of a royalty to the government, bonuses to the government upon signing an agreement and reaching certain production levels, and sharing profits from the sale of the resource with the government.

The Myanmar Mines Law was promulgated in 1994.<sup>30</sup> It grants ownership rights over mineral resources to the State. This implies that all naturally occurring minerals found either on or under the

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<sup>29</sup>See New Light of Myanmar (30 July, 2014) 'Myanmar in dire need of environmental conservation plans: Vice President' Wednesday. <http://www.burmalibrary.org/docs19/NLM2014-07-30-red.pdf>, page 3 (accessed 29 November 2017).

<sup>30</sup> State Law and Order Restoration Council Law No. 8/94, Myanmar Mines Law 1994, [http://www.mining.gov.mm/DM/1.DM/1.DM\\_Menu\\_68/mining\\_law.pdf](http://www.mining.gov.mm/DM/1.DM/1.DM_Menu_68/mining_law.pdf)

soil of any land and in the continental shelf are deemed to be owned by the State. Amendments to 1994 law made in 2015 seek to address certain areas of concern to potential investors including:<sup>31</sup>

- Increasing the maximum production period for large-scale production projects to 50 years;
- Allowing joint ventures between foreign and local investors, in the case of small- and medium-scale production projects upgraded to become large-scale production projects;
- Providing a guaranteed right to an extraction/production permit for those who have successfully carried out prospecting and exploration and completed a feasibility study.

The Environmental Conservation Law, passed in 2012, provides principles and guidance for integrating environmental conservation in the nation's development.

All oil, gas and mining tax and non-tax revenues, other than in the case of illegal mining or appropriation by armed groups, are collected directly by the national government or state-owned entities, as prescribed by the 2008 Constitution.<sup>32</sup> The revenue collection mechanism for the extractive sector in Myanmar is given in Figure 5.1.

However, it is important to note that there are data gaps on prices, extraction volumes, and payments. In addition, several payments may not even flow through the channels indicated in the figure as they are deposited in multiple bank accounts. Further, information on production volumes and payments is not publicly disclosed. All these factors make it particularly challenging to estimate revenue flows accurately. Additional sources of uncertainty include the largely informal extraction and payment practices (especially in the non-gas sectors), extensive tax holidays and the existence of military-owned companies, combined with parallel administration of some resources by sub-national entities. It is also relevant to mention here that in the 2017 Resource Governance Index, Myanmar's oil and gas sector ranked 77 out of 89 countries, while its mining sector ranked 83.<sup>33</sup>

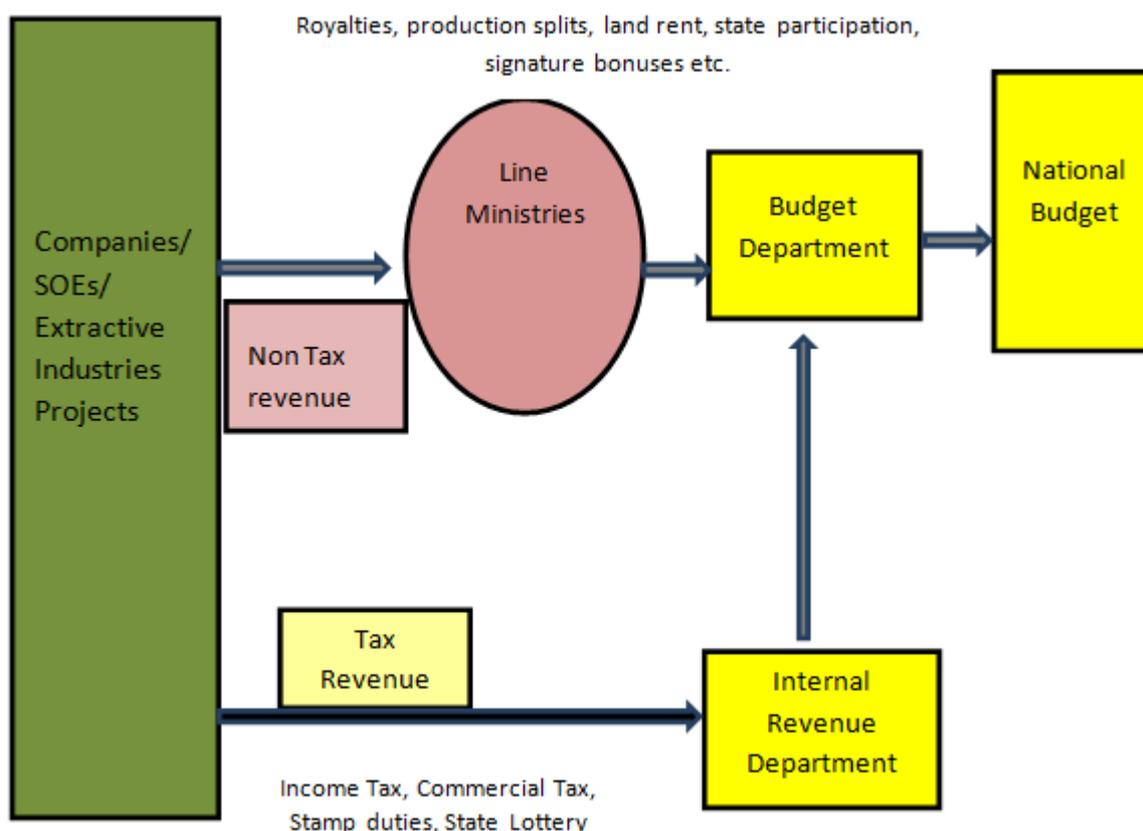
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<sup>31</sup> Law No. 72/2015 (the 'Mines Law Amendment 2015') <https://www.resourcedata.org/dataset/rgi-the-law-amending-the-myanmar-mines-law-union-parliament-law-no-72-2015/resource/8929dd0e-f131-40b3-ae4e-4e7127f11dd5> (accessed Dec 12 2017)

<sup>32</sup>In the face of centralized control over revenue, many ethnic groups have long asserted their right to make decisions over resource management in their states. Combatants in areas of active conflict and leaders from several ethnic minority parties – particularly those associated with Kachin, Rakhine and Shan states – have openly called for greater resource revenue sharing.

<sup>33</sup> The Resource Governance Index (RGI) measures the level of transparency and accountability in the oil, gas and mining sectors of 89 countries. See <https://resourcegovernance.org/sites/default/files/documents/2017-resource-governance-index.pdf> (accessed 29 November 2017).

Figure 5.1 Revenue collection mechanisms for the extractives sector



Source: Min Zar Ni (2015).

With regard to sharing of the revenue with sub-national governments, Myanmar is undertaking a process of fiscal decentralization in accordance with the 2008 Constitution. This involves allocating several key responsibilities to sub-national governments, such as oversight of local ports, roads and bridges, small and medium-sized electric power production and distribution, and agricultural water management. Since regions and states are not allowed to raise significant tax revenue, they are reliant on transfers from the national government to finance expenditures. Transfers of revenues (including natural resource revenues) to sub-national governments are made on an ad hoc basis.

According to the World Bank’s Myanmar Public Expenditure Review, the revenue assignments to states or regions are very limited at 6 per cent of public sector revenue (Addison et al. 2015). Own-source revenues financed 36 per cent of total expenditures in 2013-14; the remaining 64 per cent was financed from transfers from the national government. The distribution of own-source revenues is uneven, for example, in 2013-14, 68 per cent of own-source revenues were collected in Yangon and Mandalay.

Intergovernmental fiscal transfers have grown rapidly in the past three years, but the lack of a rules-based system for determining general-purpose grants has made them ad hoc and unpredictable on a year-to-year basis. They are disproportionately large on a per capita basis in conflict-prone areas and in states and regions with more active politicians. This has made development planning difficult and sub-national revenue sharing susceptible to patronage and political manipulation. While some have argued that states and regions with greater development needs are receiving a higher share of revenues, in practice, conflict-affected areas have generally received a higher per capita share of revenues. The newly elected NLD has committed to “work to ensure a fair distribution across the

country of the profits from natural resource extraction, in accordance with the principles of a federal union".<sup>34</sup>

Another key issue in the management of resource revenue in the country is the fact that SOEs such as MOGE and the Myanmar Gems Enterprise (MGE) retain significant amounts of natural resource revenue in what is termed 'Other Accounts'. While some Other Accounts are simply payment mechanisms for subcontractors or international donors, others are enormous funds kept at the Myanmar Economic Bank, only reviewed by a select few inside the Ministry of Planning and Finance and the Auditor General's office. Myanmar's citizens are unable to monitor how the money is used or whom it is benefiting. In 2013-14, MOGE transferred more than 1.3 trillion kyats (USD 1.1 billion) into 'Other Accounts' equivalent to 60 per cent of all its oil and natural gas revenues and an amount more than that spend on either public health or education. Currently, the national parliament and public interest groups do not have access to data to be able to make informed recommendations on the amount these powerful organizations should retain for reinvestment purposes, or, alternatively, whether the system should give the national parliament greater power to approve their budgets.

There is scope for the government to extract more value from the mining industry by combating illegal mining and attracting sustainable FDI into both existing and new projects. This would lead to substantial royalty increases to meet infrastructure development and other social objectives. Gem production monitoring could be improved, and incentives provided to combat illegal mining activities, thereby generating much-needed revenue.

Lack of transparency is a key challenge for resource management in the country. Myanmar has no freedom of information law, and environmental and social impact assessments are not required. It is unclear which authority receives payments from extractive companies. Myanmar's Auditor General has the authority to scrutinize extractive revenues, but audit procedures are not known, reports are not made public, and the auditor's findings are not systematically presented to lawmakers. It is widely assumed that corruption is rampant in the sector and that much of the country's resource revenues have been appropriated by a few political elite. However, in June 2014, Myanmar acquired status as an EITI candidate country, thus committing to implementing the EITI standards and becoming a compliant country within three years. However, Myanmar was not EITI compliant at the time of the publication of this review in December 2017. EITI is a global standard that helps countries improve the governance of the extractives sector. The Myanmar government's 12-point Economic Policy highlights the strategic role of EITI in the reform process, specifically in natural resource governance. EITI creates a platform for discussions on issues around resource sharing, which is widely debated and central to the on-going peace process.

EITI is also stimulating public debate and shedding light on lost revenues from the jade and gems sector. Official revenues from gemstone sales in 2014 were estimated at US\$3.4 billion, according to the first Myanmar EITI (MEITI) Report published in 2015 (MEITI 2015). However, there appear to be discrepancies between various sources of information with some estimates as high as over US\$ 30 billion (MEITI 2015). According to a study commissioned by MEITI in 2016, it is estimated that 60 to 80 per cent of gemstones produced in Myanmar are not declared and therefore bypass the formal system (Irwin 2016). The first EITI Report disclosed that future Myanmar EITI Reports will include royalties from jade and gems disclosed by both government and companies.

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<sup>34</sup> [http://www.burmalibrary.org/docs21/NLD\\_2015\\_Election\\_Manifesto-en.pdf](http://www.burmalibrary.org/docs21/NLD_2015_Election_Manifesto-en.pdf) (accessed 29 November 2017).

## CONTEXTUALIZATION OF REVIEW FINDINGS

In this section, we attempt to contextualize our findings for Myanmar. The first question that arises for contextualization is whether it is the right time for setting up a NRF. If the answer is yes, then the next question that is relevant is what is or are the right model(s) for the NRF, stabilization funds or savings or future generations funds? The third question relevant for contextualization is what should be the spending priorities of such an NRF, investment or strategic development funds, investment in foreign or domestic assets or spending to meet social sector priorities?

There has been some thinking about NRFs in Myanmar. In a national level conference organized on natural resource governance in 2014, there were detailed discussions on the considerable windfalls from the extractive sector that are expected by the country over the next decades and how NRFs could be established as tool to better manage oil and gas revenues. Both the Government of Myanmar and other participants at the conference expressed an interest in creating a framework for the establishment of a fund. In 2015, the Ministry of Finance was researching the potential for an NRF, in collaboration with the government of Norway.

The political actors in the country have also highlighted the need for the creation of a strengthened legal and regulatory framework for governing natural resources in Myanmar. The World Economic Forum (2013: 38) raised similar concerns and noted that:

the ability for Myanmar to translate natural resource wealth into prosperity will be dependent upon its ability to set the rules of the game for all stakeholders, nurture domestic capacities where they might be competitive, including human capital, and create infrastructure and services that allow for a successful industrial presence and beneficial supply chains.

The 2015 World Bank Myanmar Public Expenditure Review (Addison et al. 2015) has noted:

Establishing a sovereign wealth fund is another option for managing oil and gas revenue volatility. These funds can play several roles. They can accumulate savings for intergenerational equity, which may require rules for example on withdrawing only interest earnings so that the capital can grow (or be maintained) in real terms over the long-term. These funds could also help to smooth revenue flows into the budget, saving when revenues are high and allowing draw-downs during commodity price downturns (Section 2.33).

The review also highlights the need to manage risks from commodity price volatility and has suggested that the profits from hydrocarbon should be managed and fiscal rules should be adopted.

In the context of resource governance in Myanmar, there is a need to manage revenue from the extractive industries effectively, both in terms of generation and utilization. Setting up a responsible revenue management system with greater transparency and accountability can ensure that the benefits of the country's resources are shared more equitably among its people and used for the country's sustainable development.

An NRF established with the revenues from the extractive industries could be a useful tool in this regard. Such a fund could have several benefits for Myanmar. It could ensure that public expenditure is not significantly affected by fluctuations in world prices of mineral resources. This is a key challenge for countries which depend on revenue from extractive industries. Public revenue plunges when mineral prices fall, which often leads to dramatic cuts in government spending and abandoned or postponed infrastructure projects. Since Myanmar seeks to improve the functioning of the sub-national governments through fiscal decentralization, sub-national governments can also

be allowed to save NRR windfalls in an NRF for times when revenues decline unexpectedly. However sub-national governments may have trouble managing these savings, and these sub-national NRFs may become channels for political patronage and corruption.

Another key advantage of an NRF would be to prevent a negative impact on exchange rates and inflation levels from a large influx of foreign currency, in particular Dutch Disease which can undermine the domestic manufacturing sector. For Myanmar, an NRF could potentially play a role in bringing about equity in sharing and distribution of resource revenue, thereby reducing conflict, and strengthening federalism through the allocation of revenue from extractive industries directly to the sub-national governments.

However, the establishment of an NRF is only a small component within a wider framework for managing NRR. In terms of the kind of NRF that Myanmar could consider, it is important to examine several aspects to enable the fund to address macroeconomic and budgetary issues.

**Fiscal space:** The creation of an NRF requires that there is sufficient fiscal space to allow revenue to be diverted to a fund (after certain priority expenditure has been undertaken) rather than it being used for spending on ad hoc basis or for covering government inefficiencies. The country is characterized by a narrow revenue base and limited financing options. It has witnessed some revenue windfalls from one-off measures, which have enabled the government to rapidly increase spending while maintaining fiscal deficits within 5 per cent of GDP (Addison et al. 2015). Thus, the limited fiscal space needs to be addressed first. This could be done through various measures, such as widening the tax base, initiating an expenditure review of military expenditures to identify potential efficiency gains, and reviewing of investment practices and capital expenditure efficiency.

**Transfer of resource revenue to the fund:** Since revenue collection currently takes place through the SOE, MOGE, and IRD, and the SOE is allowed to retain up to 55% of its net revenues for its own use, the transfer of this revenue to the NRF could become a challenge. Additionally, how the enterprises manage these funds is not disclosed to citizens, or to their elected representatives. Therefore, what may be needed is a single account for all extractive industry revenue. This control over revenue is also important from the perspective of sterilizing the revenue inflow and implementing policies to avoid Dutch Disease.

**Oversight and transparency mechanism:** One of the key challenges for Myanmar would be to ensure improved oversight and transparency. This is critical to ensure that an NRF becomes an effective tool to achieve its policy objectives. If citizens can freely access information about how much revenue is paid to the government, and how that revenue is used, there will be less opportunity for corruption and misuse of funds, and a higher potential for revenues to be used in a manner that benefits a diverse group of people.

It is worth noting here that the Myanmar is in the process of implementing EITI, and can generate significant potential through this for strengthening the transparency mechanism. Myanmar's first EITI report has allowed the stakeholders a lot of insight into the natural resource sector (MEITI 2015). EITI data can support advocacy for reformed and responsible governance of the extractive sector, which would include improved accountability for the SOE's revenues, greater oversight of the extractive sector and transparent rules pertaining to the disclosure of contracts and beneficial owners, and sharing information with stakeholders and citizens. With professional management and strong accountability mechanisms into its functioning, along with appropriate public finance management practices, the NRF could be an effective tool for revenue management.

**Time period:** A final point is that experience has shown that establishing an NRF takes time and it can take several years for it to have sufficient funds. For example, in Norway, it was six years after it was established that the first deposits were made.<sup>35</sup> Therefore, it is important to look at these funds from a long-term perspective. In the case of Myanmar, with the government running a high fiscal deficit, which is also expected to continue for three to four years according to the IMF forecast), resource revenue may be used for meeting the deficit in the absence of strong fiscal rules and policies. In this case it would not result in any savings, as the deficit would need to be covered first before savings are made from the revenue. The fiscal rules around the use of revenue from extractive resources need to be defined such that they reduce the deficit, while also ensuring some savings for the fund.

In order to understand the spending or investment priorities of NRFs, it is first important to recognize that the establishment of NRFs is not a substitute for strengthening fiscal management or improving governance in the country. The money from the NRF can be used for multiple options; investment or strategic development funds, investment in foreign or domestic assets or spending to meet social sector priorities. However, the objective of long-term fiscal sustainability needs to be kept in mind. Even though NRFs are typically seen as savings funds, they can also be tools for spending domestically for productive investments.

When seeking to meet social sector priorities, such as education, health and physical infrastructure, or environmental protection and local development, through an NRF, it is important to have clearly defined fiscal rules that govern this spending. Weinthal and Luong (2006) suggest that for an NRF to work, the government needs an efficient, meritocratic bureaucracy, insulated from political pressure and effectively constrained by credible checks on executive authority. It is important to highlight here that the countries such as Norway, Chile and Saudi Arabia have effectively used NRFs to help stabilize their budgets, overcome Dutch Disease by sterilizing capital inflows, and created an endowment for future generations. Finally, the NRF's investment strategy must match its objectives.

With regard to spending mechanisms, a variety of strategies may be explored to share resource revenue directly with citizens, including targeted redistribution schemes (for example, transfers targeted at marginalized groups), as well as direct distribution to all citizens.

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<sup>35</sup>Fact Sheet Norway (2014) : [https://www.regjeringen.no/globalassets/upload/oed/pdf\\_filer\\_2/faktaheftet/fakta2014og/facts\\_2014\\_nett\\_.pdf](https://www.regjeringen.no/globalassets/upload/oed/pdf_filer_2/faktaheftet/fakta2014og/facts_2014_nett_.pdf) (accessed 7 December 2017)

## 5.1 SUMMARY OF FINDINGS

The review has found sufficient high-quality evidence available to suggest ways to manage mineral revenues using NRFs. Rules governing the deposit into and withdrawal of money from NRFs and those pertaining to the utilization of the money in the fund, particularly relating to investment decisions, are important and determine the extent to which an NRF is able to achieve the objectives for which it is established. These rules typically regulate the utilization of the money in the fund for spending (including spending for infrastructure that would be used to meet current development needs and/or that which would be used by future generations, thereby promoting intergenerational equity, as well as investing in high return financial assets), and saving (for intergenerational equity and for meeting unforeseen budget needs if they arise). The evidence supports following a price-contingent rule which requires that fund accumulate reserves when commodity prices are above a stipulated threshold (also called the reference value) and spend when prices are below a second specified threshold. The thresholds should be pre-announced and are typically based on an average of the price over a defined number of years (for example the previous 5 years).

NRFs are also used for meeting budget expenditures, and rules enhance the effectiveness of this utilization also. Ideally, the rules should be framed in a manner which prevents the misuse of funds by fund managers and unsustainable government expenditure.

Further, the Initial investment choices of the NRF should be conservative, liquid and low risk, especially because investment expertise may not be developed in the early stages of the fund. Developed economies may want to invest in global financial markets or use the fund to finance pension payments. However, for a low-income fragile country, NRFs could also be used to finance infrastructure and promote industrial growth. Investment rules should also cover measures to enable the diversification of the investment portfolio across developed and developing country contexts. This can allow countries to prepare for a time when non-renewable resources are depleted.

Taking the example of Norway, one of the reasons for the success of its NRF has been the clearly defined rules about how much to save, with the amount being decided through the budget process every year with the central government issuing guidelines on how to spend. The maximum amount of money that can be transferred from the fund to the central budget in order to cover the non-petroleum fiscal deficit is set with the expectation of a neutral effect on economic activities.<sup>36</sup> The fiscal rule allowed for some flexibility as it is applied to the structural non-oil deficit, which is adjusted to the economic cycle and not to the actual deficit. Utilization of the fund money is also made for investment, mostly abroad to avoid the transmission of price volatility on to the exchange rate and to create a diversified portfolio of investments with potentially higher returns.

The review also finds that the rules do not operate in silos. Even well framed rules need to be accompanied by an institutional framework which encourages compliance. These include institutional coherence, trained technocracy, and appropriate checks and balances. A clear allocation of roles and responsibilities for fund management and vigilant oversight can play a significant role in the success of NRFs. NRFs also seem to perform better in a context where there are greater constraints on the discretionary use of executive power, greater party competition and active participation of citizens in the monitoring and enforcement of transparency and accountability

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<sup>36</sup> Non-petroleum fiscal deficit refers to net state income excluding turnover and expenses related to petroleum activities, that is, the government's petroleum net cash flow.

mechanisms. Sound corporate governance (including aspects such as an independent board, professional staff, transparent reporting and independent audit) is another prerequisite for effective NRFs. Transparency measures such as clearly defined roles, publicly available information, open decision-making process, along with oversight mechanisms are important enabling factors in preventing the misuse of NRF funds and unsustainable government expenditure. These can lead to greater accountability for fund managers, reduce the possibility of the misuse of funds, and encourage compliance with fiscal rules. Interference by the executive in the management of the fund could be a hindrance to compliance with saving and spending rules. While elected representatives have the mandate to make decisions regarding public spending, investment (and other spending and saving) decisions relating to NRF fund utilization require a high amount of financial expertise and if managed incorrectly can also lead to the loss of large amounts of resource revenues.

As regards the impact of NRFs, evidence of high- and medium-quality also shows a positive impact on avoiding Dutch Disease and promoting macroeconomic stabilization with some exceptions, such as the case of Azerbaijan, where policies have led to unconditional transfers from the fund, thus undermining its stabilization role. Norway, Botswana, Chile are few examples of countries which have successfully used NRFs, along with a range of other tools for managing resource revenue and achieve these two outcomes. However, one of the key challenges for researchers is to isolate the impact of an NRF specifically, given the range of interventions which governments typically use at the same time to manage their resource revenues. There is also sufficient high- and medium-quality evidence available to show a positive impact of NRFs on the socioeconomic development and welfare outcomes. However, studies also show that some funds yield poor outcomes, mainly because of prioritization of the accumulation of assets over spending on welfare outcomes. Welfare impacts may also be limited by low stakeholder involvement and fund mismanagement.

## 5.2 LIMITATIONS OF THIS SYSTEMATIC REVIEW

Systematic reviews, especially in public health but also more recently in public policy domains, have tended to focus on studies which use quantitative methods such as randomized controlled trials (RCTs), quasi-experimental designs, or controlled before-and-after methods. This allows for aggregation and a final numerical measure of effectiveness.

In this systematic review, we did not expect these kinds of study designs as macro-economic policy interventions typically do not allow for such controlled study contexts. Further, there are very few studies which use other quantitative methods such as use of time series, cross sectional, or panel data. Thus, we rely largely on what we term qualitative and mixed study designs, which may include data to support certain arguments relating to effectiveness of NRFs but do not use these specific methods. We decided to proceed with the synthesis despite a predominance of qualitative and mixed study approaches because, firstly, we felt that it is important to learn from the best available evidence and secondly, with the increasing use of qualitative studies in systematic reviews, synthesis methods such as the configurative synthesis, which we have used, allow for the aggregation of findings from a set of qualitative or mixed methods studies.

A second limitation of this review is that isolating the impact of NRFs is challenging given that governments typically undertake a range of revenue management interventions simultaneously, and at any given times these interventions are at varied stages of implementations. In addition, even when an NRF is implemented in isolation, it is challenging to conduct a pre- and post-comparison.

Thirdly, it was challenging to aggregate findings of studies selected for synthesis as there is no standardized methodology for measuring the effectiveness of NRFs. Most studies included in the synthesis consisted of a situation analysis which included presenting a country profile including natural resource endowments, and then examining possible ways in which the resource wealth and related revenues can be managed, including through NRFs or SWFs. To enable a synthesis of these studies to answer our three review questions we tried extracting information pertaining to any of the three questions. This included extracting information on themes such as types of NRFs, their impact, and factors enabling them to be more effective. The synthesis included further identifying sub-themes in these broader questions such as impact on Dutch Disease, impact on government expenditure, and impact on welfare outcomes, among others. The emergence of a relatively standardized methodological approach for examining the impact of NRFs could create a body of literature which more readily lends itself to research synthesis in the future.

Finally, a number of studies that were included in the synthesis set did not include any description of research methods. Very few studies described data collection techniques and even fewer described data analysis approaches. However, since most studies were from academic peer-reviewed journals, or research reports/books on the topic they were included. Nonetheless, the potential for statistical interpretation of large non-experimental datasets leaves them prone to bias, and therefore the non-experimental studies included in this review need to be viewed with caution. Our quality appraisal of the studies does not extend to a re-analysis of the data, nor interrogating the models used or the assumptions within them in detail. Our quality appraisal is reliant on the extent of reporting by authors and whether they provide any responses to our review questions.

### 5.3 DIRECTIONS FOR FUTURE RESEARCH

The availability of limited quantitative studies, estimating the impact or effectiveness of NRFs suggests that additional research is required to evaluate the impact of the intervention on specific outcomes using this methodology. However, this is not to discount the insights provided by situational analyses we used for this review. Nonetheless, using some of the quantitative methods outlined in the previous section could further strengthen the basis on which policy prescriptions are made regarding NRFs.

Secondly, regardless of whether the methods are quantitative or qualitative, it would be useful to develop a relatively standardized methodological approach for analysing the impact of NRFs, given their varied objectives and institutional structures. However, as mentioned in the previous section it may be challenging to isolate the impacts of NRFs, because country contexts differ widely, and vary across time making any pre- and post-comparison difficult.

Finally, we find that most studies on the subject examine middle- or high-income country contexts, and fewer examine low-income country contexts, especially those which are political fragile and have high levels of natural resource mismanagement. With increasing use of NRFs in low-income, fragile contexts, there is a need to understand the challenges which these countries face in the management of their resource revenue in particular, and develop context-specific recommendations for them. In this review, we attempted contextualize the findings from both developed and developing country contexts for Afghanistan and Myanmar, but had to draw from a range of data sources outside the review for the contextualization as there were not enough studies on these countries specifically.

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## APPENDICES

### APPENDIX 2.1: POPULATION, INTERVENTION, COMPARISONS AND OUTCOMES (PICOS)

Language	English
Time Period	All time periods
Population (or Phenomenon or Geographical coverage)	Low- and middle-income countries experiencing political instability (as defined by the Fragile States Index) AND Natural resource-rich countries Implementing NRRM policies (either by governments at the national/sub-national level or by private companies)
Intervention	<p><i>Revenue management through:</i></p> <p><i>Generation</i> Competitive bidding; Royalties; Explicit rent taxes; Production sharing; Equity sharing)</p> <p><i>Allocation and distribution</i> Resource funds; Direct transfers to citizens; Budget allocation to specific sectors or sub-national governments or regions.</p> <p><i>Transparency and accountability</i> Transparency in rules and revenue management processes; Regular auditing; Independent regulators; Effective legal sanctions</p>
Comparison	<p>Countries which have governance mechanisms for NRRM and those which do not</p> <p>Before and after: Changes in revenue and other outcomes after a country introduces a new governance mechanism for NRRM</p>
Outcomes	<p>Natural resource revenue and outputs</p> <p>Allocative efficiency</p> <p>Reporting practices</p> <p>Institutional and legal setting</p> <p>Transparency and accountability indicators</p> <p>Controlling macroeconomic instability</p>
Study Designs	All study designs

## APPENDIX 2.2: INCLUSION AND EXCLUSION CRITERIA

### (A) Title and abstract screening (with full text used as needed)

Language	Available in English?	Yes → Continue No → Exclude
Date of Publication	Include all	-
Population	Does the study concern one or more countries listed in Appendix 2.3 as low- or middle-income countries which are considered fragile or any country which is rich in natural resources	Yes or maybe → Continue No → Exclude
Intervention	Does the study investigate or assess interventions related to natural resource revenue management (NRRM) through Generation, Allocation and distribution, Transparency and accountability or Other, at the national or sub-national level	Yes or maybe → Include No → Exclude
Comparison	Include all	-
Outcome	Include all	-
Study Design	Include all	-

### (B) Full-text screening

Full-text screening will be done for those studies where abstracts do not provide sufficient information to determine inclusion or exclusion.

## APPENDIX 2.3: INCLUDED COUNTRIES

LMIC countries which are identified as Fragile<sup>37</sup> or countries which are considered resource rich (International Monetary Fund 2012) are included. India is an exception. It is included as it is a significant country in terms of its size, comparative economic might and historical and cultural relevance to the region. Also since the contextualization in the systematic review has to be done for the South Asian Region, particularly Afghanistan and Myanmar, it makes sense to include all countries of this region. It is also important to note here that there are many geographic regions or states in India which are resource-rich (as measured in terms of the contribution of export earnings from mineral resources) and are bigger than most of the countries identified using the criteria of LMIC + fragile and resource-rich.

Country	Income Group	Fragility	Resource Rich	Selected?
Afghanistan	LIC	High Fragility	Yes	Yes
Albania	UMIC	-	Yes	Yes
Algeria	UMIC	-	Yes	Yes
American Samoa	UMIC	-	-	No
Andorra	HIC	-	-	No
Angola	UMIC	Moderate Fragility	Yes	Yes
Antigua and Barbuda	HIC	-	-	No
Argentina	HIC	-	-	No
Armenia	LMIC	-	-	No
Aruba	HIC	-	-	No
Australia	HIC	-	-	No
Austria	HIC	-	-	No
Azerbaijan	UMIC	Moderate Fragility	Yes	Yes
Bahamas, The	HIC	-	-	No
Bahrain	HIC	-	Yes	Yes

<sup>37</sup><http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/international-development-committee/dfids-allocation-of-resources/written/28276.pdf> (accessed 29 November 2017).

Country	Income Group	Fragility	Resource Rich	Selected?
Bangladesh	LMIC	Moderate Fragility	-	Yes
Barbados	HIC	-	-	No
Belarus	UMIC	Low Fragility	-	Yes
Belgium	HIC	-	-	No
Belize	UMIC	-	-	No
Benin	LIC	-	-	No
Bermuda	HIC	-	-	No
Bhutan	LMIC	-	-	No
Bolivia	LMIC	-	Yes	Yes
Bosnia and Herzegovina	UMIC	-	-	No
Botswana	UMIC	-	Yes	Yes
Brazil	UMIC	-	-	No
Brunei Darusalam	HIC	-	Yes	Yes
Bulgaria	UMIC	-	-	No
Burkina Faso	LIC	-	-	No
Burundi	LIC	High Fragility	-	Yes
Cabo Verde	LMIC	-	-	No
Cambodia	LIC	Low Fragility	-	Yes
Cameroon	LMIC	Low Fragility	Yes	Yes
Canada	HIC	-	-	No
Cayman Islands	HIC	-	-	No
Central African Republic	LIC	High Fragility	Yes	Yes

Country	Income Group	Fragility	Resource Rich	Selected?
Chad	LIC	High Fragility	Yes	Yes
Channel Islands	HIC	-	-	No
Chile	HIC	-	Yes	Yes
China	UMIC	-	-	No
Colombia	UMIC	Low Fragility	-	Yes
Comoros	LIC	-	-	No
Congo, Dem. Rep	LIC	High Fragility	Yes	Yes
Congo, Rep. of	LMIC	Low Fragility	Yes	Yes
Costa Rica	UMIC	-	-	No
Côte d'Ivoire	LMIC	Low Fragility	Yes	Yes
Croatia	HIC	-	-	No
Cuba	UMIC	-	-	No
Curaçao	HIC	-	-	No
Cyprus	HIC	-	-	No
Czech Republic	HIC	-	-	No
Denmark	HIC	-	-	No
Djibouti	LMIC	Low Fragility	-	Yes
Dominica	UMIC	-	-	No
Dominican Republic	UMIC	-	-	No
Ecuador	UMIC	-	Yes	Yes
Egypt, Arab Rep.	LMIC	Moderate Fragility	-	Yes
El Salvador	LMIC	-	-	No

Country	Income Group	Fragility	Resource Rich	Selected?
Eritrea	LIC	High Fragility	-	Yes
Estonia	HIC	-	-	No
Ethiopia	LIC	Moderate Fragility	-	Yes
Equatorial Guinea	HIC	-	Yes	Yes
Faroe Islands	HIC	-	-	No
Fiji	UMIC	-	-	No
Finland	HIC	-	-	No
France	HIC	-	-	No
French Polynesia	HIC	-	-	No
Gabon	UMIC	-	Yes	Yes
Gambia, The	LIC	-	-	No
Georgia	LMIC	-	-	No
Germany	HIC	-	-	No
Ghana	LMIC	-	Yes	Yes
Greece	HIC	-	-	No
Greenland	HIC	-	-	No
Grenada	UMIC	-	-	No
Guam	HIC	-	-	No
Guatemala	LMIC	-	Yes	Yes
Guinea	LIC	Moderate Fragility	Yes	Yes
Guinea-Bissau	LIC	Moderate Fragility	-	Yes
Guyana	LMIC	-	Yes	Yes

Country	Income Group	Fragility	Resource Rich	Selected?
Haiti	LIC	Moderate Fragility	-	Yes
Honduras	LMIC	Low Fragility	-	Yes
Hong Kong SAR, China	HIC	-	-	No
Hungary	HIC	-	-	No
Iceland	HIC	-	-	No
India	LMIC	-	-	No
Indonesia	LMIC	-	Yes	Yes
Iran, Islamic Rep.	UMIC	High Fragility	Yes	Yes
Iraq	UMIC	High Fragility	Yes	Yes
Ireland	HIC	-	-	No
Isle of Man	HIC	-	-	No
Israel	HIC	-	-	No
Italy	HIC	-	-	No
Jamaica	UMIC	-	-	No
Japan	HIC	-	-	No
Jordan	UMIC	-	-	No
Kazakhstan	UMIC	-	Yes	Yes
Kenya	LMIC	Moderate Fragility	-	Yes
Kiribati	LMIC	-	-	No
Korea, Dem. People's Rep.	LIC	High Fragility	-	Yes
Korea, Rep.	HIC	-	-	No
Kosovo	LMIC	-	-	No

Country	Income Group	Fragility	Resource Rich	Selected?
Kuwait	HIC	-	-	No
Kyrgyz Republic	LMIC	Moderate Fragility	Yes	Yes
Lao PDR	LMIC	-	Yes	Yes
Latvia	HIC	-	-	No
Lebanon	UMIC	Moderate Fragility	-	Yes
Lesotho	LMIC	-	-	No
Liberia	LIC	Low Fragility	Yes	Yes
Libya	UMIC	High Fragility	Yes	Yes
Liechtenstein	HIC	-	-	No
Lithuania	HIC	-	-	No
Luxembourg	HIC	-	-	No
Macao SAR, China	HIC	-	-	No
Macedonia, FYR	UMIC	-	-	No
Madagascar	LIC	Low Fragility	Yes	Yes
Malawi	LIC	-	-	No
Malaysia	UMIC	-	-	No
Maldives	UMIC	-	-	No
Mali	LIC	Moderate Fragility	Yes	Yes
Malta	HIC	-	-	No
Marshall Islands	UMIC	-	-	No
Mauritania	LMIC	Low Fragility	Yes	Yes
Mauritius	UMIC	-	-	No

Country	Income Group	Fragility	Resource Rich	Selected?
Mexico	UMIC	-	Yes	Yes
Micronesia, Federal States	LMIC	-	-	No
Monaco	HIC	-	-	No
Moldova	LMIC	-	-	No
Mongolia	UMIC	-	Yes	Yes
Montenegro	UMIC	-	-	No
Morocco	LMIC	-	-	No
Mozambique	LIC	-	Yes	Yes
Myanmar	LMIC	High Fragility	-	Yes
Namibia	UMIC	-	-	No
Nepal	LIC	Low Fragility	-	Yes
Netherlands	HIC	-	-	No
New Caledonia	HIC	-	-	No
New Zealand	HIC	-	-	No
Nicaragua	LMIC	-	-	No
Niger	LIC	Low Fragility	Yes	Yes
Nigeria	LMIC	Moderate Fragility	Yes	Yes
Northern Mariana Islands	HIC	-	-	No
Norway	HIC	-	Yes	Yes
Oman	HIC	-	Yes	Yes
Pakistan	LMIC	High Fragility	-	Yes
Palau	UMIC	-	-	No

Country	Income Group	Fragility	Resource Rich	Selected?
Panama	UMIC	-	-	No
Papua New Guinea	LMIC	-	Yes	Yes
Paraguay	UMIC	Low Fragility	-	Yes
Peru	UMIC	-	Yes	Yes
Philippines	LMIC	-	-	No
Poland	HIC	-	-	No
Portugal	HIC	-	-	No
Puerto Rico	HIC	-	-	No
Qatar	HIC	-	Yes	Yes
Romania	UMIC	-	-	No
Russian Federation	HIC	-	Yes	Yes
Rwanda	LIC	-	-	No
Samoa	LMIC	-	-	No
San Marino	HIC	-	-	No
São Tomé and Príncipe	LMIC	-	Yes	Yes
Saudi Arabia	HIC	-	Yes	Yes
Senegal	LMIC	-	-	No
Serbia	UMIC	-	-	No
Seychelles	HIC	-	-	No
Sierra Leone	LIC	Low Fragility	Yes	Yes
Singapore	HIC	-	-	No
Sint Maarten (Dutch part)	HIC	-	-	No

Country	Income Group	Fragility	Resource Rich	Selected?
Slovak Republic	HIC	-	-	No
Slovenia	HIC	-	-	No
Solomon Islands	LMIC	-	-	No
Somalia	LIC	High Fragility	-	Yes
South Africa	UMIC	-	-	No
South Sudan	LIC	High Fragility	-	Yes
Spain	HIC	-	-	No
Sri Lanka	LMIC	-	-	No
St. Kitts and Nevis	HIC	-	-	No
St. Lucia	UMIC	-	-	No
St. Martin (French part)	HIC	-	-	No
St. Vincent and the Grenadines	UMIC	-	-	No
Sudan	LMIC	High Fragility	Yes	Yes
Suriname	UMIC	-	Yes	Yes
Swaziland	LMIC	-	-	No
Sweden	HIC	-	-	No
Switzerland	HIC	-	-	No
Syrian Arab Republic	LMIC	High Fragility	Yes	
Taiwan, China	HIC	-	-	No
Tajikistan	LMIC	Moderate Fragility	-	Yes
Tanzania	LIC	-	Yes	Yes
Thailand	UMIC	-	-	No

Country	Income Group	Fragility	Resource Rich	Selected?
Timor-Leste	LMIC	Low Fragility	Yes	Yes
Togo	LIC	-	Yes	Yes
Tonga	UMIC	-	-	No
Trinidad and Tobago	HIC	-	Yes	Yes
Tunisia	UMIC	-	-	No
Turkey	UMIC	-	-	No
Turks and Caicos Islands	HIC	-	-	No
Turkmenistan	UMIC	Moderate Fragility	Yes	Yes
Tuvalu	UMIC	-	-	No
Uganda	LIC	Low Fragility	Yes	Yes
Ukraine	LMIC	Low Fragility	-	Yes
United Arab Emirates	HIC	-	Yes	Yes
United Kingdom	HIC	-	-	No
United States	HIC	-	-	No
Uruguay	HIC	-	-	No
Uzbekistan	LMIC	Moderate Fragility	Yes	Yes
Vanuatu	LMIC	-	-	No
Venezuela, RB	HIC	Moderate Fragility	Yes	Yes
Vietnam	LMIC	-	Yes	Yes
Virgin Islands (U.S.)	HIC	-	-	No
West Bank and Gaza	LMIC	-	-	No
Yemen, Rep.	LMIC	High Fragility	Yes	Yes

Country	Income Group	Fragility	Resource Rich	Selected?
Zambia	LMIC	-	Yes	Yes
Zimbabwe	LIC	Moderate Fragility	-	Yes

## APPENDIX 2.4: SEARCH STRATEGY FOR ELECTRONIC DATABASES AND WEBSITES

To find relevant research literature to answer the review question, we adopted a broad systematic search strategy.

The main search terms are developed from the review questions, the inclusion criteria and the studies identified in the scoping exercise. Search strings were developed for each database using combinations of the main keywords and their synonyms. Boolean operators such as AND, OR and NOT were used to further refine the search. We also used the truncation and wildcard operators for searching multiple forms of a word. Searches included the following fields: title, abstract, keywords and full text.

### #Search 1: Natural resources related terms

AB, TI('Natural resource\*' OR Mineral\* OR Metal\* OR Coal OR Oil OR Gas\* OR Gasoline\* OR Petrol\* OR 'Fossil Fuel\*' OR Mining OR Biofuel\*)

AND

### #Search 2: Revenue management related terms

AB, TI(revenue management OR mining royalty\* OR mineral royalty\* OR mining tax\* OR 'Sovereign wealth fund\*' OR 'SWF' OR 'Direct cash transfer' OR Resource fund\* OR Resource revenue\* OR Resource asset\* OR 'Resource rich\*' OR 'Resource Nationalism' OR 'Welfare fund\*' OR 'government bond\*' OR 'sovereign bond\*' OR 'Stabilization Fund\*' OR 'Savings Fund\*' OR 'Development Fund\*' OR 'Resource curse\*' OR 'dutch Disease\*')

AND

### #Search 3: Country-specific terms

(Afghanistan OR Albania OR Algeria OR Angola OR Azerbaijan OR Bahrain OR bangladesh OR Belarus OR Bolivia OR Botswana OR Brunei Darusalam OR Burundi OR Cambodia OR cameron OR Central African Republic OR Chad OR Chile OR Colombia OR Congo OR Djibouti OR Ecuador OR Egypt OR Equatorial guinea OR Eritrea OR Ethiopia OR Gabon OR Ghana OR Guatemala OR guinea OR Guyana OR Haiti OR Honduras OR Indonesia OR Iran OR Iraq OR Kazakhstan OR Kenya OR Korea OR Kyrgyz OR Lao OR Lebanon OR Liberia OR Libya OR Madagascar OR Mali OR Mauritania OR Mexico OR Mongolia OR Mozambique OR Myanmar OR Nepal OR Niger OR Nigeria OR Norway OR Oman OR Pakistan OR Papua New guinea OR Paraguay OR Peru OR Qatar OR Russia Principe OR Saudi Arabia OR Sierra Leone OR Somalia OR South Sudan OR Sudan OR Suriname OR Syria Arab Republic OR Tajikistan OR Tanzania OR timorleste OR Togo OR Trinidad OR Tobago OR Turkmenistan OR Uganda OR Ukraine OR United Arab Emirates OR Uzbekistan OR Venezuela OR vietnam OR Yemen OR Zambia OR Zimbabwe OR guinean-Bissau OR São Tome OR Côte D'Ivoire OR 'fragile countr\*' OR 'fragile state\*' OR 'fragile nation\*' OR 'fragile government\*' OR 'Low income countr\*' OR 'Lower middle income countr\*' OR 'Upper middle income countr\*' OR 'LMIC\*')

We limited the search to the following countries:

1. Fragile, low- and -middle income countries
2. Resource-rich countries.

### Key databases and websites used

## 1. Bibliographic databases

1	EconLit ( <a href="https://www.ebscohost.com/academic/econlit">https://www.ebscohost.com/academic/econlit</a> )
2	International Bibliography of the Social Sciences (IBSS) (1951 – current) ( <a href="http://search.proquest.com/ibss">http://search.proquest.com/ibss</a> )
3	PAIS Index (1914 – current) ( <a href="http://search.proquest.com/pais">http://search.proquest.com/pais</a> )
4	GEOBASE ( <a href="http://www.engineeringvillage.com">www.engineeringvillage.com</a> )
5	GeoRef ( <a href="http://www.engineeringvillage.com">www.engineeringvillage.com</a> )
6	Political Science Complete ( <a href="https://www.ebscohost.com/academic/political-science-complete">https://www.ebscohost.com/academic/political-science-complete</a> )
7	World Politics Review ( <a href="https://www.ebscohost.com">https://www.ebscohost.com</a> )
8	SocINDEX( <a href="https://www.ebscohost.com/academic/socindex-with-full-text">https://www.ebscohost.com/academic/socindex-with-full-text</a> )
9	World Bank group e-library ( <a href="http://elibrary.worldbank.org/action/doSearch?displaySummary=true&amp;startPage=0&amp;target=default&amp;t">http://elibrary.worldbank.org/action/doSearch?displaySummary=true&amp;startPage=0&amp;target=default&amp;t</a> )
10	ScienceDirect ( <a href="http://www.sciencedirect.com/">http://www.sciencedirect.com/</a> )
11	Web of Science ( <a href="http://www.webofknowledge.com/">www.webofknowledge.com/</a> )
12	JSTOR ( <a href="http://www.jstor.org">www.jstor.org</a> )
13	IDEAS: Economics and Finance Research –RePEc ( <a href="https://ideas.repec.org/">https://ideas.repec.org/</a> )
14	Knimbus ( <a href="http://knimbus.com/TERI">http://knimbus.com/TERI</a> )

## 2. WEBSITES OF INTERNATIONAL AGENCIES AND CONSORTIUM WORKING IN THE FIELD OF INTERNATIONAL DEVELOPMENT

UNESDOC, United Nations Economic Commission for Africa, World Bank, International Monetary Fund

## 3. WEBSITES OF DEVELOPMENT AGENCIES

IDRC, OECD, Asian Development Bank, Africa Development Bank

## 4. WEBSITES OF DEVELOPMENT THINK TANKS, NETWORKS AND RESEARCH INSTITUTES

National Bureau of Economic Research, ELDIS, SSRN, U4 Anti-corruption Research Network, Evidence and Lesson from Latin America, GDNNet, Natural Resource Governance Institute

## 5. OTHER SOURCES OF DIGITAL OPEN ACCESS RESOURCES

Google Scholar, ResearchGate, OAlster

APPENDIX 2.5: DATA CODING TOOL – SCOPING

Study ID	Name of authors, year of publication	
Type of document	Journal article; Organizational report (Government, NGO, IGOs and Other), Independent research report, Master or doctoral thesis, Other	
Year of publication	Year of publication	
Aim of study	Investigate acceptance, feasibility or implementation of the Intervention / Assess Cause or Harm / Assess impact / Other	
Country/Region	Please specify Multi-region No country specifically mentioned	
Population	Highly fragile/Fragile/Moderately Fragile/not Fragile Resource rich/Not resource rich Low Income / Lower Middle Income / Upper Middle Income / High Income Multi-country	
Intervention	Formal name of the intervention?	Name if stated OR No
	Type of NRRM intervention	1. Generation 2. Allocation and distribution: Natural resource fund related Transfers to sub-national levels of government Direct cash transfers Others 3. Transparency and accountability 4. Other(5. Unclear
Outcome	What are the types of outcomes?	1. Natural resource revenue and outputs Production volumes and values: Changes in share of government in natural resource revenue Returns on natural resource funds 2. Allocative efficiency Sharing of natural resource revenue with sub-national governments Allocation of natural resource revenue to specific sectors Transfer of revenue to natural resource funds Direct transfers to citizens Subsidies Intergenerational allocative efficiency 3. Institutional and legal setting: Clarity in revenue collection Sub-national transfers clearly defined Others 4. Transparency and accountability indicators 5. Others 6. No specific outcome studied

Study design	What are the study designs?	Qualitative: Case study (one country) Case study (multi-country) Interviews / oral history Others Quantitative: Time series Cross-sectional Panel data Descriptive/Correlational Others: Mixed Others
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## APPENDIX 2.6: POTENTIAL USERS

Potential users for the systematic review include:

- Relevant government entities (ministries and departments) dealing with mineral resources; ministries of finance, ministry of environment, forest and climate change
- Sector organizations/agencies working on community development
- Agencies implementing public investment projects
- Businesses and shareholders, state-owned enterprises
- Wider public
- Local community and other beneficiaries
- Bilateral and multilateral organizations: DFID and the overseas development departments of other countries, the International Finance Corporation, the World Bank.

APPENDIX 3.1: SUMMARIES OF STUDIES USED IN THE SYNTHESIS

Author (year)	Country	Aim(s)	Methodology	Intervention(s) studied	Outcome(s) examined
Acosta (2012)	Resource-rich countries- Botswana, Zambia, Nigeria, Indonesia, Peru, Mongolia, Ghana, South Sudan	Understand how resource revenues can be used to promote socio-economic development, with a focus on education	Multiple country case studies	Natural resource fund Direct cash transfers Social sector spending	Social sector spending Fiscal stabilization Inter-generational equity
Afanasiev (2004)	Russia, Norway, Chile and Venezuela	Critically examine the features of a proposed stabilization fund in Russia	Multiple country case studies	Natural resource fund	Fiscal stabilization Inter-generational equity
Ahmadov (2011)	Azerbaijan, Kazakhstan, Russia, Norway	Examine financial management and transparency aspects of SWFs in the Caspian region, possible risks to SWF financial performance and investments	Multiple country case study	Sovereign wealth funds	Financing development projects Fiscal stabilization Macro-economic stability Corruption levels
Aslanli (2015)	Azerbaijan	Examine whether Azerbaijan's NRF has been able to promote fiscal sustainability	Single country case study	Natural resource fund	Fiscal stabilization Inter-generational equity Economic development
Azhgaliyeva (2014)	Kazakhstan	Examine if Kazakhstan's NRF has been able to stabilize government expenditure and exchange rates	Single country case study, using an empirical model	Natural resource fund	Fiscal stabilization, specifically government expenditure and exchange rates
Bahl and Tumennasan (2002)	Indonesia	Examine policy options for sharing resource revenue	Single country case study	NRF with sub-national spending Vertical and horizontal resource revenue	Equitable sharing of resource revenue with sub-national levels Fiscal stabilization Inter-generational

Author (year)	Country	Aim(s)	Methodology	Intervention(s) studied	Outcome(s) examined
				sharing Local taxes and charges Autonomy for resource rich regions	equity
Bauer (2013)	Multiple countries	Provide recommendations on how sub-national governments can manage resource revenues	Multiple country case studies	Natural resource fund Fiscal rules Public finance management	Fiscal stabilization Economic development Quality of public spending
Bauer (2014)	Multiple countries	Understand how to make NRFs more effective through examining institutional structure, fiscal rules, investment options, transparency and oversight mechanisms	Multiple country case studies	Natural resource fund	Fiscal stabilization Inter-generational equity Economic development Mitigating Dutch Disease Quality of public spending
Chevrier (2009)	Russia	Examine the functioning of the Reserve Fund and National Welfare Fund	Single country case study	Natural resource fund	Fiscal stabilization Inter-generational equity Financing pension funds
Claessens and Varangis (1994)	Venezuela	Examine market based instruments to ensure sustainability of Venezuela's NRF	Single country case study	Natural resource funds	Fiscal stabilization
Drysdale (2008)	Timor-Leste	Examine five principles for effective natural resource revenue management using the case of Timor-Leste	Single country case study	Natural resource fund	Poverty alleviation Inter-generational equity Returns from NRF
Ekeli and Sy (2011)	Norway	Draw lessons from Norway's SWF for asset	Single country case study	Natural resource fund	Fiscal stabilization Inter-generational

Author (year)	Country	Aim(s)	Methodology	Intervention(s) studied	Outcome(s) examined
		allocation in other resource rich countries			equity
Etemad(2014)	Iran, Kuwait, Norway, Algeria, Mexico, Qatar	Examine the outcomes of sovereign wealth funds on certain macro-economic outcomes	Panel data econometric analysis	Natural resource fund	Consumer price index Broad money Real exchange rate Real government spending
Fasano (2000)	Norway, Venezuela, Alaska (USA), Chile, Kuwait, Oman	Examine the functioning of NRFs in six countries	Multiple country case study	Natural resource fund	Fiscal stabilization Inter-generation equity Social sector spending Smoothing public expenditure
Gelb et al. (2014)	Multiple	Examine if SWFs should invest domestically or in foreign assets and if they should be used to finance development needs	Multiple country case study	Natural resource fund	Increasing domestic investments
Hannesson (2013)	Norway	Examine issues with the Norwegian NRF's fiscal rules and their implementation	Single country case study	Natural resource fund	Savings from resource revenues
Havro. and Santiso (2011)	Norway and Chile	Examine the role of international development policy in preventing the resource curse	Multiple country case study	Institutional arrangements Technocratic ability Checks and balances	Fiscal stabilization
Hjort (2006)	Botswana, Indonesia, Norway	Examine if citizen revenue distribution funds ought to be established in resource rich developing countries	Multiple country case study	Citizen revenue distribution funds	Impact on Dutch disease Income inequality and private consumption Provision of public goods

Author (year)	Country	Aim(s)	Methodology	Intervention(s) studied	Outcome(s) examined
Johnson(2012)	Chile, Venezuela	Examine the role of political institutions in managing resource revenues	Multiple country case study	Natural resource funds	Fiscal stability
Kalyuzhnova (2006)	Azerbaijan, Kazakhstan	Examine the role of governance in NRFs established in Azerbaijan and Kazakhstan	Multiple country case study	Natural resource funds	Fiscal stabilization Smoothing public expenditure Social and economic development Inter-generational equity
Kemme(2012)	Kazakhstan	Examines issues related to NRFs, specifically state ownership and transparency	Single country case study	Natural resource funds	Fiscal stabilization Smoothing public expenditure Social and economic development
Korinek (2013a)	Botswana	Examine key policies used by Botswana in the management of its mineral resources	Single country case study	Natural resource funds Licensing Taxation Beneficiation	Social and economic development Smoothing public expenditure Diversification
Korinek (2013b)	Chile	Identification of good practices in mining regulation in Chile	Single country case study	Taxation Revenue management Strategies to promote diversification	Economic development Fiscal stabilization Smoothing government expenditures
Korinek (2015)	Colombia, Peru	Examine key policies used by Colombia and Peru in the management of their mineral resources	Multiple country case study	Taxation Revenue management strategy (including natural resource fund in Colombia) Strategies to combat illegal mining	Social and economic development Revenue sharing with mining regions Smoothing public expenditure

Author (year)	Country	Aim(s)	Methodology	Intervention(s) studied	Outcome(s) examined
Landon and Smith (2015)	Focuses on Petroleum producing regions; with examples from Venezuela and Chile	Examine the impact of natural resource funds on welfare outcomes	Quantitative (Monte Carlo techniques)	Natural resource funds	Welfare outcomes
Lassourd and Bauer (2014)	Uganda	Examine a range of fiscal rules for revenue management	Economic Modelling	Fiscal rules governing resource revenue Natural resource funds	Fiscal stabilization Smoothing government expenditure Savings and inter-generational equity
Lohmus and Ter-Martirosyan (2008)	Norway, Alaska, Kazakhstan, and Azerbaijan	Understand key challenges relating to fiscal policies in resource rich contexts	Single country case study	Fiscal rules Natural resource funds	Fiscal stabilization
Luecke (2011)	Azerbaijan, Kazakhstan, Norway	Examine if NRFs of Azerbaijan and Kazakhstan promote sustainable use of their oil revenues	Multiple country case study	Natural resource funds	Fiscal stabilization Inter-generational equity Transparency
Mahmudov. (2002)	Azerbaijan, Kazakhstan	Examine the effectiveness of NRFs in Azerbaijan and Kazakhstan	Multiple country case study	Natural resource funds	Dutch disease Inter-generational equity
McKechnie (2013)	Timor-Leste	Examine key issues with the functioning of Timor-Leste's NRF	Single country case study	Natural resource funds	Fiscal stabilization Inter-generational equity
Meggison and Fotak. (2015)	25 countries which have employed SWF since 2008	Examine how SWFs allocate resources and the impact of SWF investment on target firm performance	Multiple country case study	Sovereign wealth funds (including natural resource funds)	Performance of firms which SWFs invest in Allocation of SWF funds across sectors
Overseas Development Institute	Multiple countries (Kazakhstan,	Examine international experiences in	Multiple country case study	Economic and fiscal policies including	Smoothing government expenditure

Author (year)	Country	Aim(s)	Methodology	Intervention(s) studied	Outcome(s) examined
(2006)	Timor L'Este, Nigeria, Norway, Russia, São Tomé and Príncipe, Vietnam)	resource revenue management		natural resource funds	Dutch Disease Promoting productive investment Reducing corruption
Ploeg (2014)	Multiple countries	Examine the role of SWFs in inter-generational equity and fiscal stabilization, with a focus on permanent income hypothesis, the Hotelling rule and the Hartwick rule.	Economic modelling	Fiscal rules Sovereign Wealth Funds	Fiscal stabilization Inter-generational equity Domestic investment
Ramírez-Cendrero and Wirth (2016)	Norway	Examine revenue management policies and institutions in Norway	Single country case study	Natural resource funds State-owned enterprises Institutional framework Economic policies	Dutch disease Fiscal stabilization Inter-generational equity
Rios-Morales et al. (2011)	Gulf oil producing countries	Examine the role of SWFs, especially from the Gulf region, in sustaining global economies	Descriptive and comparative analysis	Sovereign wealth funds	Global levels of Foreign Direct Investment
Sovacool (2016)	Sao Tome and Principe (STP)	Examines policies related to STS's NRF and related revenue management policies	Single country case study	Natural resource funds	Diversification of economy Inflation levels Poverty reduction Reducing corruption
Sugawara (2014)	Multiple countries; Data from 68 countries	Examine the effect of multiple stabilization funds on volatility of government expenditure	Panel (data) analysis	Natural resource funds	Smoothing government expenditures

Author (year)	Country	Aim(s)	Methodology	Intervention(s) studied	Outcome(s) examined
Tsani (2013)	Sample of 27 countries rich in non-renewable resources such as fuels, ores, metals and minerals	Examine the impact on NRFs on governance and institutional quality	Regression analysis	Natural resource funds	Governance Institutional quality
van Ingen et al (2014)	Norway, Nigeria	Compare fiscal and revenue management policies in Norway and Nigeria and draw lessons for Nigeria	Multiple country case study	Natural resource fund Public investment management systems	Fiscal stabilization Smoothing public expenditure Economic development
Wills (2015)	Capital Abundant and developed economies like the UAE, the Netherlands, Norway and Australia and Capital scarce and developing economies like Ghana, Iraq, Nigeria	Examine how capital scarce countries should manage resource revenues	Economic modelling	Natural resource funds	Domestic investment Fiscal stabilization Inter-generational equity
Yücesoy (2013)	Azerbaijan	Examine the extent to which Azerbaijan's NRF has been able to promote economic diversification	Single country case study	Natural resource funds	Economic diversification