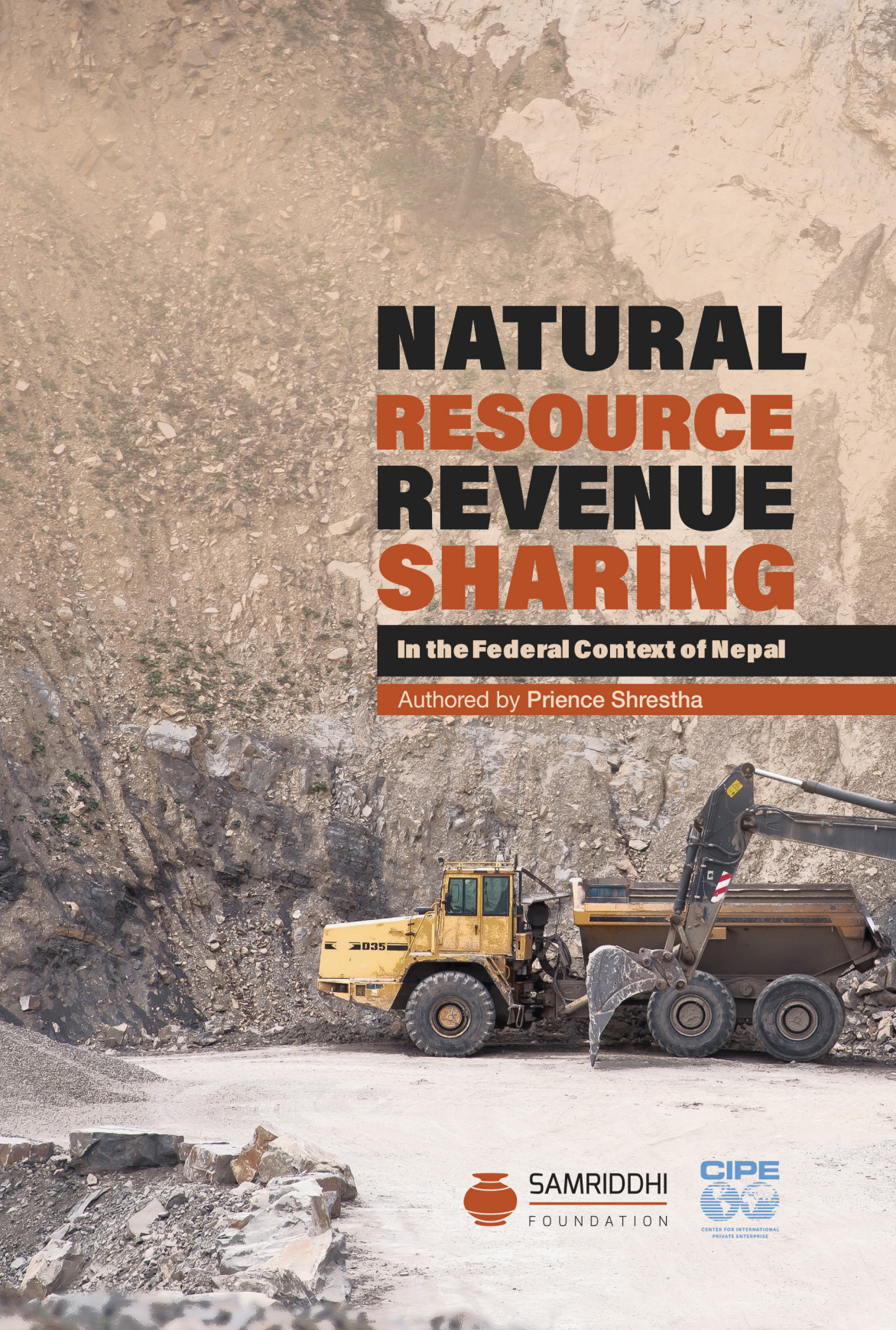
NATURAL RESOURCE REVENUE SHARING

In the Federal Context of Nepal

Authored by Prience Shrestha



SAMRIDDHI FOUNDATION

CIPE
CENTER FOR INTERNATIONAL PRIVATE ENTERPRISE

NATURAL RESOURCE REVENUE SHARING
In the Federal Context of Nepal

Authored by **Prience Shrestha**

SAMRIDDHI FOUNDATION

CIPE
CENTER FOR INTERNATIONAL PRIVATE ENTERPRISE

Published by
Samriddhi Foundation
664, Bhimsengola Marga, Minbhawan Kharibot, Kathmandu, Nepal
Tel. : (+977)-1-446-4616, 448-4016
E-mail: info@samriddhi.org
Website: www.samriddhi.org

About the Author

Prience Shrestha reserves interest in areas of macroeconomics, environmental economics, resource governance and development economics. He has produced a number of research papers and newspaper articles in areas of promoting MSMEs, federalism, infrastructure development, international development, natural resource governance and macroeconomics. He holds future research interest in areas of water resource governance for ensuring sustainable development and secured livelihood of local and regional communities across the diverse physiographic zones of Nepal.

Acknowledgements

I would like to extend my sincere gratitude to Mr. Ram Prasad Ghimire, former Director-General of Department of Mines and Geology, Mr. Jay Raj Ghimire, former Deputy Director-General and Spokesperson of Department of Mines and Geology, Ms. Nisha Rijal, Senior Divisional Engineer (SDE) and Information Officer at Department of Electricity Development, Mr. Janak Kumar Jha, Economist at the Water and Energy Commission Secretariat of the Ministry of Energy, Water Resource and Irrigation, Mr. Ram Chandra Dangal, former Joint Secretary of the Natural Resource Operations and Royalty Sharing Head Division of the National Natural Resource and Fiscal Commission, Mr. Parshuram Pokhrel, Planning Officer at the Energy, Water Resources, Irrigation, Forests and Environment Section of the National Planning Commission, Dr. Hari Sharma Neupane, Senior Researcher and Head of Research Department at Policy Research Institute, Dr. Dhurba Bhandari, former Senior Economist at Institute of Integrated Development Studies, Prof. Dr. Ishwor Gautam, former Vice Chairperson of Provincial Planning Commission of Lumbini, Mr. Dibya Raj Pokhrel, former Under-Secretary at Ministry of Economic Affairs and Planning of Karnali Province, Mr. Shyam Kumar Basnet, Vice Chairperson of Provincial Planning Commission of Bagmati, Mr. Kul Prasad Pandey, Assistant Professor at Tribhuwan University, and Er. Arun Rajauria, Director at Vision Energy and Power Private Limited for providing me valuable feedback and information during the stakeholder consultations while this study was being conducted. Their insights greatly helped me navigate through the new territories that this paper required me to venture into given Nepal's recent experience with governance of natural resources and resource revenues in the federal context of Nepal. Lastly,

I would also like to thank Mr. Ranjan Sapkota for his valuable assistance in gathering strategic resources to develop an entire chapter of this study concerning international practice of resource revenue governance across the world.

This paper is also a result of constant dedication and support provided by the team at Samriddhi Foundation who continually helped in conducting the research, building strategic networks, writing, editing, and proofreading the paper.

I thank my colleagues at Samriddhi Foundation for providing me much needed inspiration, and specifically Mr. Akash Shrestha for providing me editorial support to help build this paper, and Mr. Roshan Basnet for the layout, design and publication support.

Lastly, I would like to thank Center for International Private Enterprise (CIPE) for their feedback and generous funding support for the research project.

Abbreviations and Acronyms

CDF:	Community Development Fund
CMD:	Center for Humanitarian Dialogue
COAG:	Council of Australian Governments
CRA:	Commission for Revenue Allocation (Kenya)
CSR:	Corporate Social Responsibility
Cu. ft:	Cubic feet
DMG:	Department of Mines and Geology
DoED:	Department of Electricity Development
EIA:	Environment Impact Assessment
EITI:	Extractive Industry Transparency Initiative
FCGO:	Financial Comptroller General Office
GDP:	Gross Domestic Product
GoN:	Government of Nepal
GST:	Goods and Service Tax
IEE:	Initial Environment Examination
IFG:	Iraq Federal Government
IGFA:	Intergovernmental Fiscal Arrangement

IIDS:	Institute of Integrated Development Studies
IOC:	Independent Oil Corporation
ISIC:	International Standard Industrial Classification
KII:	Key Informant Interview
KRG:	Kurdish Regional Government
KRI:	Kurdish Region of Iraq
KV:	Kilo Volt
KVDWSMB:	Kathmandu Valley Drinking Water Supply Management Board
KVWMB:	Kathmandu Valley Water Management Board
Kw h:	Kilo Watt Hour
LGO:	Local Government Operations
MDC:	Mine Development Committee
MoEAP:	Ministry of Economic Affairs and Planning
MoICS:	Ministry of Industry, Commerce, and Supplies
MoO:	Ministry of Oil (Iraq)
MoU:	Memorandum of Understanding
MRDC:	Mineral Resource Development Center
MW:	Mega Watt
NFB:	Net Fiscal Benefit
NNRFC:	National Natural Resource Fiscal Commission
NRGI:	Natural Resource Governance Institute

NT:	Northwestern Territories
OECD:	Organization of Economic Cooperation and Development
PEPP:	Petroleum Exploration Promotion Project
PRC:	People's Republic of China
PRI:	Policy Research Institute
PSC:	Production Sharing Contract
RDP:	Regional Development Program
SBL:	State Budget Law
Sq. m.:	square meter
SWF:	Sovereign Wealth Fund
USA:	United States of America
USD:	United States Dollar
VAT:	Value Added Tax

Glossary

1. **Artisanal scale resource exploitation**
   Exploitation of natural resources at a very small scale, mostly with minimal use of mechanization.

2. **Benefit-sharing**
   Compensation or reward to the local or regional communities in the form of direct payments or other unique arrangements for the disturbances caused by the exploitation of local or regional natural resources of which they reserve certain proprietary ownership.

3. **Criteria for resource revenue redistribution**
   The criteria and indicators provisioned by the NNRFC to redistribute resource revenue among local governments shared initially in the aggregate to the local level of governance.

4. **Derivation-based resource revenue sharing regime**
   The regime that requires sharing the fruits of natural resources exclusively among the population of the regions hosting the natural resources and the exploitation work.

5. **Direct externality**
   The effect of externality on local communities in the vicinity of resource exploitation work likely to suffer considerable disruption that can range from displacement and loss of livelihood, local environmental damage, and other undesired socio-economic and cultural alterations as a result of resource diversion.

6. **Diversion capping**
The practice of limiting the amount of water resources that can be diverted from a particular water basin.

7. **Doctrine of Prior Appropriation**
The doctrine of water rights that awards community members or individuals who first utilize a natural resource in the form of a body of water or piece of land for beneficial use or purpose with ownership rights to such natural resources.

8. **Environment Impact Assessment**
The detailed assessment of the environmental consequences of a plan, policy, program, or actual project before the decision to move forward with the proposed action if required as per the Initial Environment Examination.

9. **Equitable sharing or distribution of natural resource revenue**
The idea of sharing resource revenue in a manner that ensures justifiable compensation for communities directly and indirectly affected by resource exploitation works.

10. **Externality**
The unintended consequence or effect to the third parties necessarily of undesirable nature from the exploitation of natural resources commonly in the form of reduced quantity or quality of natural resources.

11. **Extractive earth resources useful for construction**
Earth-based natural resources pertaining to sand, stone, and gravel useful for the construction of buildings and other infrastructures.

12. **Extractive natural resources**
Natural Resources that often pertain to exhaustible mineral resources with intrinsic value that is useful for consumption, investment, or decoration.

13. **Federal-Interstate Compact**
The compact built among concerned regional governments with federal signatory to enable management and expedited settlement of externalities and disputes concerning a particular interregional resource basin.

14. **Indicator-based resource revenue sharing regime**
The regime that requires sharing the fruits of natural resources across the county based on specific criteria or formulae to achieve a certain national fiscal or economic goal or uphold the idea of absolute fiscal rule or fiscal indiscrimination.

15. **Indirect externality**
The effect of externality on local communities afar from natural resource exploitation work but affected as a result of sharing the same river basin or affected by industrial activities concerning the resource exploitation work.

16. **Initial Environment Examination**
Examination measuring the environmental condition of a resource exploitation project and its potential impact to formulate mitigation measures, monitor environmental disturbances, and prepare necessary institutional requirements.

17. **Interjurisdictional externality**
The effect of externality to jurisdictions belonging to another subnational government.

18. **Levels of government**
The three-tier governments (i.e., federal, provincial, and local) provisioned in the federal system of Nepal.

19. **Local shares/local equity grant**
A form of benefit-sharing whereby a proportion of the total paid-up equity of resource exploitation projects is awarded to the local community hosting or neighboring the resource exploitation work.

20. Manner of natural resource exploitation

The method of resource exploitation, especially of water resources either in the form of hydroelectricity generation and inland navigation (i.e., non-consumptive manner) or for irrigation and industrial consumption (i.e., consumptive manner).

21. Mineral resource blocks

A block representing a wider geographical area where a particular mineral resource is explored.

22. Natural resource exploitation

The act of extracting or utilizing the natural resources depending on whether the resources are used for the consumptive or non-consumptive purposes.

21 Natural resource exploration

The act of surveying or discovering the presence of mineral resources estimated at a certain amount, volume, grade, etc. before extraction or exploration.

22 Natural resource gain

The gross revenue or sales earned from the sale of natural resource either by the government or contracted private resource exploitation entity.

23 Natural resource governance

The norms, institutions, and processes that determine the rules and decisions surrounding the utilization and conservation of natural resources along with the administration of revenue arising from them.

24 Natural resource rent

The intrinsic value of natural resources entirely shared with the government in the form of natural resource revenue.

25 Natural resource revenue

The revenue paid by private resource exploiting entities in the form of tax or royalty for the extraction or exploitation of the natural resources to the government.

26 Natural resource revenue administration

The task of determining, collecting, sharing, and redistributing the revenue emanating from natural resources.

27 Natural Resource revenue equalization formula

The method of sharing or distributing resource revenue within a certain region and among a certain population based on certain criteria and weight provided to such criteria.

28 Natural Resource revenue sharing modality/framework

The sharing framework to share natural resource revenue among different levels of government existent in Federal Nepal.

29 Natural Resource revenue sharing provision

The provisions that set the characteristics of a certain natural resource revenue sharing modality/framework.

30 Natural resource royalty

Payment made to the government for the use of natural resources considered sovereign wealth.

31 Nature of Natural Resource

The classification of natural resources based on their characteristics, especially based on whether resources are exhaustible, semi-exhaustible, or renewable.

32 Partial Equalization

The method of only qualifying the proportion of resource revenue or gain to be shared nationally based on a certain indicator or formula.

33 Permanent sovereignty over natural resources
Legal, governmental control, and authority over natural resources, particularly as an aspect of the exercise of the right of self-determination.

34 Public Trust Doctrine
The principle that certain natural resources are preserved for public use and that the government is required to maintain them for the public's reasonable use.

35 Renewable natural resources
Natural resources that will replenish to replace the portion depleted by usage and consumption, either through natural reproduction or other recurring processes in a finite amount of time in a human time scale.

36 River basins
The portion of land drained by a river and its tributaries.

37 Royalty-based resource revenue generation
Generation of resource revenue in the form of royalty.

38 Scale of Natural Resource exploitation
The extent at which natural resources are extracted or exploited (i.e., artisanal, small, medium, or large).

39 Scope of natural resource revenue sharing
The geographical extent of the population among whom revenue emanating from a particular natural resource can be shared.

40 Significance-Distribution Matrix
The matrix that helps determine the suitable sharing regime of resource revenue obtained from certain nature of natural resources or their manner of exploitation based on prevalent national economic significance and geological distribution of the resource or its manner of exploitation.

41 Sovereign Wealth Funds

State-owned investment funds that globally invest in financial assets such as stocks, bonds, real estate, precious metals, or in alternative investments such as private equity funds or hedge funds.

42 Suitability Matrix

The matrix that helps determines the level of government that should be authorized for the administration of resource revenue obtained from particular nature of natural resources or their manner of exploitation based on its prevalent national economic significance, method of revenue generation, and sharing regime adopted.

43 Tax-based resource revenue generation

Generation of resource revenue in the form of direct or indirect tax.

44 Water markets

The practice of intercommunal or intra-communal trading of water entitlement (i.e., water right) of a particular water basin granted by a specific water right related doctrine.

Contents

List of Tables

List of Figures

List of Cases

Executive Summary

The primary objective of the study is to explore a suitable and equitable natural resource revenue (or royalty) sharing modality in Nepal for the nature of natural resources being exploited in a certain manner and scale. The study's other objective is to explore the mechanism for addressing interregional disputes that may arise from exploiting natural resources at the provincial and local levels.

Background

The study begins by briefly looking into Nepal's various legislative and executive arrangements governing natural resource utilization and sharing. As such, the study finds the Constitution of Nepal, 2015, National Natural Resource Fiscal Commission Act, 2017, and Intergovernmental Fiscal Arrangement Act, 2017 to be the founding legislation in directing the governance of natural resources and sharing of royalties arising from it. The study also looks into various federal and subnational legislatures to support the explorations of the study.

On the executive front, the study finds the NNRFC to be the primary body responsible for recommending the federal government in areas of natural resource utilization, division, and sharing of revenue among the tiers of government. Meanwhile, the study also observes the Natural Resource Operation and Royalty-Sharing Head Division of the NNRFC to be the unit within the NNRFC that is mainly responsible for addressing natural resource-related affairs.

Geologically, the study observes that mines and mineral resources characterized as nonmetallic, metallic, fuel, and decorative stones are

discovered, explored, and exploited in Nepal. And, roughly 85% of such minefields/blocks are present in Province 1, Bagmati, Gandaki, and Lumbini. On the other hand, the study finds that hydrological resources appear to be fairly distributed among all regions except Province 2 which particularly seems to reserve no potentiality for exploiting hydrological resources to produce hydroelectricity.

Literature Review

The study briefly conceptualizes the idea behind resource gain, resource rent, and resource revenue which appear to be significant in exploring its objective. In short, the study confirms that the government's share of natural resource revenue or royalty before it is shared across various recipient bodies should purely emanate from resource rent which appears to be the windfall proportion of the total resource gain earned by a resource-exploiting entity.

Likewise, the study also explores the idea behind tax-based and royalty-based methods of resource revenue determination. The study finds tax-based charges on resource rent as purely an additional percentage (on top of conventional profit tax) of charge applied on estimated windfall or resource rent. Royalty-based charge, on the other hand, is derived in the form of lump-sum payments based on the size of the project/resource licensed to be exploited, or more commonly based upon the quantity, volume, or value of the resource exploited, explored, or converted before or after the resource exploitation.

The study also conceptualizes the idea behind the derivation-based and indicator-based methods of resource revenue sharing. As such, the study finds the derivation-based sharing regime to require a sufficient portion of the natural resource revenue from exploiting the resources to be channeled to its area of origin or to the jurisdiction or locality where the resource exploitations were originally carried out. The indicator-based resource revenue sharing regime, on the other hand, requires resource revenues to contribute toward the interregional fiscal equality across the country.

The study also specifically observes and analyzes the concern governing the exploitation of extractive and renewable natural resources (specifically in the context of river basins) to explore resource revenue-sharing modalities suitable to such natural resources' unique characteristics.

Observations from case studies

The study has come across unique and sophisticated resource revenue-sharing frameworks practiced by countries across the world. While few countries seem to base their sharing framework on a specific sharing regime, others base their sharing framework on the method of revenue generation, nature of a natural resource, the scale of resource exploitation, and other sophisticated partial equalization formulae explicitly observed in the case of Canada and Iraq.

Importantly, case observations tend to exhibit the proportion of revenue raised among the levels of governance to be somewhat dependent on the level of government authorized for raising the resource revenue. As such, consistently higher proportions of resource revenue are shared with or reserved by subnational governments when authorized to draw revenue from resources exploited within their jurisdictions. Case observations also indicate central/federal government to be primarily responsible for resource revenue administration in most countries.

Meanwhile, population size, as an indicator, is commonly used as the indicator for sharing resource revenue based on the indicator-based sharing regime in the observed country cases. Other than that, indicators such as production capacity, demographics, poverty index, land area, and fiscal responsibility are consulted during resource revenue sharing through indicator-based regimes across all countries.

Case observations also depict that the countries have commonly handled the interjurisdictional disputes or disputes between the resource exploiting enterprises, licensing governments, and local inhabitants through the method of negotiations and dialogues between the concerned stakeholders and agencies.

Analysis and Explorations

As the study explores suitable sharing modalities for exploitation of certain nature of natural resources or manner of resource exploitation for the particular context of Nepal, it has generally followed a specific procedure in which

i. It first observes the economic significance of revenue emanating from the exploitation of the very natural resource or manner of resource exploitation in the national economy, followed by

ii. observation of the distribution of the natural resource and the potentiality to exploit it in a certain manner across the political regions of Nepal

The observed data are then processed through two tools – (a) significance-distribution matrix and (b) suitability matrix that the study has conceptualized to explore sharing regimes applicable for sharing resource revenue emanating from the exploitation of the concerned natural resources in a certain manner and scale.

For such basis of analysis, the study has primarily concentrated on exploring sharing modalities for royalty (i.e., resource revenue) obtained from the exploitation of water resources in the manner of hydroelectricity generation, exploitation of extractive mineral resources, and artisanal or small-scale resources exploitation of earth resources useful for construction purpose. These, the study believes, could also be applicable to other manners of resource exploitation.

The study has dominantly come to explore resource revenue sharing modalities with a higher tendency towards the derivation-based sharing regime in following the explorations of the analysis. The study explores such modality for all nature of natural resources, manner of resource exploitation, and the scale of resource exploitation observed by the study. Also, the study ubiquitously explores a devolved arrangement with authority at the subnational level of governance for collecting and sharing resource revenues emanating from the given nature of natural resources or their manner of exploitation.

However, the study explores a hint of an indicator-based sharing regime with a simple equalization proposition for resource revenue emanating from hydroelectricity generation to achieve fiscal inclusiveness for regions deprived of the potentiality to generate hydroelectricity. The explored resource revenue sharing provisions also deemed to sufficiently address remuneration for the level of governance engaged in addressing interjurisdictional externality or dispute at inter-provincial or inter-local levels.

It is important to note that a certain amendment in the concerned legislation is warranted to enable a legislative pathway for the exploration succeeded by the study. In such contexts, Constitutional amendments may also be needed to allow provision for subnational governments to raise and share royalty revenue as explored by the study.

Chapter 1

Background

Political and legislative background, and objective of the study

The Constitution of Nepal[1], 2015 in Part 10, 16, and 19 provides the fiscal procedures for the three-tier governance with certain provisions for expenditure responsibilities and revenue-raising authorities among the provincial and local governments. The Intergovernmental Fiscal Arrangement (IGFA) Act, 2017, which discusses the provisions regarding revenue-raising authorities, revenue sharing modalities, grants, loans, budget arrangements, public expenditure, and fiscal discipline for the entire federal system, further deliberates this fiscal system provisioned in the new federal system of the country. Notably, the Act also provides the natural resource revenue sharing framework[2] for sharing of natural resource revenue raised from the exploitation of various natural resources or their manner of exploitation among the tiers of governance in its schedule 4 (also provided in Table 1 below) eligible to be reviewed every five years.

This study recognizes that the very sharing framework reserves a substantial room for improvement, beginning with the idea of formulating specific mechanisms to share resource revenue based upon the nature of the resources being exploited, their manner of exploitation, and the scale of exploitation as required. As such, the study identifies the need for the sharing framework to maker a departure from the current arrangement of assigning a common sharing framework for all nature of the natural resources being exploited and adopt sharing frameworks that address

1 From here onwards alternatively referred as Constitution
2 From here onwards alternatively referred as sharing framework

unique contexts that govern each nature of the natural resources being exploited in a certain manner and scale.

Also, the study identifies the need for a robust mechanism to address interjurisdictional disputes at the regional level likely to occur due to interregional externalities arising from resource exploitations. At present, such provision remains inexistent, although multiple legislations[3] recognize the National Natural Resource and Fiscal Commission (NNRFC) function in researching the anticipated cases of such interjurisdictional disputes concerning natural resource utilization to formulate effective resolutions or protocols with the cooperative effort of the concerned governments.

On such consideration, this study identifies the need to explore a detailed and well-encompassing resource revenue sharing modality along with mechanisms that address

- Equitable and justifiable sharing of resource revenue within the different levels of the jurisdiction(s) based upon the nature of natural resources and their manner of exploitation by acknowledging certain criteria and indicators
- Provision for compensating, rewarding, or sharing benefits with the community(ies) directly and indirectly affected by the exploitation of natural resources
- Interprovincial disputes that may appear from the exploitation of renewable resources as river networks that have far-reaching interregional impacts within a shared river basin

Given that the Constitution envisions the beginning of a federal system of governance in its preamble, it sets a conducive stage for formulating a comprehensive natural resource revenue sharing framework that encompasses fundaments of resource governance. This confidence is achieved as the literatures[4] argue that the federal system of governance particularly encourages the effective allocation of natural resources

3 Legislations essentially referring to Constitution, NNRFC Act, 2017 and IGFA Act, 2017
4 For the purpose of our study, the word 'literature' is used to represent various relevant study materials

compared to a centralist system of governance (Khalid, 2018). Furthermore, as the Constitution also recognizes a cooperative style of federalism within the country as explicitly maintained in Article 232, a proper ground to devise a sharing framework with a more holistic ecological approach towards the environmental ills and consideration of the entire ecosystem is guaranteed (Fischman, 2006).

Methodology of the study

The study leverages literature reviews, international cases of resource revenue sharing practices, and stakeholder consultations with different levels of governments and private experts to build analysis and exploration for the study. Particularly, the study has attempted to gather international cases of resource revenue sharing practices of countries located worldwide to feature global representations. Likewise, the study has also pursued consultation with relevant government officials at federal and provincial levels separately along with experts of fiscal federalism to test and advance the efficacy of the analysis and explorations.

Legislative and executive arrangement for resource revenue sharing modality in Nepal

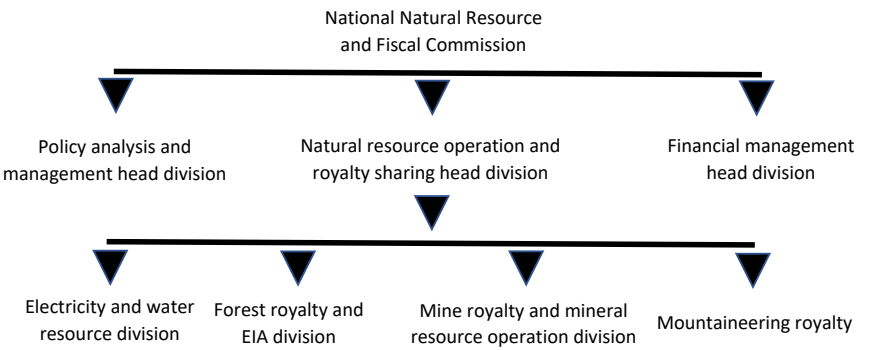
Article 51(g) of the Constitution directs the State policy to conduct sustainable utilization of natural resources available in the country by adopting the concept of intergenerational equity and equitable distribution of the fruits of natural resources among the concerned communities. Likewise, Article 59(4) recognizes the role of the federal, provincial, and local governments to ensure equitable distribution of benefits derived from the use of natural resources in the forms of royalty, services, or goods to the project-affected regions and local communities. Hence, Schedule-9 of the Constitution enlists royalty from natural resources to be within the concurrent jurisdiction of the federation, provinces, and local governments (in item 14) to ensure that all levels of governance can partake in the equitable distribution of resources revenues.

Likewise, Part-26 of the Constitution in articles 250-251 provides the

provision for establishing the NNRFC[5] as the constitutional body responsible for assuring equitable or justifiable sharing of natural resources and revenues arising from such resources among the federal, provincial, and local governments of the country. Following this, the NNRFC Act, 2017 provides detailed functions, duties, authorities, and operational modalities for the commission. Chapter 2 and 4 of the Act specifically recognize the role of NNRFC in recommending the appropriate shares of the federal, provincial, and local government in investments and returns from the exploitation of natural resources, along with recommending the basis for sharing natural resource revenue within the federal system by prioritizing certain criteria. Furthermore, the Act also mentions other vital responsibilities and functions of the commission to recommend the Government of Nepal (GoN) regarding other fiscal affairs concerning but not limited to tax & non-tax revenue sharing and other fiscal transfers among the subnational governments based on specified criteria.

Meanwhile, Natural Resource Operation and Royalty Sharing Head division appears to be the specific unit within NNRFC responsible for undertaking the entire responsibility of advising the GoN in areas of natural resource utilization/exploitation, division, and sharing of benefit or revenue (NNRFC, 2020).

Figure 1: Organizational structure of NNRFC with a specific focus on head divisions



(NNRFC, 2020)

5 NNRFC was officially commission on 28 December, 2017

The specific functions and duties of the head division that further detail the role of NNRFC in regards to natural resource and resource revenue administration are

- To recommend resolution for equitable sharing of resource revenue, and the utilization of such revenue arising from various natural resources
- To formulate and recommend resource revenue sharing frameworks that justifiably shares benefit or compensate the affected provincial or local-level jurisdiction from the exploitation of natural resources
- To formulate the criteria for resource revenue sharing provisions among the concerned subnational governments by conducting a detailed study of other resource revenue sharing modalities practiced around the world
    - Meanwhile, the current criteria for determining and recommending the appropriate share of resource revenue amongst concerned local entities from the exploitation of natural resources as per section 14(2) of chapter 4 of the NNRFC Act, 2017, are
        - State of the natural resource being exploited
        - Area(s) or jurisdiction(s) affected by the exploitation of a natural resource
        - Dependency upon exploited natural resource
        - Population benefiting from the exploitation of a natural resource
        - Population dependent on the natural resource
        - Participation of the concerned level of government in sustainable management and conservation of the natural resource
- To study and research possible interjurisdictional disputes that may

arise between the federation and the province(s), between provinces, between a province and local government(s), and between local governments to recommend resolutions that prevent or resolve the disputes through coordinated efforts of all concerned governments

- To set criteria for the determination of shares of the federal, provincials, and local governments in investments and returns in the exploitation of natural resources
    - The current criteria for determining and recommending the appropriate share of federal, provincial, and local investment in the exploitation of natural resources as per section 14(1) of chapter 4 of the NNRFC Act, 2017, are
        - Investing capacity of the level of government
        - State of revenue of the level of government and revenue-raising capacity of the government from tax and non-tax revenue sources
        - Share of benefit or revenue from resource exploitation to be shared with the level of government
        - Share of benefit that is allowed to be retained/consumed by the level of government
        - Need and state of infrastructure within the particular jurisdiction
        - The economic status of the government and the geographic structure within the ruling jurisdiction
- To generate the criteria for utilization of natural resources by scientifically estimating the benefit that can be obtained from the utilization of a particular natural resource
- To conduct a detailed Environmental Impact Assessment (EIA) required in the course of distribution of natural resources, and recommend the federal government accordingly

- To recommend environment-friendly mediums for sharing or dividing natural resources among different jurisdictions.

(NNRFC, 2020)

Additionally, the IGFA Act, 2017 provides the fiscal mechanism to distribute revenue obtained from exploiting natural resources among the federal, provincial, and local governments in Section 7 of the Act according to a sharing framework provided in schedule-4. IGFA Act, 2017 was specifically drafted and enacted by the federal parliament to provide the fiscal foundation for the country's federal system. NNRFC has also subsequently formulated the criteria/indicators for further redistributing the one-fourth proportion of resource revenue (royalty) allocated for each concerned provincial and local-level governments in the NNRFC information guide 2020 (See Appendix – A for detail).

Table 1: Framework for distribution of natural resources revenue (royalty) raised from the exploitation of various natural resources or manner of resource exploitation among different levels of governance (in percentage)

Type of royalty	Federal government	Concerned provincial government	Concerned local government
Mountaineering	50	25	25
Electricity generation	50	25	25
Forest exploitation	50	25	25
Mines and mineral exploitation	50	25	25
Water and natural resources	50	25	25

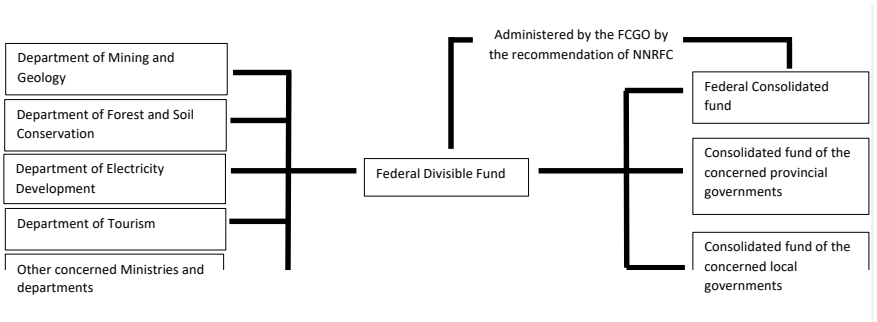
Source: IGFA Act, 2017

It can be learned from Table 1 that the framework is entirely based upon the idea of exclusively sharing resource revenue with the jurisdiction hosting the very natural resource and the community affected by the exploitation of such natural resources. NNRFC (2020) also affirms the sharing framework to have been developed after careful consideration of

the principle of equitable sharing of benefit, the principle of sustainable development, precautionary principle, public trust doctrine, the principle of polluter's pay, the principle of permanent sovereignty over natural resources[6], and the principle of eminent domain as mentioned in the report[7] prepared by the former Committee on Natural resource, economic rights, and revenue allocation of the first Constitutional Assembly (p. 200).

However, the federal government is responsible for collecting all revenue from the resource exploitations. Such revenues collected by the concerned departments are later deposited in the divisible fund established and managed by the Office of the Financial Comptroller General (FCGO) as per the IGFA Act, 2017. FCGO then shall redistribute the revenue amassed in the federal divisible fund in the Federal Consolidated Fund and the consolidated funds of the concerned provincial and local governments as per the resource revenue (royalty) sharing framework drafted by the NNRFC and other criteria adopted by the commission (NNRFC, 2020).

Figure 2: The financial process of collecting and distributing natural resource revenue



6 As an example, Section 3 of Water Resource Act, 1992 affirms ownership of all water resources in Nepal to vested in Nepal

7 Find at https://constitutionnet.org/sites/default/files/concept_paper_natural_resource.eng__0.pdf

Observation of natural resource landscape in Nepal

Geological observation of extractive minerals resource in Nepal

Portfolio observation of discovered and explored (not prospective) extractive minerals existent across Nepal provides an initial insight that the country's geology encompasses all nonmetallic, metallic, fuel, and decorative minerals. The distribution of such discovered mineral fields across the provincial political division of the country pictures that Bagmati appears to be the most mineral resource-rich province, followed by Province 1, Gandaki, and Lumbini. On the other hand, Province 2, Karnali, and Sudoorpaschim appear to be resource-poor provinces, at least based on the number of mineral fields discovered and explored as provided in Table 2. Geologically, most minerals are concentrated in the hilly region of the central and western parts of the country (Chapagain & Ghimire, 2019). Also, few mineral fields intersect between two districts belonging to different provinces (highlighted in yellow in Figure 3). The exploitation of such mineral fields can likely trigger interprovincial disputes regarding the sharing of resource revenue earned.

Among the minerals discovered and explored to date, copper, iron, lead, mica, coal, and limestone are the most common minerals found in various parts of the country. So far, very limited minerals have been explored and exploited for industrial and commercial purposes to date (Chapagain & Ghimire, 2019). Until the present, the Department of Mines and Geology (DMG) has provided 300 exploration licenses and 150 extraction licenses across the country[8]. Hence, significant numbers of prospective mines are yet to be discovered and explored. A proper resource revenue determination method & sharing framework, and increased survey & research capacities can play a vital role in incentivizing profitable mineral exploitation works. Likewise, establishing governmental agencies at the regional and local levels to facilitate the mineral exploration works is also crucial to expedite the discovery and exploration of mines and mineral resources in Nepal[9].

8 Based on KII conducted with the Executive Director of DMG
9 Based on KII conducted with the Deputy Executive Director of DMG

Meanwhile, the DMG/Petroleum Exploration Promotion Project (PEPP), in technical cooperation with the People's Republic of China (PRC) government, has already started petroleum exploration and detailed investigations in 2019. The team is conducting the investigations within the Dailekh district of Karnali (see Figure 3 depicting the country's discovered and explored oil mining site), where oil and gas seepages are seen (Kaphle, 2020). This particular exploration project has seen considerable progress among ten prospective blocks across the country's southern region with oil resource prospects (p. 14).

Figure 3: Explored and discovered extractive minerals resources in Nepal:

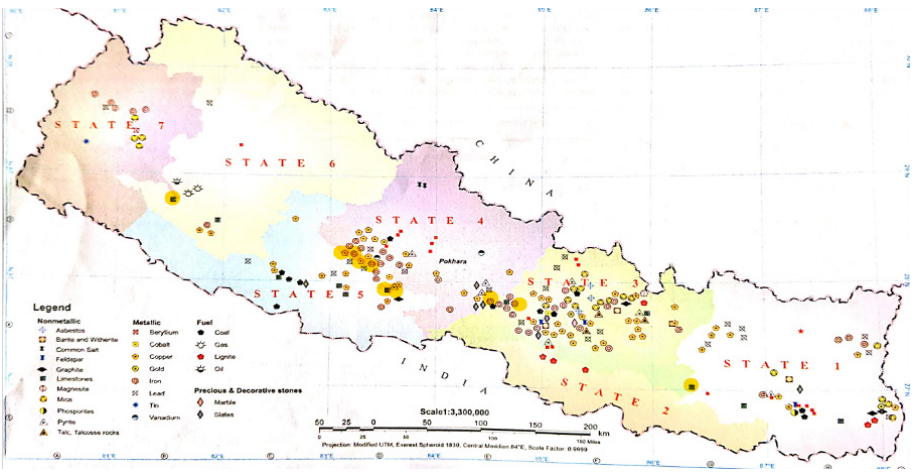


Table 2: Total number of explored minefields and their existence across the Provinces of Nepal

Type of extractive minerals	Minerals	Number of mine fields/blocks discovered and explored							
		Province 1	Madhesh	Bagmati	Gandaki	Lumbini	Karnali	Sudoorpaschim	Total
Nonmetallic	Asbestos	0	0	3	0	0	0	0	3
	Barite and Witherite	1	0	3	0	0	0	0	4
	Common salt	0	0	0	2	0	0	0	2
	Feldspar	1	0	2	0	0	0	0	3
	Graphite	2	0	1	0	1	0	0	4
	Limestone	3	0	2	0	4	2	0	11
	Magnesite	0	0	1	0	0	0	0	1
	Mica	5	0	11	0	0	0	4	20
	Phosphorites	1	0	0	0	0	0	0	1
	Pyrite	1	0	2	4	0	0	0	7
	Talcose rocks	0	0	3	0	0	0	0	3
Metallic	Beryllium	0	0	0	0	0	0	1	1
	Cobalt	0	0	1	0	0	0	0	1
	Copper	8	0	23	15	8	2	0	56
	Gold	1	0	1	0	0	0	0	2
	Iron	4	0	16	12	3	1	5	41
	Lead	7	0	6	3	4	1	1	22
	Tin	0	0	0	0	0	0	1	1
	Vanadium	0	0	0	2	0	0	0	2

Fuel	Coal	1	0	4	1	4	0	0	10
	Gas	0	0	0	0	0	2	0	2
	Lignite	2	3	1	0	0	0	0	6
	Oil	0	0	0	0	0	1	0	1
Decorative stones	Marble	0	0	1	0	0	0	0	1
	Slates	1	0	2	2	1	0	0	6
Total		38	3	83	41	25	9	12	211

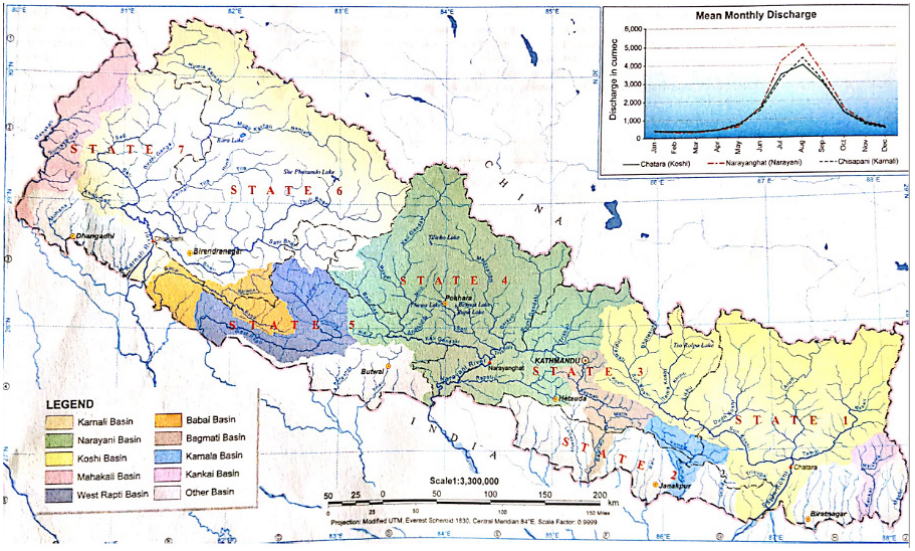
Chapagain & Ghimire (2019)

Geological observation of hydrological resources (river basins) in Nepal

Hydrological resources are undoubtedly the largest asset among all kinds of natural resources (i.e., extractive and renewable resources) in Nepal. Nepal reserves 196 billion cubic meters of water volume within its political boundary composed of major and minor river basins (Setopati, 2019). Nepal has more than six thousand big and small streams originating from the Mountain, Mid-hill, and Chure/Siwalik[10] region, with a total drainage area of about 194,471 sq. km (Asian Development Bank, 2018). Meanwhile, the Koshi basin, the Narayani basin (also referred to as the Gandaki basin), and the Karnali basin are the three major river systems in Nepal (p. 9). There are also various minor river basins in Nepal, including the renowned Mahakali basin, West Rapti basin, Babai basin, Bagmati basin, Kamala basin, and Kankai basin (see Figure 4).

10 Region lying at the southernmost foothills of the Himalayan range between the hilly region and southern planes

Figure 4: River basins in Nepal



Chapagain & Ghimire (2019)

Unlike the distribution pattern of extractive mineral resources yet discovered and explored, water bodies within the country are equitably divided across all provinces. Also, significant opportunity from the exploitation of water bodies within the geological limits of the country to generate economic benefit remains.

Chapter 2

The Fundamentals of Resource revenue governance

Conceptualizing natural resource gain, rent, and revenue

The concept of resource rent from which a particular nature of resource revenue for the governments is expected to emanate is fundamental to the study and analysis that concern scientific sharing of natural resource revenue among different levels of governance in a cooperative federal structure like Nepal.

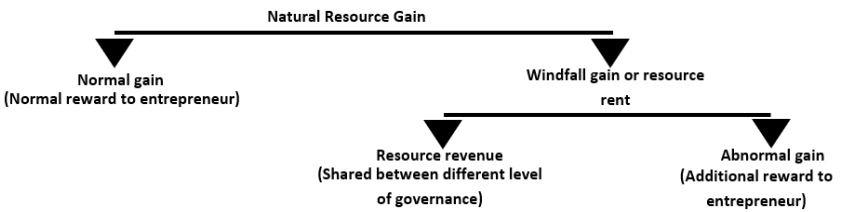
Scott (1975) identifies resource rent as a surplus or a windfall gain that signals excess from the amount of resource gain that is normal or necessary. He identifies resource rent as the residual gain or surplus rewarded to the firms after payments to suppliers of fuels, lubricants, and other materials used for resource exploitation and other payments made to labor, capital, and entrepreneurship (p. 1). As such, resource rent should "be the part" of such net gain that accrues in the process of exploitation above all necessary internal and external factor costs and rewards involved but not limited to finding, caring for, and selling the natural asset by all parties involved (Scott, Campbell, & Gainer, 1975). Mazzucato, Kattel, O'Riley, & Entsminger (2021) boldly identifies resource rent as additional wealth purely generated by extraction activities and is "separate from the part of the gain" rewarded for entrepreneurial endeavors.

In this regard, natural resource revenue[11] for the governments before it is shared should purely emanate from taxation (or other royalty-based charges) of such resource rent or windfall gain (Scott, 1975). Importantly, care should be taken to distinguish the resource revenue from either

11 From here onwards resource revenue allocated to government through taxation or royalty system shall be termed as "natural resource revenue" or "resource revenue"

entrepreneurial profit (i.e., normal profit/gain incidental to income tax) or returns to factors of production of enterprises engaged in resource exploitation in a manner that does not affect the rational decision to engage with natural resources in future (Moore, 1975). Hence, it remains a primary objective for the government with claims to resource rent at a certain proportion to ensure that their share of rent in the form of resource revenue does not disturb the economic feasibility of resource exploitations. (Scott, Campbell, & Gainer, 1975).

Figure 5: Hierarchal chart to clarify concepts of resource gain, rent, and resource revenue



Resource revenue-generating methods

Taxation and royalty-based resource revenue-generating methods are two fundamental methods of resource revenue generation. Taxation-based resource revenue generated (via direct or indirect method[12]) at the central or subnational level from enterprises engaged in resource exploitations differs from the royalty-based method of resource revenue generation raised before or after the exploitation of a particular piece of natural resources. Taxation-based charges on resource rent is purely an additional percentage (on top of conventional profit tax) of charge applied on estimated windfall or resource rent. Royalty-based resource revenue generation, on the other hand, is derived in the form of lump-sum payments based on the size of the project/resource licensed to be exploited, or more commonly based

12 Direct tax particularly refers to special Income tax levied on resource exploiting enterprises, whereas indirect tax refers to Goods and Service Tax (GST)/Value-Added Tax (VAT) or export tax on resource exported levied upon resource exploiting enterprises.

upon the quantity, volume, or value of the resource exploited, explored or converted. For instance, Section 11(1) of the Electricity Act, 2049 authorizes the Department of Electricity Development (DoED), a federal government agency in Nepal, to charge royalty at the rate[13] of NRs. 100 for each installed kilowatt of electricity per year in addition to two percent of the average tariff per kilowatt-hour (kw/h) generated for a term of up to fifteen years[14] for generating hydroelectricity from river streams for projects producing more than 1 MW of electricity. Apart from financial payments, royalty payments may also be stipulated in resource payments, commonly termed Production Sharing Contracts (PSCs) (Aresti, 2016). PSC, as a medium of royalty payments, is provisioned in section 13(a) of the prevailing Petroleum Act, 1983 of Nepal. As per the Act, royalty payments equivalent to at least 12.5 percent as prescribed in the value of petroleum sold could be made entirely or partially in terms of oil as may be fixed by the GoN.

Case I: Tax-based resource revenue generation vs. royalty-based resource revenue generation

Tax-based resource revenue generation	Royalty-based resource revenue generation
Determining the resource rents or resource gains earned particularly from resource exploitation operations to tax them is often largely arbitrary especially if the extracting entity is engaged in multiple operations apart from resource exploitation in a given country	Determining the base for calculating the royalty is relatively easier as they can be easily linked to resource extraction value, volume, or quantity obtained from resource exploitations during a given time interval.

13 The details regarding the royalty rates of hydroelectricity projects are provided in Appendix – I of the Hydropower Development Policy, 2001 as per section 6.13.1 of the policy.

14 Note that the royalty payments on installed capacity and electricity generated rises by multiple folds following the fifteen years window

Taxes on resource rent are complex to calculate as they are also subject to tax deductions and tax-avoidance measures. Robust models, technical capacity, and sufficient information are required to make accurate estimations.	Royalties are easier to calculate as it only requires production volume, quality, and market prices of the resource to estimate the resource revenues.
Federal government is most suitable to lead such revenue assignment based on its technical capacity to deal with demanding tax calculation methods and obtain detailed accounting information.	Subnational governments are most suitable to lead such revenue assignments as local or regional government can more effectively monitor production volumes staged at local/regional jurisdictions and make accurate estimations of resource revenue
Revenue usually peaks after several years into exploitation when net profits are observed in the financial statements of the resource-exploiting entities.	Revenue can be yielded from the early phase and during the entire phase of the exploitation works depending upon the terms of royalty payment

(NRGI, 2016)

Analysis of resource revenue sharing

It is important to note that the scope of our study is limited to analysis regarding sharing of raised resource revenue among different levels of governance in a federal structure irrespective of the basis adopted for resource revenue generation. Nevertheless, it is essential to conclude that appropriate allocation of resource rent between a private resource exploiting enterprise & government[15] (in the form of resource revenue) and sharing of resource revenue between different levels of governance

15 See Basu & Pegg (2020) that discusses allocation of resource rent in a manner that allows no wealth loss and full capture of resource rent by the government

are two important interrelated aspects of the study of resource economics and fiscal federalism that have gathered significant volume of literary observations in the past (Scott, Campbell, & Gainer, 1975).

Property rights of natural resources as the foundation for resource revenue sharing provisions

Ideas concerning property rights regarding natural resources are the key foundation for studying resource revenue sharing arrangements among different levels of governance in federal structures. Such a study can provide a substantive argument for effective sharing of resource revenue either previously raised in terms of taxes or based on royalty charged for the amount or volume of resource exploited, extracted, or converted.

Thompson (1975), regarding natural resources, identifies different kinds of property rights in the form of

i. Right to alienate a natural resource

ii. Right to manage a natural resource (i.e., executive rights to a resource), and

iii. Right to use and enjoyment of the natural resource

Thompson (1975) maintains that the holders of rights to use and enjoyment of the natural resource automatically enjoy the rights to alienate and manage such natural resources and are always in the position to benefit from such resource revenues (p. 113). Supporting literatures argue holders of such rights to be indigenous community members who were awarded the dominant rights to the natural water system based on the doctrine of prior appropriation as per numerous studies conducted in the western United States (Gardner, 1983). Meanwhile, a separate report also observes the effectuation of customary ownership benefiting indigenous communities in the Philippines, whereby extraction of resources under the ancestral domain demanded royalty payments to such a group of people (NRGI, 2016). However, it is essential to note that the idea and the definition of customary ownership over natural resources by indigenous or local communities can vary significantly based on local culture, local

political outfit, and the nature of rights doctrine[16] adopted diversly around the world. For instance, the idea of customary ownership may vary drastically in between the North American and Asian cultural and political contexts[17].

This review of property rights regarding natural resources provides a fine basis for acknowledging the rights of regional and local communities to enjoy and benefit from the use of a particular natural resource as they can be expected to have indigenously or first utilized the resource to support their livelihood. Hence, it provides an important reference for demanding the need to share a significant proportion of resource revenue with the communities hosting the natural resource entirely or partly. In fact, the Constitution of Nepal already demands the provision to share the fruits of natural resources with the location hosting the natural resource and the community directly affected by its exploitation to be the foundation of the natural resource revenue sharing mechanism in Nepal, as also mentioned in the earlier chapter. Hence, it provides enough justification for this study to provide a basis to explore a resource revenue sharing modality that proposes the need to share sufficient proportions of resource revenue with the subnational governments representing such communities.

Literary observations concerning sharing of resource revenue among multiple levels of governance

The literature on property rights on natural resources also sets a reference base for additional literatures to provide diverse viewpoints regarding sharing of resource revenue among different levels of governments representing different extensity of population or community(s). The arguments of each literature differ based on the emphasis placed on numerous social, economic, and political factors that determine the most effective utilization of raised resource revenue.

On such consideration, Scott (1975) recognizes the need for resource revenue to be shared among jurisdictions hosting the community whose

16 See Easter, Rosegrant, & Dinar (1998) that identify various doctrines of natural resources that award customary rights to natural resource differently

17 Based on KII conducted with Senior Research Fellow and economist at Policy Research Institute (PRI)

population most nearly approximates the group to whom benefits ought to be redistributed. Meanwhile, the definition of a group or community in a federal system that deserves to be benefited from the resource revenue is not concrete and can be perceived somewhat diversely. Regarding such, two regimes provide different definitions of community eligible or deserving of resource revenue. They are commonly termed Derivation-based and Indicator-based resource revenue sharing regimes.

Derivation-based resource revenue sharing regime

First of all, the derivation-based resource revenue sharing regime[18] claims the province or locality of which the natural resources are being exploited to be the exact definition of a community that deserves to be benefited from the resource revenue (Anderson, n.d.). As per the regime, a substantial portion of the natural resource revenue earned from exploiting the resources should be channeled to its area of origin (NRGI, 2016). Also, resource revenue raised and captured by the subnational authorities from the exploitation of resources within the subnational jurisdiction automatically demonstrates the practice of the derivation-based sharing regime (p. 32).

The derivation-based sharing regime also hugely accommodates the notion of sharing benefit (or typically termed as benefit-sharing) obtained from the exploitation of a particular piece of natural resource with the affected community. The notion justifies and urges sufficient compensation for the disturbances caused by the exploitation of local natural resources for local communities, followed by the provision to reward the community for exploiting resources of which they reserve certain proprietary ownership. The idea of benefit-sharing typically encompasses local disruptions that can range from displacement and loss of livelihood, local environmental damage, and other undesired socio-economic and cultural alterations for which sufficient compensation is warranted (NRGI, 2016).

The idea of benefit-sharing provisions long-term services coupled with a one-time payment to compensate the affected local population (Bhandari, 2015). Hence, the benefit is not only characterized entirely in the form

18 From here onwards shall be termed shortly as derivation-based sharing regime

of a proportion of revenue distributed from the exploitation of a piece of natural resource based on a certain sharing framework as discussed previously but also in the form of barter deals such as

- Development of certain local infrastructure (i.e., health post, road, school, irrigation line, etc.) or sharing access to the certain locally useful infrastructure of the project with local citizens and businesses
- Payments to the Community Development Fund (CDF) usually as part of mandatory Corporate Social Responsibility (CSR) package
- Equity grants or local shares (ranging from 5 – 10%) of the subsidiary entity to the entire local community established for the operation of the particular project engaged in the exploitation of the concerned resource
- Employment generation for the local population, local business development through local content procurement preferences, technology transfer to local enterprises, and other skills development opportunities to be created by resource exploiting enterprises

Bhandari (2015) & NRGI (2016)

Therefore, though falling within the scope of the derivation-based sharing regime, the benefit-sharing mechanism also seems to vantage a particular resource exploitation project as the avenue for developing a concerned local territory. Hence, the mechanism also envisions a development partnership between the resource exploitation project and the community, thus integrating the project with the local socio-cultural and economic system.

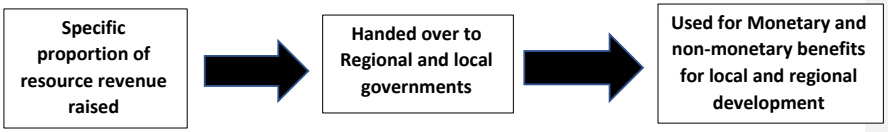
The peculiar idea of the benefit-sharing mechanism to achieve such overarching objectives beyond compensating or rewarding the directly affected community(s) may be justifiable. But the problem arises when the cost of benefit-sharing/developmental demands from the project does not correspond with or exceed the project's size, budget, and

financial feasibility. It often happens when the local communities perceive the resource-exploiting enterprises as the proxy of local government (Bhandari, 2015).

On such ground, Bhandari (2015) identifies another reason to formulate a comprehensive and clear sharing framework that also defines the basis and scope of benefit-sharing along with providing a clear guideline that takes into account the size, budget, source of funding, and feasibility of the project (p. 9). As such, any sharing framework incorporating the benefit-sharing provision to the directly affected local community(s) should not overburden the resource exploiting enterprise beyond the limit of resource rent that can be feasibly shared with the government. Also, the sharing framework should ensure that the local governments are empowered to handle and coordinate all matters regarding benefit-sharing in the vicinity of the project regardless of the level of government responsible for raising the resource revenue in the first place (Bhandari, 2015).

Hence, the private resource exploiting enterprise should be emancipated from the responsibility to address the development needs of the local jurisdiction as demanded by the local community such that such roles are transferred to the local governments technically assumed to be most capable for coursing the development of their local jurisdiction(s).

Figure 6: The process chart of revenue-raising to benefit-sharing



According to Figure 6, the central government may be assigned with the task of raising resource revenue (as is currently practiced in the context of Nepal), of which a specific portion of it can later be shared with the concerned regional and local governments that hold territorial jurisdiction of the resource from which revenue is derived from its exploitation. The subnational governments can later autonomously determine the criteria

for benefit-sharing as monetary and non-monetary benefits by keeping local and regional developmental needs in priority.

But, given that the royalty-based method of revenue determination often precedes the derivation-based sharing regime, subnational governments may be assigned the fundamental role of resource

revenue administration based on the justification provided in Case I.

Case II (opinion piece): On compensating indirectly affected local communities

It is likely for other local communities that neighbor the particular community(s) hosting the exploitation projects to be indirectly affected by exploitation projects. As such, indirect externality implication to other community(s) or entities can be in the form of downstream externality implication from hydroelectricity generation projects occurring upstream (see Case V for illustration) or other externalities that occur from activities within the industrial value-chain. For instance, externality caused to certain localities due to transmission lines stretching from distant hydroelectricity projects, or frequent movement of heavy trucks through localities afar from but falling en route between limestone mines and cement factories.

However, such indirectly affected communities may likely not fall within the criteria of benefit-sharing mechanism only limiting to the local community(s) directly affected by an exploitation project. In such context, the level of government (whether federal or subnational) with authority to administer resource revenue arising from resource exploitation projects should be held responsible for compensating such indirectly affected communities, most likely by parting resource revenue captured by the very government after all compensations are paid as demanded by the notion of benefit-sharing.

However, Interprovincial resolution, preferably with federal signatory (see later sections on instruments and institutions for resolving interjurisdiction externality impact from resource exploitation works), should be leveraged to address any direct or indirect externality implications to other local community(s) or entity(s) belonging to other provinces. Such is particularly true in a federal arrangement that awards provincial or local governments to administer resource revenue arising from resource exploitation works.

On the other hand, unilateral assessment of externality and decision to share benefits or compensation for affected local entities falling outside of a province's jurisdiction hosting the resource exploitation can cause interjurisdictional tensions. Since the province(s) hosting the affected localities could have differing and conflicting observations regarding the intensity and extensity of effect within their regional territory from resource exploitation works carried outside of their jurisdiction.

Indicator-based resource revenue sharing regime

The indicator or need-based resource revenue sharing regime[19] derives the community as an entire nation whereby resource revenues have an important role in contributing to interregional fiscal equality across the country. And such is achieved through the deployment of a certain fiscal equalization formula administered by the central government (Scott, 1975). The equalization formula enables the central government to distribute natural resource revenues to subnational authorities based on a set of objective indicators—such as population, revenue-generating capacity, poverty level, or geographic characteristics (e.g., remoteness)—irrespective of where the natural resources are extracted (NRGI, 2016).

19 From here onwards termed shortly as indicator-based sharing regime

Also, the equalization formula adopted by such sharing regime can be different from the formula deployed for other budgetary transfers to subnational governments commonly prevailing in the fiscal system of a federation (pp. 18-19).

Notably, this resource revenue sharing regime does not prioritize the idea of explicitly benefiting the population of the jurisdiction from where the resource revenue is derived in the first place. Also, indicator-based sharing regimes do not prioritize the objective of having a sharing system that recognizes local claims on the resource (i.e., customary ownership) to sufficiently compensate the regions for the disruption caused as a result of resource exploitation (NRGI, 2016). Instead, indicator-based sharing regimes can, in theory, be effective at targeting resource revenues to those who need them most (e.g., those in poorer regions, regions with less access to education, regions suffering from remoteness, or regions with less revenue-generating capacity) to address unequal regional development. NNRFC, while recommending sharing framework based upon a derivation-based sharing regime, has also considered the future potentiality of sharing resource revenue among provinces and local governments entirely deprived of resource revenue through the formulation of a rather inclusive resource revenue equalization criteria (NNRFC, 2020).

Comparative analysis of Derivation and Indicator based resource revenue sharing regime

First and foremost, the derivation-based sharing regimes are generally simpler to explain to citizens and key stakeholders, are often easier to calculate and require less data than an indicator-based sharing regime (NRGI, 2016). But the potentiality of this regime to effectively link the financing need of particular regional or local jurisdiction with the actual revenue shared with the very jurisdiction is doubted. It is because the resource revenue is shared with a particular subnational jurisdiction based on the quantity and value of resource exploitation present within the sub-jurisdictions irrespective of their service delivery responsibilities, development status, or financing needs (NRGI, 2016)

Experts fear that such regimes for revenue sharing can aggravate regional

income inequalities and make spending less efficient in countries where resource-rich regions are relatively wealthy, to begin with (NRGI, 2016). As such, resource-rich regional and local governments with fulfilled basic services infrastructure needs are likely to channel future streams of windfall resource revenue into wasteful & vanity projects and lavish benefits for the local population at the expense of other revenue deficit regions remaining starved of much-needed infrastructure and service needs [i.e., a typical case of differential Net Fiscal Benefit (NFB) discussed in (Shah & Qiao, 2018)]. Hence, the marginal efficacy of each unit of resource revenue spent by subnational governments could recede following serious misallocation of resource revenues by jurisdictions deserving share of resource revenue based on the derivation-based sharing regime (NRGI, 2016).

On such note, literatures identify indicator-based sharing regime to be more effective than derivation-based sharing regime at contributing toward national priorities concerning nationwide poverty alleviation, mitigation of interregional economic inequality, and equitable distribution of economic development through sharing of natural resource revenue in developing economies as Nepal (NRGI, 2016). But it takes a very robust and scientific interregional resource revenue equalization formula to achieve such objectives. Also, such vigorous equalization formula demands enormous amounts of detailed regional-level data that is often barely within the reach of the central government[20] of developing economies, let alone subnational authorities (p. 51).

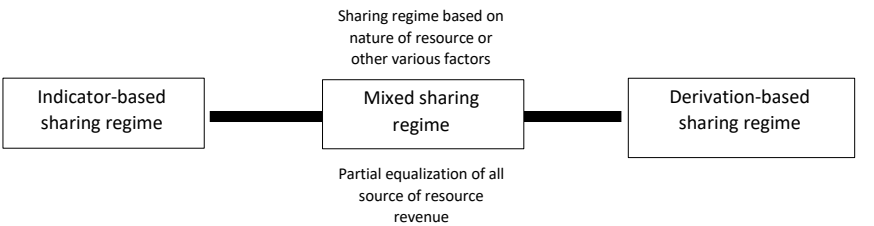
Hence, given the critical role of the level of governance overseeing the governance of an entire nation to administer such an interregional sharing regime, the central government can be recognized as the most suitable level of governance for sharing resource revenue through an indicator-based sharing regime as opposed to the expected role of subnational government in conducting derivation-based sharing regime.

On the other hand, many countries practice mixed sharing regimes with inspirations from both indicators and derivation-based sharing regimes

20 Central government/governance in this study shall refer to top-level government of all governance setup (I.e., federal or unitary). Meanwhile, federal government shall specifically refer to top-level government only of a federal setup

(NRGI, 2016). As such, while some countries qualify only specific nature of resources with significance to national economic development under the scope of the indicator-based sharing regime, others draw only a partial amount of resource revenue raised from resource exploitation to be shared based on the indicator-based sharing regime (i.e., partial equalization). For instance, while Canada maintains an impressive and thorough indicator-based equalization formula to equitably share resource revenue among its 'have' and 'have-not' States[21], only fifty percent of natural resource revenues raised by the State governments are included in this formula (p. 49)[22].

Figure 7: The continuum of resource revenue sharing regime



Case III (opinion piece): Economic and geographic characteristic of natural resources (or the manner of exploitation) as a basis for selecting a sharing regime

The economic significance of the natural resources (or the manner of their exploitation) and their geographical distribution within a country is considered a vital basis by multiple literatures to decide on the extensity of sharing the revenue availed from such resources. As such, resource revenues should be shared across all regions of the country through the adoption of an indicator-based sharing regime if the revenue gain from the sale or exploitation of natural

21 From here onwards State(s) represent nomenclature for regions as chosen by some federal or unitary regimes.

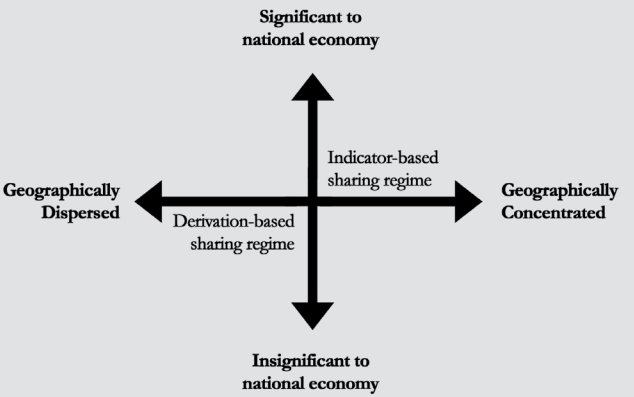
22 More on resource revenue sharing framework for Canada is discussed in following chapter

resources significantly contributes towards the national Gross Domestic Production (GDP) of an economy while being concentrated within specific geographic regions of the country. After all, resources or the manner of resource exploitation of such nature are of national economic significance and should be mobilized towards achieving balanced interregional development or fiscal equality. Furthermore, adopting such a sharing regime under the given circumstances may be essential despite the relative technical complexity in formulating an effective equalization formula to share the revenue from such natural resources. For instance, the Canadian economy that has mining and oil & gas extraction amassing 7.8% of the Canadian GDP (i.e., third-largest) in FY2019 (Statistics Canada, 2020) enlists fifty percent of the revenues from extractive resources into the indicator-based comprehensive national fiscal equalization formula to contribute towards interregional fiscal equality.

On the other hand, derivation-based sharing regimes can be applied for revenues arising from natural resources if the resource gains from such natural resources or from a certain manner of its exploitation are relatively inconsequential to the national economy and are distributed relatively uniformly. Apart from being least economically significant for achieving the national economic objective of the country, such nature of resources or their manner of exploitation is unlikely to cause regional inequality and misallocation of resource revenues, as shall be discussed in a later section. Thus, a simpler derivation-based sharing formula can be appropriate for such resource revenue.

The following matrix titled Significance – Distribution matrix graphically advises sharing regimes to be adopted for certain nature of the natural resource or their manner

of exploitation based on their economic significance and geographical dispersion.



In conclusion, the discussed literatures provided in the chapter deliver a valuable insight regarding the priority held on specific purposes and objectives of resource revenue and the prevalent resource revenue-generating method as the guiding factor for determining the resource revenue sharing regime to be adopted while identifying the level of governance most suitable to administer such resource revenue. Such insight, at first, can help explore resource revenue sharing modalities based on the purpose and objective of resource revenue most suitable in the particular context of Nepal as a country that hosts a distinct geological & economic landscape of natural resources. Also, it can assist in determining the level of government most suitable to administer resource revenue emanating from the exploitation of certain nature of natural resources or their manner of exploitation appropriate in the federal context of Nepal.

Figure A of Appendix – C introduces a suitability matrix that advises the use of particular resource revenue sharing regime to be administered by a particular level of government based on the conditioning variables being (i) method of resource revenue generation and (ii) economic significance of particular nature of the natural resource or its manner of exploitation

Analysis of resource revenue sharing for extractive resources

The determination of the most appropriate resource revenue-sharing modality also seems to depend on the characteristics of the natural resource being exploited. As such, extractive natural resources such as precious metals and minerals that are exhaustive have attracted numerous literary observations that deliberate upon the unique dynamics that govern such resources and prescribe sharing framework accordingly.

In such context, Rowell-Sirois Commission[23] had advocated for entire natural resource gain or resource revenue obtained from extractive natural resources to be assigned to regional governments (Scott, 1975). The Commission makes such a recommendation to ensure that enough proportion of the resource revenue is available to amortize the debt incurred in the development of regional infrastructure carried out also for the purpose to assist the development or exploitation of such resources and to prepare for the expenditures necessary when the resources are depleted (p. 10). After all, regions or provinces may face a financial burden if debt incurred from public spending or pledged fiscal responsibilities tied to certain resource exploitation projects have to be fulfilled without the aid of resource revenue (Scott, 1975). This recommendation further maintains that the shorter the life of the resources (i.e., quickly exhaustible), the larger the percentage of the resource revenue that should be directed to the government closest to the natural resource under extraction (p. 12).

Regardless, the literature also identifies viable extraction of resources to be partially dependent upon the federal fiscal decisions. Such includes capital expenditure on transportation (i.e., mining roadways and railways) and other infrastructures along with policy measures that regard the federal government as another deserving candidate to claim a particular share of resource revenue (Scott, 1975).

On the contrary, experts of fiscal federalism appear to have very largely supported the view that jurisdiction over extractive resources should be with the central government (Anderson, n.d.). Given that resource

23 A former Canadian royal commission investigating the federal-State relations of the Canadian federation

revenue or gains from such resources that significantly contribute to national Gross Domestic Production (GDP) is expected to be squared across all regions or provinces of a country by adopting a certain interregional fiscal equalization principle or formula as discussed in Case III (p.3). Although, this argument is predominantly held in the context of petroleum and precious mineral resources that tend to play a significant role in the national economy in most geographical regions where they exist (p.22). This assertion is sufficiently bolstered by other studies in South American countries that indicated neither economic growth nor public service outcomes improved following the collection of large oil or mineral revenue windfalls by subnational governments (NRGI, 2016).

In line with the observation, many modern federations allow the federal government to have constitutional control over the resource revenue yielding from extractive resources (Anderson, n.d.). Moreover, few developing devolved or federated economies even have federal government undertaking full rights of enjoyment, use, and management of petroleum resource gain obtained from whether onshore or offshore oilfields (p.13). Meanwhile, with resource extraction projects wholly owned by the federal government in its entirety, the federal government also entirely captures resource gains yielding from such extraction projects to administer and redistribute at federal discretion. Such constitutional mandate is prevalent regardless of the inhabitant of producing regions feeling strongly about property claims over local natural resources whether recognized in the constitution or not (Anderson, n.d.).

Nevertheless, few federal and devolved countries have engaged in limited devolution of revenue authority emanating from artisanal and small-scale mining activities especially involving the extraction of low-value mineral resources such as sand and gravel useful for construction purposes to regional or local entities (Anderson, n.d.). Such practice can be of particular interest in the case of managing resource revenues from numerous haphazardly scattered artisanal and small earth resource mining projects observed across the river banks of Nepal.

Regardless of the resource revenue-sharing framework devised by federal constitutions of likely devolved nature, the significance of the extractive

sector to the national economy strongly influences the politics around extractive resources. (Anderson, n.d.). As such, the federal government will tend to play or seek to play a key role, whatever the constitution provides via fiscal levers such as federal taxation policies, policies relating to extraction and distribution of extractive resources, export & import controls, regulations relating to interregional commerce, and price controls specifically regarding petroleum resources (p.11). Such resource revenue manipulation by the federal government through fiscal measures is even observed in the case of mature and developed federations such as Canada, where States reserve autonomy regarding natural resource governance and resource revenue administration (Scott, 1975).

The discussed prescriptions concerning extractive resources were based on the identified need for revenue from transient natural resources to match immediate regional and local expenditures. However, other literary observations identify other elements as immediate needs of a developing economy and the role of resource revenue from exhaustive natural resources in fulfilling such needs to be the most critical variables in determining the sharing framework for resource revenue raised from extractive sources.

Collier, Ploeg, Spence, & Venables (2010), through numerous case observations, recognize a constant need for channeling the resource revenue or the entire resource gain raised through the exploitation of extractive resources to finance public capital expenditure or the social transfer programs to combat poverty in developing economies. While the authors assert such needs as imperative, they advocate for resource-related revenue to be sufficiently handed over to the level of government most able to effectively channel the resource revenue towards the needed capital expenditure at a steeply rising path (p.97). And, given that the revenue derived from the sale of extractive resources are notoriously volatile, the authors also recognize the need for the resource revenue to be under the jurisdiction of the level of government most able to manage revenue volatility by possibly creating a separate Sovereign Wealth Fund (SWF)[24]

24 Sovereign Wealth Fund is a revenue stabilization fund created in order to moderate the flow of revenue by depositing excess revenue to a fund pool so that it can be drawn during the period of revenue deficit

or Stabilization funds to hedge the economy from the volatile nature of such resource revenues (p.86). Failing to manage the volatility of windfall gains from extractive sources can result in a tendency for the government to spend on conspicuous infrastructure projects during the period of resource boom followed by unsustainable borrowing and painful austerity of public expenditure leading to half-finished roads, unmaintained buildings, or public sector layoffs during resource busts.

In a nutshell, the level of government with such caliber to effectively manage natural resource revenue volatility in a newly federalized government is often the federal government with direct responsibility to take care of national economic development, social security, and poverty alleviation in developing economies. Also, the federal government has certain access to the global financial market to fully or partially diversify wealth funds away from the domestic financial risks. Besides, the federal government can also be expected to reserve data and capacity to predict resource revenues from extractive resources to manage the boom-bust cycles[25] (NRGI, 2016).

However, the authors convey that it is imperative to get resource revenues outside the central government's grip in countries with bad central governance with high chances of misaligned activities ranging from rent-seeking to corruption (NRGI, 2016). This advocacy is especially relevant in the context of resource revenue that does not require budgetary reporting [recognized as being extra-budgetary by (Shah & Qiao, 2018) and has severe chances for it to be misappropriated (p.107).

Similar to literatures consulted in previous sections, literatures concerning resource revenue sharing of extractive sources provides multiple viewpoints regarding the most suitable level of governance to hold controlling jurisdiction on such receipts based on the emphasis placed on numerous factors. Hence, great care should be taken in applying such literary observation based on weightage placed on certain elements considered most important, specifically in the context of the federal system of Nepal.

25 A boom-bust cycle is a series of events in which a rapid increase and decrease in economic activity oscillates indefinitely

Analysis of resource revenue sharing in the context of renewable natural resources

It is natural for a framework concerning resource revenue sharing for water resources to be significant in Nepal. After all, given the hydroelectric production potentiality from the river basins across the country as an example (see Table 4), resource revenue arising from the exploitation of rivers basin in Nepal can undoubtedly contribute significantly to the total resource-related revenue generated for Nepal in a given year. More so in the distant future, if not immediate.

Water resource as natural and renewable resource maintains specific characteristics that are unique from other extractive resources in that the given resource is often exploited for both consumptive and revenue-generating purposes (Ziberman & Parker, 1998). While the utilization of water resources for consumptive uses (i.e., for drinking, household utilization, and subsistence farming) ensures this resource to be a vital aspect of the local habitat and closely integrated into the socio-economic dynamics of the local inhabitants, its utilization for revenue-generating purposes (i.e., for navigation, irrigation of commercial farms, and hydroelectric generation) regards this resource as a beacon for economic development and national security (p. 90).

However, exploitation of hydrological resources in general and river system in particular for revenue generation purposes is highly likely to cause disturbances in the status-quo of the water volume, quality, and river course for other regional jurisdictions of a federation. It is apart from direct disturbances for local communities having systemic socio-cultural and economic integration with the water resource (likely to be addressed through the benefit-sharing mechanism discussed earlier) within the host region[26]. In comparison to the exploitation of other kinds of natural resources, exploitation of water resources, especially from a river system, is likely to have a far-reaching impact in terms of the area affected within the shared basin incorporating multiple regional jurisdictions.

26 See Bhandari (2015) to learn about the mechanisms to address direct affect of water resource exploitation for the purpose of hydroelectricity generation

Literary observations of instruments and institutions devised for achieving equitable compensation during the exploitation of shared water basins

The sharing framework for water resources in a federation can be expected to be sensitive to the peculiar way by which exploitation of a shared water basin is often likely to engage stakeholders of other semi-autonomous regional and local jurisdictions far beyond the project location. Hence, to justifiably compensate such a larger pool of affected stakeholders, multiple literatures have discussed innovative instruments and institutions such as water trading/markets (Ziberman & Parker, 1998), Federal-Interstate Compact (Cairo, 1998), Watershed approach (Wayland & Lewicki, 1998), Diversion capping (Pigram & Musgrave, 1998), etc. as the tools for handling interjurisdictional externality from the exploitation of shared water resources in a federated setup. Such instruments are applicable in governance systems that have devolved subnational jurisdictions (especially at the provincial or regional level) with the autonomy to authorize resource exploitations and are responsible for effective and justifiable administration of natural resource revenues.

In particular, water trading/market instrument through an active, passive, or block trading system enables a subnational jurisdiction (likely a water district[27] or a province/State) to purchase rights or ownership of a certain volume of water from another jurisdiction beyond what is allocated to it initially as part of the river basin (Ziberman & Parker, 1998). It is to compensate the latter for the disturbances borne by exploiting shared basins for consumptive or commercial use (p. 96). By compensating the latter for the amount of water overused through an interjurisdictional pricing mechanism, the instrument attempts to create a sharing mechanism amongst multiple subnational jurisdictions concerning water resource exploitation by creating a market system for the resource itself.

However, the instrument/market reserves certain limitations. It seldom accounts for other disturbances such as degradation in water quality, other environmental problems, difficulties of having to relocate, etc., caused

27 See Griffin (1998) to learn about how water districts serve as custodian of water rights in the State of Texas

by large projects such as hydroelectric dam construction[28]. Regardless, this instrument enables some form of provision to compensate other jurisdictions affected by the reduced volume of water available than previously allocated during water diversions for irrigation, industrial, or hydroelectric generation purposes in a particular jurisdiction.

Literatures also recognize interjurisdictional institutions such as the federal-Interstate compact to be visibly effective in resolving all nature of issues related to exploitation of shared water basins across State jurisdictions from an observation made in the particular case of Delaware[29] and Susquehanna[30] river basins of United States of America (USA) (Cairo, 1998). Such compacts awarded with parliamentary approval of both federal and concerned State governments are designed as the broadest and most comprehensive authority to address all issues related to water quality, interstate allocation of water resources, and other effects concerning developments and exploitations involving a shared water basin (p. 123).

However, a statement from the US House Judiciary Committee implies the cruciality of a federal vote in any interstate or interprovincial compacts to address interjurisdictional issues at the regional level (Cairo, 1998). The committee observed the sole voluntary cooperation of States sharing a shared water basin to be less effective in resolving issues raised by the exploitation of interjurisdictional water basins (p.121). And therefore, the federal vote representing the interest of all subnational jurisdictions involved in such delicate matters is warranted. A literary observation studying the effectiveness of an institutional arrangement resembling the federal-Interstate compact for sustainable exploitation of Murray and Darling River basins in Australia through the medium of the intergovernmental forum called Council of Australian Governments (COAG) formed in 1992 has also made a similar observation (Pigram & Musgrave, 1998). The literature insists the role of COAG formed under

28 Mai, et al., (2018) and McCully (1996) identifies widespread non-quantitative effects of hydroelectric dam in upstream, downstream, and in entire floodplain region.

29 Delaware river basin straddles across the east coast States of Pennsylvania, Maryland, New Jersey, Delaware and New York

30 Susquehanna river basin straddles across the east coast States of Pennsylvania, Maryland, and New York

the cooperative federal structure of Australia to have remained catalytic in the formulation and implementation of the water resource sharing framework in the Murray-Darling basin straddling five eastern States[31] of the country (p. 133).

> *Case IV (opinion piece): Practicing water trading instruments for compensating artisanal and small-scale exploitation of shared aquifers*
>
> Water trading mechanism that addresses the overuse of surface water in a particular jurisdiction for commercial use may also be particularly applied in the context of artisanal and small-scale exploitation of groundwater for communal, domestic, or industrial use from aquifers shared between multiple local jurisdictions. Such artisanal and small-scale exploitation of ground water from a shared aquifer is likely to have its externality implication limited across local jurisdictions than across a region as in case of larger exploitation of river basins for larger hydroelectric and irrigation projects. Hence, local jurisdiction if authorized to autonomously allow exploitation of a particular shared aquifer may undertake the role of compensating or rewarding other local jurisdiction (with State signatory) affected by such groundwater exploitation through the mechanism of water markets. However, enactment of prior allocations and regulations related to groundwater rights is preliminary in order to enable practice of such trading instruments for exploitation of shared aquifer (Ziberman & Parker, 1998).

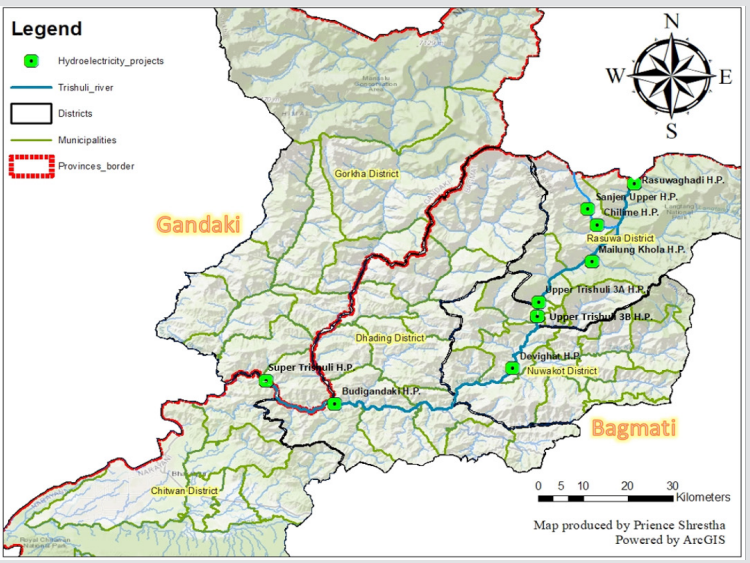
It is important to note that the feasibility of instruments and institutions to address interjurisdictional externalities relating to the use of water resources depends on the existence of a firm property rights system, as briefly discussed in an earlier section. After all, a workable system of property rights that implement comprehensive systems of water allocation

31 The States include Queensland, New South Wales, Australian Capital Territory, Victoria, and South Australia from north to south

across jurisdictions & communities, along with precise specification in terms of ownership, volume, and transferability of water resources, is a prerequisite for the effectiveness of water trading systems and institutions engaged in providing a sound framework for equitable sharing of water resource revenue (Pigram & Musgrave, 1998). On the other hand, lack of consistency in determining property rights regimes can, in turn, impede the formulation of a sound water resource-related sharing framework that finds common ground among all stakeholders engaged (p. 141).

Observation of literatures discussing instruments and institutions devised for sharing resource revenue emanating from shared water basins provides helpful insight on leveraging market mechanisms and specialized executive framework for ensuring equitable sharing of benefit or resource revenue from water resources. Though the scope of study strives to prescribe a suitable legislative framework regarding sharing resource revenue across the three-tier government, it welcomes such atypical ideas about the executive arrangement to aid equitable sharing of resource revenue or benefit.

Case V (opinion piece): Case observation of interjurisdictional externality from exploitation of Trishuli river



Trishuli River straddling the northern and western region of Bagmati province before merging with Budhi-Gandaki, Marsyangdi, and finally Seti-Gandaki River along the western edge of the province connects multiple local municipalities within the Rasuwa, Nuwakot, Dhading, and Chitwan districts. As such, hydroelectric projects at various municipalities along the upper section of Trishuli river (i.e., upstream) is likely to affect river course, quality, and volume of the water of neighboring and afar municipalities hosting the lower section (i.e., downstream) of the river, particularly in Chitwan district. However, if such interjurisdictional effect or externality occurs at the intra-provincial level, the compensation or reward provision for the indirectly affected local jurisdiction from the establishment of hydroelectricity projects may be dealt with directly under the provincial authority. As such, the criteria or indicator for redistributing resource revenue among directly and indirectly affected local communities from such manner of exploitation as formulated by the NNRFC and listed in Table B of Appendix-A can be referred to. Of course, with the assumption that provincial governments are devolved with authority to administer resource revenue emanating from the exploitation of river basins in the manner of hydroelectricity generation.

But, given that the Trishuli river also geographically passes along the southern edge of the Gorkha district that fall within the neighboring province of Gandaki soon after it merges with the Budhi-Gandaki River, the localities within the Gandaki may also suffer the interjurisdictional effect or externality from hydroelectric projects located at upstream Trishuli river within Bagmati. In the event of such interjurisdictional externality at the provincial level, executive arrangement/compact for an entire Narayani basin with the cooperation of concerned provinces with federal

signatory as discussed earlier could be leveraged. It shall help devise an effective compensation mechanism for water resource-related disputes at the Interprovincial level. After all, direct enforcement of criteria/indicators formulated by the NNRFC to address interprovincial externalities could be met by the conflicting opinion of the provincial government hosting the indirectly affected local community for the reasons also provided in Case II.

Chapter 3

Country Cases

This chapter begins by looking into various resource revenue-sharing frameworks practiced by different countries worldwide to meet their respective political, social, and economic objectives. It shall be observed that almost all countries with resource revenue to share subscribe to resource revenue-generating methods and sharing frameworks that include a mix of multiple bases and sharing regimes deliberated in the earlier chapter of this study. While some countries practice a sharing framework that provides equal weightage to either sharing regime (i.e., derivation and indicator-based), others prioritize either of the sharing regimes with only a hint of the other. Meanwhile, only a few countries entirely subscribe to a single resource revenue-generating basis or regime in its sharing framework.

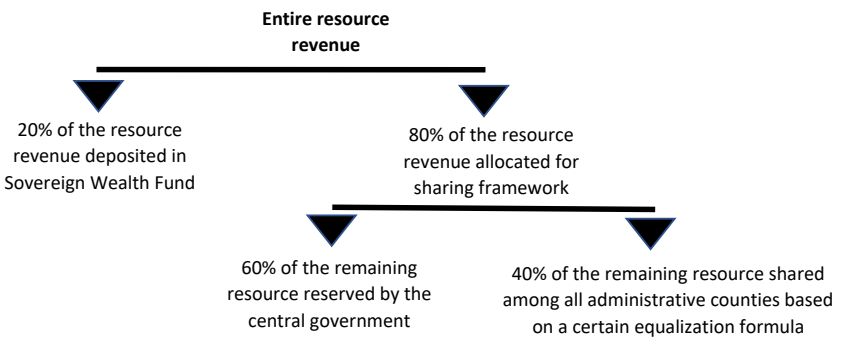
Resource revenue sharing framework practices

Resource revenue sharing framework based on a particular sharing regime

The Republic of Kenya lying on the eastern coast of the African continent can be accurately exemplified as a country subscribing to a particular sharing regime. With a unitary administrative system composed of one central government and 47 administrative counties, Kenya generates revenue from both tax and royalty bases. Meanwhile, the country strictly follows the indicator-based sharing regime to share resource revenue

across all administrative counties based on the Natural Resource sharing bill, 2018 (Kimenyi, 2013). With the provision to deposit 20% of all resource revenue into the country's SWF, the central government reserves 60% of the remaining 80% of the resource revenue raised while securing the rest for the 47 administrative counties (Kimenyi, 2013). The 40% of the remaining resource revenue allocated for the administrative counties is further divided among counties based on a specific fiscal equalization principle as provided in row A of Appendix-B of this paper exhibiting the resource revenue sharing framework practiced in countries worldwide.

Figure 8(a): Resource revenue sharing framework of Kenya



On a similar account, the Republic of Peru, lying at the western edge of South America, entirely subscribes to the derivation-based sharing regime whereby all resource revenue generated through tax or royalty is shared only with the revenue-producing jurisdictions. As such, this South American country with a unitary administrative structure composed of one central government, 25 regions, 196 provinces, and 1868 districts employs a specific equalization formula for sharing resource revenue between its layering administrative governances (Aresti Lasa, 2016). However, the equalization formula for sharing resource revenue based on the derivation sharing regime is distinct by whether the resource revenue was generated based on tax or royalty. See row E of Appendix-B to learn Peru's sharing framework based on a derivation-based sharing regime for revenue generation by both royalty and tax basis.

In contrast, countries such as Indonesia, Kyrgyzstan, Canada, DRC, and

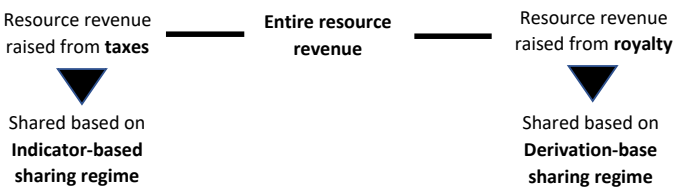
Bolivia subscribe to a mixed form of sharing framework with more or less provisions provided to either of the sharing regimes. However, each country's sharing framework is unique in respect to different manners of how sharing regimes are assigned or applied. Regardless, the countries can be casually classified based on the certain bases upon which the countries have distinctively assigned the sharing regime.

Resource revenue sharing framework based on bases of resource revenue generation

At first, Bolivia [at least specifically in exploiting extractive (hydrocarbon) resources] adopts the basis for assigning sharing regimes in their sharing framework based on resource revenue generation. As such, the sharing regime applied for a portion of resource revenue generated within the country would depend on whether tax or royalties-based method of resource revenue generation was used. For instance, all royalty-based resource revenue generated in Bolivia is distributed between four producing departmental governance and two non-producing departmental governance somehow affected by the exploitation of hydrocarbon resources in the region. The unitary administrative structure of Bolivia consists of one central government, nine regional departments, 339 municipalities, and 1374 cantons (Bolivia Revenue Sharing, 2016).

On the contrary, the central government divides revenue obtained from direct taxation on the exploitation of hydrocarbon (Spanish acronym, IDH) among different municipalities classified based on their population, as exhibited in row G of Appendix-B. Suffice to say, an indicator-based sharing regime with consideration for the population as the only indicator element is applied for resource revenue generated from taxation.

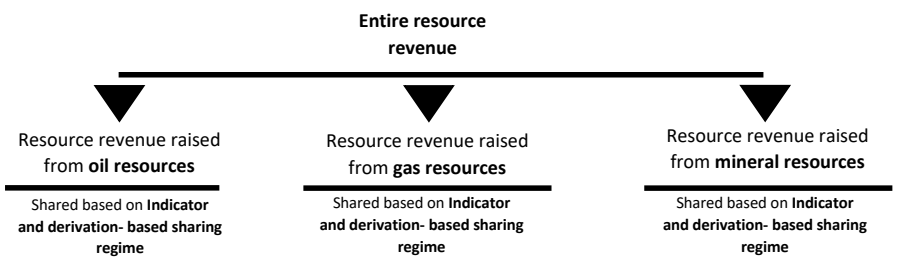
Figure 8(b): Resource revenue sharing framework of Bolivia



Resource revenue sharing framework based on the nature of the natural resources exploited

Secondly, the Republic of Indonesia adopts the basis for assigning sharing regimes in their sharing framework entirely based upon the nature of the natural resources present in the country. Regardless, the sharing framework for all three natures of extractive natural resources (i.e., oil, gas, and minerals) exploited in this Asian country located in maritime Southeast Asia provides resource revenue sharing based on the derivation and indicator-based sharing regime. However, the proportion of resource revenue shared between the unitary administrative system of Indonesia composed of one central government, 32 States, and 434 districts, is varied (Arora, Ghose, & Bakshi). Also, it is important to note that the indicator-based sharing regime adopted for sharing all three natures of extractive natural resources among the Indonesian administration ironically does not refer to any indicator. It is instead equally distributed across all districts (also termed as an absolute fiscal rule). See row B of Appendix-B to observe the equalization formula adopted for sharing resource revenue among multiple jurisdictions of Indonesia.

Figure 8(c): Resource revenue sharing framework of Indonesia



Resource revenue sharing framework based on mixed elements

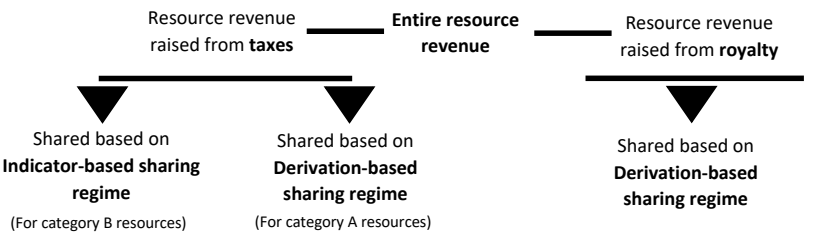
DRC, lying in Central Africa, applies sharing regimes based on revenue generation and the nature of extractive natural resources exploited in the country. It is in contrast to the resource revenue sharing frameworks adopted in Bolivia and Indonesia based on revenue generation or the nature of natural resources.

In a rather detailed sharing framework of DRC, resource revenue generated from royalty-basis is shared entirely based on a derivation-based sharing regime, whereas the resource revenue generated from tax-basis is shared either based on a derivation-base sharing regime or indicator-based sharing regime based on the nature of natural resources.

The country applies an indicator-based sharing regime for resource revenue generated from oil explorations (classified under Category B). As such, 40% of the resource revenue available to the Ministry of Finance of the central government from such extractive resources is shared between all States of DRC based on a specific indicator-based Interstate fiscal equalization formula (Iwerks & Toroskainen, 2017). In addition, another 10% is shared with the State hosting the exploitation work (i.e., derivation-based), followed by another 10% deposited in the fund created to support equal development across all States (p.3). Such category of resource revenue is treated differently from other nature of natural resources classified under category A (also raised from tax-basis) of which 25% of the resource revenue is shared with the particular State hosting the resource, and 15% to the particular town and municipality in where extraction activity is conducted (p.3).

The methodology of revenue sharing framework for resource revenues generated from different bases or nature of resources earmarked for different purposes is described in row F of Appendix-B.

Figure 8(d): Resource revenue sharing framework of Congo



Resource revenue sharing framework based on the size of the mining exploitation projects

Apart from the assignment or application of sharing regime based on resource revenue generation, nature of resources, or the blend of both, sharing regime is also applied based on the size of the resource exploitation project as observed in the unique sharing framework of the Kyrgyz Republic or Kyrgyzstan. In the unitary administrative structure of this Central Asian country with one central government, seven States, 40 districts, and 453 municipalities, the application of indicator-based sharing regime is varied based on whether the exploitation project is classified as large or small, at least for the extractive resources excluding gold and petroleum. While both classifications of resource exploitation projects allow provision for both derivation and indicator-based sharing regimes in a cascading manner, the application of the derivation-based sharing regime is nevertheless uniform for both classifications of projects.

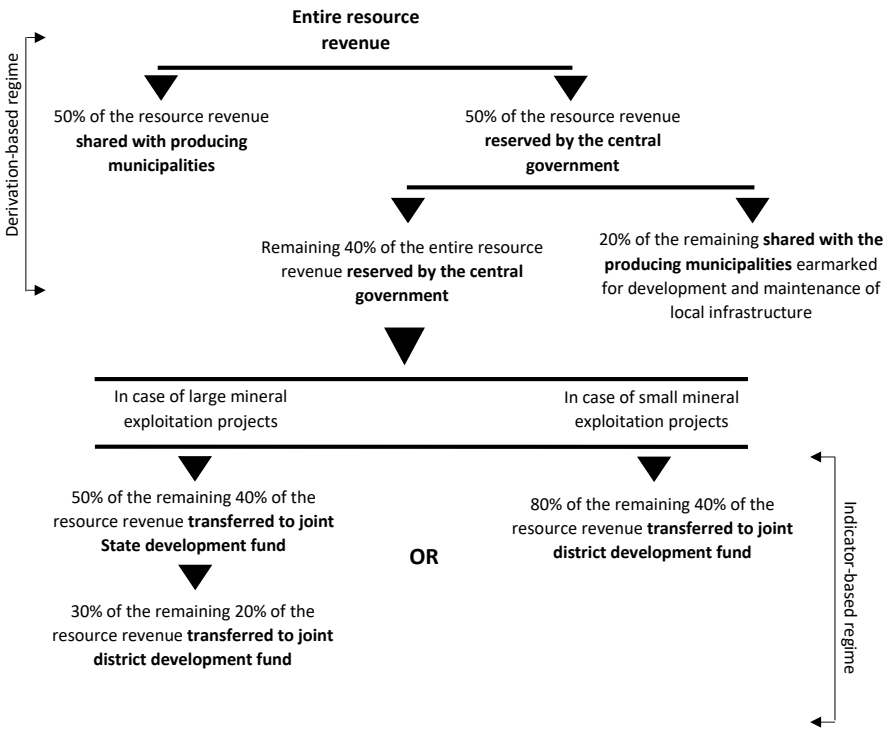
In such a context, the central government shares 50% of the resource revenue obtained from listed mineral exploitation with the producing municipalities. The central government further shares 20% of its 50% share (i.e., 10% of the entire resource revenue) with the producing municipalities earmarked for local infrastructure development and maintenance (OECD & UCLG, 2019). While the derivation-based sharing of resource revenue concludes with such simplicity, the sharing of the remaining proportion of resource revenue available to the central government by the indicator-based sharing regime is unique based on whether the mineral exploitation project is large or small.

As such, while the central government is left with 80% of the 50% of the resource revenue reserved (i.e., 40% of the entire resource revenue), the central government transfers another 50% of its remaining 40% of the revenue (i.e., 20% of the entire resource revenue) to joint State development funds. The central government finally shares another 30% of the remaining 20% of the resource revenue (i.e., 6% of the entire resource revenue) to joint district development funds expected to benefit all municipalities of the country in case of mineral exploitation projects classified as being large (OECD & UCLG, 2019). In contrast, only 80% of

the remaining 40% of the resource revenue reserved initially by the central government after fulfilling the derivation-based sharing requirement is transferred to the district development funds to benefit all municipalities in case of mineral exploitation projects classified as being small (OECD & UCLG, 2019).

As such, the central government reserves 14% of all resource revenue regarding large mineral exploitation projects leaving 86% of the revenue among subnational entities. At the same time, it reserves only 8% of all resource revenue, leaving 92% of the revenue among subnational entities regarding small mineral exploitation projects after sharing resource revenue with lower-tier governments through both derivation and indicator-based sharing regimes.

Figure 8(e): Resource revenue sharing framework of Kyrgyzstan



Resource revenue sharing framework based on partial equalization

Canada and the Republic of Iraq practice partial equalization methodology in their sharing framework compared to other case countries discussed earlier. The two federal countries with two of the most detailed and sophisticated sharing frameworks qualify a portion of their collected resource revenue to be shared via indicator-based sharing regimes while reserving the rest to be shared based on derivation bases.

First and foremost, Canada, lying in the northernmost part of North America, applies a precise equalization formula for sharing revenue obtained from twenty listed non-natural and natural resource-based sources (see Table 3) that come under the purview of the Federal-State Fiscal Arrangements Act of 1967 (Courchene, 1975). Hence, a single fiscal equalization mechanism is adopted to share revenue from all sources enlisted as per the Act.

Table 3: Twenty listed revenues selected for the Canadian fiscal equalization formula

S.N.	Revenue headings	Nature of revenue
1	Personal Income Tax	Tax revenues
2	Corporate Income Tax	
3	General and miscellaneous sales tax, tobacco taxes, and amusement taxes	
4	Motive fuel taxes	
5	Succession duties and gift taxes	
6	Race track taxes	
7	Miscellaneous State taxes	
8	School purpose taxes	
9	Motor Vehicle licensing revenue	Non-tax revenues
10	Alcoholic beverage revenues including profits of provincial liquor boards	
11	Hospital and medical care insurance premiums	
12	Water power rentals	
13	Miscellaneous State revenues	

14	Forestry revenue	Natural resource revenues (tax-based and royalty-based)
15	Oil royalties	
16	Natural gas royalties	
17	Sales of Crown leases and reservations on oil and natural gas lands	
18	Oil and gas revenues other than those described in lines 11, 12, and 13	
19	Metallic and non-metallic mineral revenues	
20	Payments by the government of Canada pursuant to A. Public Utilities Income Tax Transfer Act B. Part V of the Federal-Provincial Fiscal Arrangements Act, 1972	Special transfers

Source: Courchene (1975)

Also, the framework only draws 50% of the revenue obtained from listed sources into the fiscal equalization scheme for sharing on the indicator basis with ten autonomously functioning States of the country[32]. The States raise revenues from natural resources in royalty payments as per the autonomous authority over natural resources provided to the State governments by the British North America (Constitution) Act, 1867 (Lederman, 1975). However, the equalization payments concerning revenue from all sources are directly withdrawn from the federal purse, including the share of revenue obtained from Corporate Income Taxes (i.e., tax-based resource revenue generation) levied on resource exploiting enterprises (Courchene, 1975).

The precise formula for equalizing revenues over each of the twenty-odd revenue sources is as follows:

$$\mathbf{E_{ij} = TR_i\ [P_j/P_c - B_{ij}/B_{ic}]}$$

$\mathbf{E_{ij}}$ = the equalization payment to province J arising from revenue source I
$\mathbf{TR_i}$ = total revenue from revenue source I.
$\mathbf{P_j}$ = population of province J
$\mathbf{P_c}$ = population of Canada.

32 Apart from 10 autonomously operating States, there are three other federal territories in Canada named Northwest Territories (NT), Yukon, and Nunavut

$\mathbf{B}_{ij}$ = tax base in the province I for revenue source J
$\mathbf{B}_{ic}$ = total tax base in Canada for revenue source I

As per the equalization formula, for a particular revenue source, if a province's proportion of Canada's population exceeds its proportion of the aggregate revenue source base, then it is entitled to an equalization payment (Courchene, 1975). For instance, suppose total revenue from a particular revenue source was 1 billion dollars. Suppose further that the State of Nova Scotia's proportion of this tax base was 2.65%. Compared to its share of Canada's population (i.e., 3.65% in 1973-74), Nova Scotia would have a so-called "fiscal capacity deficiency" of 1%. Accordingly, the State's equalization payment deriving from this revenue source would be 1% of 1 billion or 10 million dollars.

Importantly, these equalization payments are calculated for each revenue source, and the resulting entitlements are then summed. If the sum is positive, the resulting figure is the amount of the State's equalization payment. If the sum is negative, the province is deemed a 'have State' and receives no equalization payments (Courchene, 1975). If a State has no tax base for a particular revenue source, the fiscal capacity deficiency equals its share of the population (p .77).

Secondly, the Republic of Iraq, lying at the center of Middle-east Asia, practices a partial equalization method of resource revenue sharing. The Ministry of Oil (MoO), an Iraq Federal Government (IFG) agency, partially shares the proportion of raised resource revenue in royalties, fees, taxes, or direct resource gain through the exploitation of extractive resources (i.e., oil and gas) within the country [excluding the Kurdish Region of Iraq (KRI)] from contracted resource exploitation enterprises by the indicator-based regime to all State governments in the form of Regional Development Program (RDP) (Aresti, 2016). The RDP is specifically earmarked to finance the reconstruction and development of infrastructure projects ruined during the recent wars on terrorism and other internal conflicts. This indicator-based sharing regime essentially holds the population present in the districts and sub-districts of each State as the only indicator that determines the sharing proportion (p. 17). The federal administration of Iraq consists of one central government,

18 states (of which three States[33] fall under the KRG), and other districts and sub-districts.

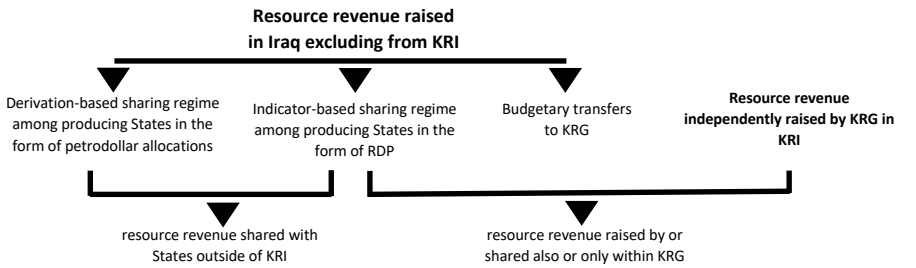
Likewise, the Ministry reserves the remaining portion of the resource revenue to be shared with the State governments for sharing among the resource-producing States in petrodollar allocations (i.e., derivation-based sharing regime). The concept of petrodollar allocations as a form of the derivation-based sharing regime is based upon the requirement to pay a certain amount of United States dollars (USD) to oil-producing States as dictated in the annual State Budget Law (SBL) drafted by the IFG (Aresti, 2016). For instance, the provision of IFG 2010 SBL requires IFG to pay USD 1 to oil-producing State governorates per each barrel of oil produced, each barrel of oil refined, or each 150 cubic meters of natural gas produced (p. 16). However, it is essential to note that such a sharing regime excludes State governments functioning under Kurdistan Regional Government (KRG), unlike the RDP which qualifies all States.

It is important to note that State governments in Iraq cannot obtain direct revenue from resource exploitation, and therefore can only obtain resource revenue through the above-mentioned IFG's sharing framework. However, this legislation does not apply to the autonomous KRG that raises signature bonuses, corporate income tax, and royalties from Independent Oil Corporations (IOCs) actively exploring within the autonomous KRI[34] (p. 7). This level of fiscal autonomy in resource revenue determination and raising is on par with the provision allowed for State governments in Canada. In addition to IDP, KRG also separately receives budgetary transfers from IRG as detailed in row H of Appendix-B (p. 16). Such transfers for a regional government are undoubtedly an exceptional privilege in terms of resource revenue sharing provision. However, how the KRG shares its share of resource revenue with three States functioning under it is undisclosed by the regional government. And therefore, a significant lack of transparency remains in terms of the resource revenue sharing framework practiced within KRG (p. 22).

33 States that fall under the governance of KRG are Erbil, Dohuk, and Sulaymaniyah

34 see Row H of Appendix-B for further detail on how KRG interpedently performs PSCs with IOCs, and also carries out its own independent resource sales

Fig 8(f): Resource revenue sharing framework of Iraq



Critical insights from resource revenue sharing frameworks

The foremost insight from the observed sharing framework of the case countries is that the central government appears to mostly undertake the authority and responsibility of raising and sharing the resource revenue among the subnational governments regardless of the administrative system (i.e., federal or unitary) adopted in the country. The extraordinary authority of subnational governments to entirely administer resource revenue was only present in a dualist federation as in Canada, with a significant amount of authority vested upon the State government. Or, such could have been prevalent among the regional governance sharing lesser nationhood (or nationalistic leaning) with the country as in the case of KRI and Aceh State of Indonesia, of whose the central government vows to prevent potential attempts for secession with generous devolution of resource revenue administering authorities when applicable.

Also, specific resource-rich subnational authorities with exclusive resource revenue raising and sharing authorities were likely to consistently reserve more proportion of resource revenue in comparison to other subnational governments dependent upon the resource revenue receipts to be shared by the central government regardless of the quantity of natural resources existent in their regions. For instance, the resource-rich States of Canada (i.e., Alberta, British Columbia, Saskatchewan, etc.) and the Aceh[35] State of Indonesia are allowed to keep 50 percent or more of resource revenue arising from the exploitation of resources existent in their territories.

35 The provision for Aceh to keep 70% of the revenue arising from sale of oil and gas was agreed to only last 7 years from the date of agreement in 2005

Likewise, the KRG of KRI has an agreement to retain entire resource revenue from the independent sale of oil and gas explorations above 250 thousand barrels of oil produced in the oil-rich States of KRI. Undoubtedly, such a proportion of resource revenue provision held by such States or regions in the derivation-base sharing regime is higher than other subnational governments without autonomous privileges on resource-related affairs.

However, subnational governments with arrangements to depend on the central government for resource revenue receipts do not seem to receive a consistently low proportion of resource revenue. Instead, the resource revenue receipts for such subnational governments were rather varied in that the receipts range from as low as 15.5% in total for States and districts of Indonesia from oil revenue (see row B of Appendix-B) to 92% of resource revenue for subnational governments of Kyrgyzstan from revenue arising from small minefields (see row C of Appendix-B). Regardless, the study observes a stronger correlation between the higher authority of the subnational government regarding resource revenue administration and the proportion of revenue shared from resources within the jurisdiction.

Lastly, all case countries have used population as the indicator for sharing resource revenue based on the indicator-based sharing regime in the observed country cases. Other than that, the countries referenced other indicators such as production capacity, demographics, poverty index, land size, and fiscal responsibility during resource revenue sharing through indicator-based regimes.

Handling Domestic conflict/dispute in regards to resource revenue sharing

The study observes Interjurisdictional disputes or disputes between the resource exploiting enterprises, licensing governments, and local inhabitants to have been commonly handled through negotiations and dialogues between the concerned stakeholders and agencies in the studied case countries. Meanwhile, domestic dispute handlings have also required international mediation apart from domestic engagements to generate

consensus among conflicting parties in most cases. For instance, the dispute between the central government of Indonesia and the State of Aceh in western Indonesia regarding the rights and sharing of resource revenues from extractive resources (oil and natural gas) discovered within the jurisdiction of Aceh in 1971 required international mediations. The intensity of the dispute followed by aggressive events also contributed to almost a three-decade-long civil war (1976 – 2005) between the Indonesian government and the Aceh population (UNEP, 2015).

The Centre for Humanitarian Dialogue (or CHD) had mediated the Geneva peace process as part of the international mediation effort to resolve the violent interjurisdictional dispute in this Southeast Asian maritime region. It was followed by the former Finnish president Martti Ahtisaari mediating the Helsinki peace process between 2000 – 2005 to create a peace framework agreement that led the way for the establishment of the Memorandum of Understanding (MoU) between the two parties in 2005 (UNEP, 2015). As part of the MoU, the Aceh government could retain 70% of its oil and natural gas revenues for the next eight years before the resource revenue would come under the Republic of Indonesia's usual resource revenue sharing framework (UNEP, 2015).

On the other hand, conflicts of lighter intensity, although violent, have been successfully mitigated through negotiations and dialogues between the domestic stakeholder only with assistance from the international non-governmental agencies. In such context, the study observes disputes between the resource exploiting enterprises, licensing governments, and the local inhabitants in Kyrgyzstan and Canada regarding extensive environmental, socio-cultural, and local economic damages caused by exploitation activities to have been resolved through negotiation between State governments, local community, exploitation enterprises, and International non-governmental environmental agencies. The conflicts were born out of incidents that involved serious human causalities due to the spillover of harmful chemicals in the local river bodies in the vicinity and proximity of the Kumtor Gold mine of Kyrgyzstan (Ryskeldi, 2016) and the significant slump in the local economy and rise in local unemployment in the Great bear rainforest of Canada due to rapid logging (UNEP, 2015).

Such conflicts in both countries culminated in grave local unrest that even warranted the use of force from the authority. However, dialogues and negotiations among the involved stakeholders of both regions enabled consensus and resolution for compensation (UNEP, 2015).

In the case of the Kumtor region in Kyrgyzstan, the stakeholders were able to resolve the dispute after a particular local policy reformation was enacted that required local communities to engage in the mining licensing process and monitoring the auction process (UNEP, 2015).

Likewise, the resolution for the conflicted region of the Great bear rainforest was reached in 2001 when the stakeholders came to an agreement framework consisting of

- Logging deferrals in 100 valleys in the region and protection of 830,000 hectares of old-growth forest
- Establishment of an independent group of scientists to advise the best use of the land and rainforest safeguard funded by the provincial government, central government, forest companies, and the environmental organizations
- Initiation of ecosystem-based management approach to move away from traditional forestry approach to a sustainably functioning ecosystem approach
- Establishment of a financial package of $35 million to cover up for the damages done by forest logging and other land issues along with further discussion between different levels of governance and the local community to form a financial base to support the biodiversity and the local economy of the Great bear rain forest

(UNEP, 2015)

On a similar account, the study observes the engagement of international agencies specializing in resource governance and sharing helped resolve the interjurisdictional complexity and grievance regarding resource revenue sharing, almost turning into a conflict in DRC (Iwerks & Toroskainen, 2017). A comprehensive reassessment of resource revenue shared by the

central government with the subnational governments was carried out to ensure that the federal government equitably shares resource revenue with the subnational jurisdiction as per the agreed-upon resource revenue sharing framework (p. 6). Extractive Industries Transparency Initiative (EITI) assisted in conducting the assessment to scientifically compare the resource revenue subnational governments were receiving compared to what they were entitled to receive and the timing of the transfers (p. 6). Such assessment is believed to have eliminated confusion related to calculations of resource revenue sharing and enabled subnational governments to receive entitled amounts of resource revenue. Otherwise, the autonomous action of the local and State governments to continue raising subnational taxes on resource exploitation against the national law to compensate for the gap between entitled and received resource revenue would have created sub-optimal situations in the resource extraction industry while also igniting conflict with the central government (p. 3).

Apart from negotiations, dialogues, and mediations to resolve conflicts concerning resource revenue sharing, few countries already have institutional arrangements established to handle the particular nature of such conflicts. As such, the Commission of Revenue Allocation (CRA) of the central government responsible for deciding and compensating the affected jurisdictions (i.e., executive arrangement) handles horizontal interjurisdictional disputes among the administrative counties of Kenya in regards to sharing of revenue from the exploitation of resources straddling across multiple jurisdictions (Kimenyi, 2013). Nepal also provisions a similar arrangement with the establishment of the NNRFC.

Chapter 4

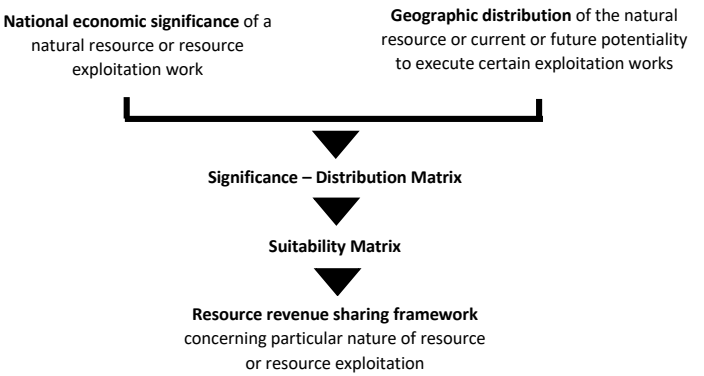
Analysis for Nepalese context

Sharing provision of resource revenues received from hydroelectricity generation

Exploring the sharing provision of resource revenue earned from the hydroelectricity generation requires identifying the direct economic significance and the geographical distribution of the hydroelectricity generation and its potentiality across the country. These two conditioning factors can help identify the suitable sharing regime for resource revenue emanating from hydroelectricity generation when processed through the Significance - distribution matrix introduced in the Case III of this study. Furthermore, the Suitability matrix presented in Figure A of Appendix – C can further enable the identification of the level of the governance most appropriate to administer resource revenue obtained from hydroelectric generation. The suitability matrix determines the most suitable level of government to administer resource revenue based on the prescribed sharing regime and economic significance of natural resources or their manner of exploitation.

The matrices provide the pathway for conceptualizing or exploring sharing modality of revenue generated from hydroelectricity generation, as also figuratively provided in Figure 9.

Figure 9: Mechanism for exploring resource revenue sharing modalities based upon the indication of Significance - Distribution matrix and Suitability matrix



Economic significance and geographical distribution of hydroelectricity generation activities

Multiple prior literatures and opinion pieces identify hydroelectricity to be of national economic significance to Nepal. As observed in Table 4, Nepal retains the theoretical potential to generate 83,280 MW of electricity from its river basins, whereby the feasible potentiality remains at 43,000 MW (Bhadari, Joshi, & Shrestha, 2019). However, very few proportions of the estimated potentiality have been exploited yet. As such, the current hydroelectricity generation figure stands at a mere 1,261.709 MW (i.e., approximately 2.93 percent of the nation's feasible potential) according to the latest report obtained from the DoED[36].

Table 4: Theoretical hydroelectricity potential of river basins of Nepal

River Basins	Potential [Mega Watt (MW)]
Koshi	22,350
Narayani	20,650
Karnali	32,010
Mahakali	4,160
Other southern river basins	4,110
Total	83,280

(Kandel, 2018)

36 Data retrieved on 16th April, 2021

Apart from recognizing the economic significance of hydroelectricity to power Nepal's growing industrialization efforts, its significance as a major export commodity to neighboring countries recognizes its unchecked economic potential in the distant future. However, in the present context, the direct economic significance of hydroelectricity generation or the sector, proxied by the contribution of the classification titled "Electricity, gas, steam, and air conditioning supply" in the national GDP at the producer's price as per International Standard Industrial Classification (ISIC), is visibly trivial.

Table 5: Contribution of Electricity, gas, steam, and air conditioning supply industrial classification on the National GDP at producer's price (at base year price of FY 2010/11)

Fiscal year	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21
Contribution ratio	0.95%	0.98%	1%	1.29%	1.34% (est.)

Source: Ministry of Finance (2021)

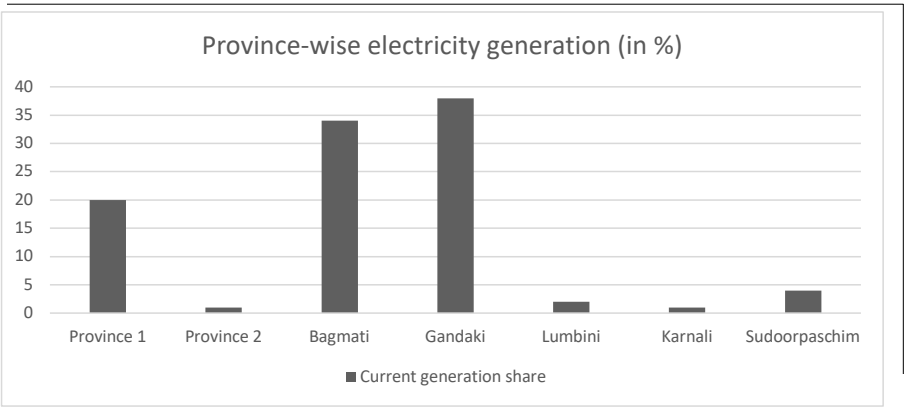
As shown in Table 5, the combined contribution of revenue obtained from the end-user sale of domestically produced electricity, gas, steam, and air conditioning supply is only 1.11% of the national GDP at the average producer's price. At this rate, this industry representing revenue from the sale of hydroelectricity is one of the least contributors to national GDP based on ISIC.

Meanwhile, the geographic distribution of hydroelectricity generation potential across the country is relatively uniform. It is in corollary with the geographic distribution of river basins across the country, as provided in Figure 2. Also, three major river basins falling within Province 1, Bagmati, Gandaki, and Karnali, reserve 90% of the theoretical hydroelectricity production possibility in Nepal, as provided in Table 4.

However, though the potential and the current hydroelectric generation within the country are fairly distributed among all provinces from an

administrative point of view, Province 2 observes no potentiality for hydroelectric generation coupled with limited potentiality for Province 5 (Bhadari, Joshi, & Shrestha, 2019). As such, the study observes a reasonably uniform but limited regional concentration of potentiality for resource gain to be obtained from the exploitation of river basins for the generation of hydroelectricity.

Figure 10: Provincial contribution of hydroelectric generation during FY 2020/21



Source: Ministry of Finance (2021)

From the above analysis, the study draws two critical observations regarding the nature of exploitation in the form of hydroelectric generation

1. The exploitation of water resources in the form of hydroelectric generation is not of national economic significance in terms of its direct contribution[37] to national GDP in the present and near future

2. The potentiality of hydroelectricity generation is reasonably uniform across all administrative regions of the country

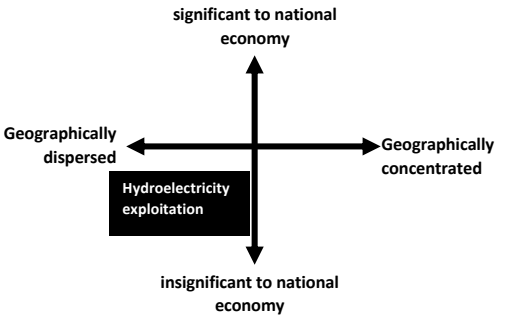
Sharing of revenue obtained from hydroelectric generation

The observation in the earlier section makes it convenient for the study to position this particular nature of resource exploitation on the Significance

37 Direct contribution only pertains to revenue from the sales of hydroelectric power and does not represent its significance in the form of powering the industrialization of the economy

– Dispersion matrix[38] as provided in Figure 11.

Figure 11: Positioning of small to large scale hydroelectricity exploitation in Significance – Distribution matrix[39]



The exploration recommends the sharing regime for resource revenue obtained from hydroelectric generations should have a strong tendency toward a derivation-based sharing regime when referred to the Significance – Distribution matrix. Hence, the regional and local community(s) hosting the exploitation projects should obtain a higher proportion of the resource revenue received from hydroelectricity generation. However, a hint of equalization of the resource revenue[40] to share a certain proportion of resource revenue obtained from hydroelectricity generation with the government of Province 2 appears advisable on the grounds of geographical concentration of resource revenue generation potentiality among the six provinces of the country. As such, a separate royalty equalization fund can be established to deposit a certain portion of royalty[41] obtained by all other provincial governments from hydroelectricity generations within their territorial jurisdiction to share it with Province 2.

The study conceptualizes this additional application of an indicator-based sharing regime to ensure that this nature of resource exploitation

38 In this particular case of administration of Significance – Distribution matrix, the observation is not based on nature of resource but based on nature of resource exploitation

39 In here, the Significance-Distribution Matrix is based upon the nature of resource exploitation

40 As observed in the particular case study of Canada

41 From here onwards the term royalty will be used interchangeably with resource revenue given royalty as the method of resource revenue determination is practiced in Nepal

can also contribute toward interprovincial fiscal equality not addressed by the current provision of derivation-based sharing framework practiced in Nepal. Also, apart from the existing political significance of the hydroelectricity projects as a beacon of national economic development, the gradual increment of the sector's contribution towards the national economy in the future may further signify its extended ownership across the nation than a particular generating regional or local community(s). Hence, the role of resource revenue from hydroelectricity generation towards achieving national economic priorities concerning mitigation of interregional poverty and economic inequality may eventually demand this manner of resource exploitation to visibly contribute to the country's fiscal equality in the current federal system. Not to mention, the vitality of this demand becomes more sensitive when in concern with Province 2 as it addresses their agenda for regional equality at least through inclusive fiscal federalism. Apart from resource revenue emanating from hydroelectricity generation, this recommendation also advises royalties deriving from entire natural resources of national political significance (for instance, royalties emanating from mountaineering conducted in the mountains above 8000 meters)[42] to retain the component of partial equalization of resource revenue.

Therefore, this study explores a sharing modality with a higher tendency towards the derivation-based sharing regime with slight provision for equalization for this manner of resource exploitation. Also, an indicative sharing regime with sole provision for a particular province may not require a technically complex equalization formula or arduous criteria observed in the most indicator-based sharing regimes. Instead, the equalization formula can simply require a minimum (at most 1/7th)[43] of the royalty obtained from each hydroelectricity project to be mandatorily shared with Province 2. Furthermore, it can be kept within the discretion of the

42 Based on KII conducted with Vice Chairperson of Lumbini Provincial Planning Commission

43 This study conceptualizes the idea to share around 1/7th of the resource revenue obtained from hydroelectric projects with Province 2 on assumption that all six provinces (except for Province 2) with potentiality for generating resource revenue from hydroelectricity generation is binarily assumed to be "have Province" with 100% potentiality of hydroelectricity generation. On the other hand, Province 2 with no potentiality for

provincial government of Province 2 to directly utilize the equalization fund for regional development of Province 2 or equally distribute a certain proportion of the fund among the local jurisdictions within the province based on the size of the local population as observed in the particular case study of Indonesia.

The need to accommodate a benefit-sharing mechanism for royalty obtained from hydroelectricity generation is another important reason for this manner of resource exploitation to adopt a derivation-based sharing regime. Bhandari (2015) identifies hydroelectricity projects as popularly recognized as the avenue for local development by subnational communities. And therefore, it warrants a significant proportion of resource revenue obtained from hydroelectricity generation to be shared on a derivation basis to ensure that the local jurisdictions hosting the exploitation projects can meet the non-monetary benefits or barter deals expected by the local community(s). Also, it is undoubted that hydroelectricity projects maintain many direct and indirect impacts or externalities, as discussed earlier. Hence, a significant proportion of royalties from this resource exploitation activity is required to compensate or reward the affected parties. And, the derivation-based sharing regime can better provision such arrangement than the indicator-based sharing regime.

Level of governance advisable for the administration of resource revenue achieved from hydroelectric generation

This study observes subnational governments as the most suitable level of governance to administer royalties emanating from the nature of resource

exploitations not significantly contributory to national GDP and suitably shared through the derivation-based regime based on the Suitability matrix

generating resource revenue from hydroelectricity generation is binarily assumed to be "have-not Province" with 0% potentiality of hydroelectricity generation.

As such, when all provinces have to at most contribute 14.28% (or 1/7th) of the resource revenue from hydroelectricity generation within their territorial generation, the portion of resource to be shared with Province 2 is likely to average royalty from hydroelectricity generation obtained or divided among all seven provinces. Such may exhibit a justifiable formula for achieving interprovincial fiscal equality of royalty obtained from hydroelectricity generation.

provided in Figure A of Appendix – C. Also, subnational governments, when authorized to administer resource revenue within their territorial jurisdictions, consistently retain higher proportions of resource revenue as observed from earlier country case studies. Hence, it provides sufficient argument for subnational governments at the provincial level to administer resource revenue obtained from hydroelectricity projects to share most of the resource revenue among the resource communities and regions.

As such, the federal government needs to relieve the current role of raising and sharing royalties obtained from hydroelectricity projects located across the country to transfer the same authority to the provincial governments. At present, section 11 of the Electricity Act, 1992 authorizes DoED (i.e., a federal entity) to charge royalty from all hydroelectricity projects. Whereas FCGO is responsible for disseminating such collected royalty revenues among other levels of governance, as also exhibited in Figure 2 of this paper.

Meanwhile, sections 3 and 11 of the Electricity bill, 2020 submitted to the federal parliament propose to authorize provincial governments for issuing generation licenses[44] for hydroelectricity projects estimated to produce below 20MW of electricity. However, it is unsure if the act provides enough substance to devolve provincial governments with the authority to also administer royalty arising from such hydroelectricity projects. But, section 5(4) of the very bill at least recognizes the authority of provincial and local governments to administer royalty from hydroelectricity projects classified under rural electrification initiative.[45] Nevertheless, such amendments in the legislation can build a suitable pathway towards devolving authority concerning the raising of royalties from hydroelectricity projects established within the regional territorial jurisdictions to provincial authorities.

While such transfer of resource revenue administration authority at the provincial-level ensures sufficient sharing of royalties based upon the

44 The current electricity regulation, 1993 authorizes DoED to authorize and issue licenses for hydroelectricity projects of all capacity as provided in rule 4 and 12

45 Electricity bill, 2020 recognizes rural electrification initiative as the electrification works connecting rural and remote regions through distribution line and substations at or below the capacity of 33 kilovolt (KV)

principle of derivation, the idea of partial fiscal equalization of such resource revenue, as discussed earlier, is accommodable by authorizing the federal government to administer and mediate the royalty equalization fund for Province 2. In the meantime, the equalization mechanism can require provincial governments to contribute a minimum share of royalties and licensing fees obtained from hydroelectricity projects established within their regional jurisdictions.

Nevertheless, the immediate applicability of the idea to devolve resource revenue authority to provincial governments is entirely dependent on whether the Constitution of Nepal, 2015, enables devolution of authority related to the administration of royalty revenue for subnational authorities. At present, the constitutional authority of the federal government in areas concerning the utilization of water resources for any manner of economic activity provided in item 11 of Schedule – 5 titled "policies related to conservation and multiple uses of water resources" is conveyed. As such, the cabinet unbundling report 2017[46] guarantees the authority of the federal government to formulate and implement master plans concerning the strategic use of water resources and river streams apart from building uniform policy, law, and mandate for sustainable development of water resources and its conservation. Most importantly, the report (based on item 11) also solely authorizes the federal government to determine, implement, and regulate royalty affairs relating to any use of water resources (including use for electricity generation). Such authorization constitutionally denies provincial governments to undertake the function concerning independently raising, retaining, and sharing royalty revenue amassing from the hydroelectricity sector as conceptualized by this study. Though the item titled "royalty from natural resources" is listed in schedule – 9 of the Constitution enlisting the concurrent authority of all levels of government on natural resource revenues, the cabinet unbundling report preempts the devolution of authority regarding such.

Meanwhile, the unbundling report dictates the authority of the provincial

46 Cabinet unbundling report, 2017 was formulated by the federal council of ministers to further elaborate independent and concurrent authority of federal, provincial, and local governments provisioned in the Constitution. The report can be reached at https://www.opmcm.gov.np/federalism-admin/

governments in areas of water resource utilization as per list 7 of schedule – 6 under "electricity, irrigation, and drinking water." Hence, the provincial governments are empowered to formulate provincial plans, policies, laws, and mandates regarding electricity development, formulate a basis of service charge for utilization of provincial-scale electricity and manage and regulate provincial waters and river network, though within the mandates of the federal government. List 19 of the same schedule dictating the "use of forests and waters and management of environment within the province" is elaborated by the report on an identical notion. But, no authority of the provincial government, specifically in areas of the hydroelectricity sector or administration of royalty revenue from the same, is envisioned in the Constitution.

It is clear that the Constitution of Nepal, 2015, at present, does not allow devolution of authority related to independent administration of royalty revenue by provincial governments amassing from hydroelectricity generation of any scale. Therefore, the Constitution preempts this study's finding regarding the level of governance that should administer royalty revenue gained from the exploitation of water resources for electricity generation. However, it does not readily invalidate the idea and instead becomes a vital basis for amending the Constitution in the future.

Addressing interjurisdictional impact occurred from hydroelectricity generation

The study observes the likelihood of hydroelectricity projects established in a particular province to impact local jurisdictions of another province belonging to the same river basins from an earlier case. Such impacts are often likely to brew interprovincial conflicts and disputes. Hence, mechanisms under the cooperative efforts of federal and provincial governments can be explored to address or resolve such interjurisdictional impact observed at the interprovincial level. Such compensation mechanism can be made either under the sole reign of the federal authority[47] or through interprovincial compacts with a federal signatory that governs interprovincial coordination.

47 The Cabinet unbundling report enlists the function of the federal to government to mediate and address issues relating to interprovincial water resources also under item 11 of schedule – 5

In the latter case, Steering Committee or constitutional agency such as the Intergovernmental fiscal council or Inter-coordination and facilitation committee with a federal vote can be commissioned to fulfill such functions. Or, specific basin commissions for each river basin with federal signatory authorized for addressing compensation mechanism for interjurisdictional river basin functioning under a council or the Steering Committee may be conceptualized. However, as mentioned earlier, a federal signatory or vote is crucial for any institutional mechanism to address such interprovincial impact or externality.

This interpretation supports the argument that recognizes the pivotal role of federal commissions such as the Steering Committee[48] or constitutional agencies such as the Intergovernmental fiscal council[49] or Inter-coordination and facilitation committee[50] to resolve future issues related to sharing resource revenue arising from the exploitation of interjurisdictional water basins. Of course, such would be necessary only if the provincial governments are provided with the authority to govern and execute water resource exploitation projects and their revenue at their discretion.

Meanwhile, the federal government's role in addressing interprovincial externality occurring from the establishment and operation of hydroelectricity projects justifies the need to share a portion of resource revenue obtained from the sector to reward its participation in resolving interjurisdictional conflicts. As such, it is important to note that alike to contributing toward the royalty equalization fund mentioned earlier, provincial governments (if constitutionally allowed to administer royalty from hydroelectricity projects in the future) should share a portion of the resource revenue with the federal government to remunerate its functions of participating in mediating interjurisdictional disputes. Furthermore, it is imperative for the subnational jurisdictions (i.e., provincial and local-level)

48 Electricity Bill, 2020 provisions the establishment of Steering Committee in Section 42 also for the role of coordinating with all levels of governance regarding development and management of electricity projects

49 IGFA Act, 2017 provides provision for establishment of Intergovernmental Fiscal Council in Section 33.

50 IGFA regulation, 2019 provides provision for establishment of Inter-coordination and facilitation committee in Rule 16

hosting the exploitation works to reserve or share at least 50% of the total resource revenue to preserve the spirit of the derivation-based sharing regime. Hence, the provincial governments can at most share 1/3rd (approx.)[51] of the royalty with the federal government after withholding 1/7th of the royalty for contributing towards the royalty equalization fund.

Last but not least, the same royalty sharing arrangement can also warrant the provincial government to be directly responsible for compensating indirectly affected local entities within the province (i.e., intra-provincial externality) that are far from the exploitation area or even river basin. Given that the criteria/indicator proposed by the NNRFC for compensating both directly and indirectly affected local communities from the exploitation of water resources for the generation of hydroelectricity (Refer to Table B of Appendix-A) does not address such entities.

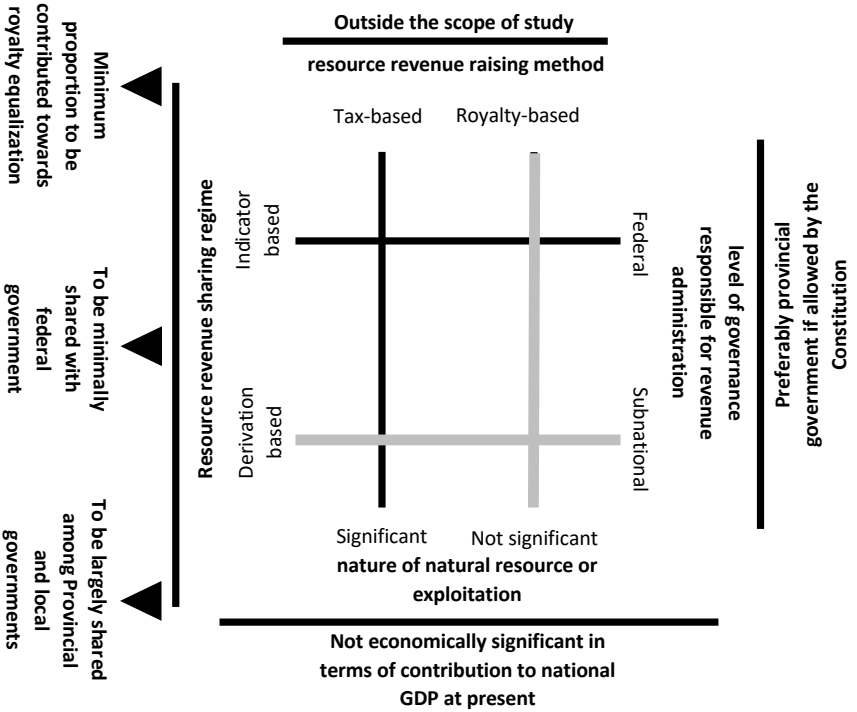
Table 6: Proportion of royalty from hydroelectricity projects to be shared among various areas

Areas for sharing royalties	Proportion of royalty to be shared[52]	Crucial objectives
Royalty equalization fund	1/7 or 14.28%	• Interprovincial fiscal equality contribution for Province 2
Federal government	At most 1/3 (approx.) or 35.72% (precise)	• Federal vote for addressing interprovincial externalities occurring from hydroelectricity generation of rivers with interprovincial significance
Subnational governments	At least 1/2 or 50%	• Engaging in the administration of royalty revenue emanating from hydroelectricity generation • Arranging crucial benefit-sharing needs for local entities hosting the projects • Involvement in addressing interprovincial and intra-provincial externalities that can appear as a byproduct of certain projects

51 The study advises at most 1/3rd (approx.) of the royalty obtained from hydroelectricity projects to be shared with the federal government as 2/3rd (approx.) of the royalty combinedly is shared among the royalty equalization fund and subnational jurisdictions hosting the exploitation work

Note that the objectives linked with royalty sharing have excluded licensing functions and other functions that do not relate to royalty administration

Figure 12: Resource revenue sharing provision advised for the royalty obtained from hydroelectricity projects



As can be observed in Figure 12, the resource revenue sharing provision conceptualized for sharing royalty obtained from hydroelectricity generation is diagrammatically built over the Suitability matrix combinedly indicating the nature of sharing regime, level of governance, and the method of resource revenue generation preferred based on the economic significance of the manner of resource exploitation. The diagram attempts to encompass the entire royalty administration and the idea for sharing collected royalty earned from hydroelectricity generation.

52 The numbers recommended are very tentative and are result of a crude calculation. Sophisticated analysis of the exact proportion of royalty to be shared is beyond the scope of this study

Also, it is essential to note that the study takes the currently applicable royalty-based method of resource revenue generation as given in the context of Nepal. Therefore, the term "resource revenue" and "royalty" has been used interchangeably since the beginning of this chapter. However, some experts have recommended taxation-based resource revenue determination methodologies in Nepal[53]. But, as mentioned in the earliest section of the study, the exploration regarding the resource revenue generation methodology to gather revenue from the use of natural resources falls beyond the scope of the study.

Sharing provision of resource revenues received from extractive natural resources

The study again identifies the direct economic significance of the extractive resources and their geographical distribution to devise sharing modalities of royalties earned from the exploitation of extractive natural resources. This study will rely on the explored and discovered extractive mineral resource briefly observed in the first chapter to identify the sector's economic significance and geographical distribution within Nepal. But, it is essential to note that a fewer number of minerals and minefields have been explored and exploited for industrial and commercial purposes, and therefore significant numbers of prospective mines are yet to be discovered.

The study finds that the gross value added by the "Mines and Minerals" sector calculated based on ISIC is the lowest contributor to GDP at the producer's price. As exhibited in Table 7, the GDP contribution of the "Mines and Minerals" sector based on ISIC only measures up to 0.61% on average in the last five fiscal years. And, exploitation of limestone minefields singlehandedly measures up to 90% (approx.) of what is contributed by the mines and mineral resources exploitation industry in national GDP[54].

53 Based on KII conducted with the undersecretary of Ministry of Economic Affairs and Planning (MoEAP) of Karnali

54 Based on KII conducted with the Deputy Executive Director of DMG

Table 7: Contribution of Mines and Minerals Industrial classification on the National GDP at producer's price (at base year price of 2010/11)

Fiscal Year	2016/17	2017/18	2018/19	2019/20	2020/21
Contribution ratio	0.57%	0.58%	0.64%	0.64%	0.66% (est.)

Source: Ministry of Finance (2021)

Experts lament that lack of sufficient regional and local avenues of the DMG and the Ministry OF Industry, Commerce, and Supplies (MoCIS), responsible for mines and mineral resource development, has kept the industry laggard in its economic contribution[55]. Also, the lack of coordination with the forest-related authorities has allowed limited access to most prospective minefield blocks located within forest premises.

Regarding the geological distribution of extractive mineral resources, Province 1, Bagmati, Gandaki, and Lumbini are mineral resource-rich regions, whereby Province 2, Karnali, and Sudoorpaschim appear to be resource-poor provinces at least based on the number of mineral fields discovered and explored as provided in Table 2. Hence, the study observes a form of visible resource concentration at the regional level regarding the availability of discovered and explored extractive mineral resources.

From the above analysis, the study draws two critical observations regarding extractive natural resources:

1. Revenue from the exploitation of extractive mineral resources is not of national economic significance in terms of its direct contribution to national GDP at present

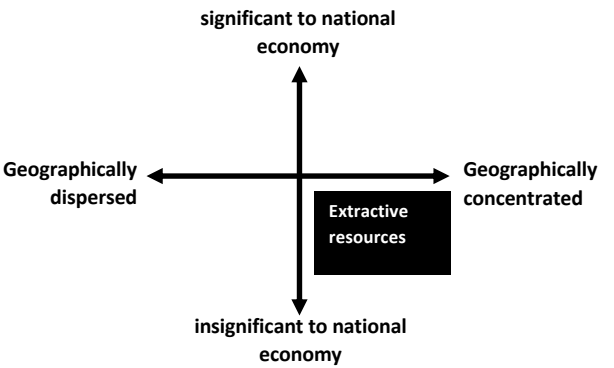
2. The presence of explored and discovered extractive mineral resources is highly concentrated between half the number of provinces within the country.

55 Based on KII conducted with the Deputy Executive Director of DMG

Sharing regime advisable for resource revenue obtained from extractive resources in Nepal

The observation regarding the lack of economic significance of this natural resource and the postulation of its regional concentration does not make it very convenient to position extractive natural resources on the Significance – Dispersion matrix[56]. As such, extractive natural resources fall in the matrix's fourth quadrant (bottom-right), as exhibited in Figure 13. Hence, the decision to either deploy derivation or indicator-based regime to share resource revenue emanating from extractive resources requires further deliberation beyond the capacity of the matrices.

Figure 13: Positioning of extractive natural resources in Significance – Distribution matrix



The references from earlier observation of literatures concerning extractive resources nevertheless hint at the economic significance of extractive resources in the national economy to reserve heavier weight than the geographic dispersion of the natural resource or the feasibility of resource exploitation. Regardless, instead of abruptly deciding the basis for adopting a sharing-regime based on such an argument, this study shall consider specific criteria observed during the earlier literature overview to justify the most suitable sharing regime applicable for specifically sharing royalties from extractive mineral resources in the particular case of Nepal.

56 In this particular case of administration of Significance – Distribution matrix, the observation is based on nature of natural resource

In such context, the study shall consider the following criteria observed during the literature study applicable to extractive natural resources.

1. Characteristics of extractive natural resources
2. Characteristics of resource revenue or gain to be obtained from extractive natural resources (in terms of volatility)
3. Likely chances of resource revenue to aggravate interregional fiscal inequality in the context of Nepal
4. Collective economic background of provinces considered to be rich in extractive mineral resources in comparison to that of provinces deemed to be poor in extractive mineral resources

First and foremost, the pronouncing characteristics of extractive natural resources are such that extractive natural resources are non-renewable and shall eventually deplete in the future. Also, revenues arising from extractive mineral resources are volatile due to fluctuating market prices of such natural resources. Hence, it is imperative to ensure that resource revenues arising from such extractive natural resources are beyond the levels of governance unable to manage the revenue volatility that may eventually affect the fiscal balance of the concerned government. Therefore, such resource revenue needs to be under the jurisdiction of the level of government most able to manage such revenue volatility by ensuring effective mobilization of sophisticated financial derivatives and conducting informed management of a large revenue stabilization fund, as discussed in the earlier chapter.

In such context, it is undoubted that such resource revenue or gain in Nepal should essentially be under the federal government's jurisdiction. After all, the federal government is relatively more technically capable of managing resource-related revenue with access to important financial tools and techniques than the newly established provincial governments. As such, the federal government is automatically advised to have the discretion to decide upon the proportion of resource revenue to invest in stabilization funds, share with subnational entities based on certain indicator-based criteria to realize national economic priorities, and

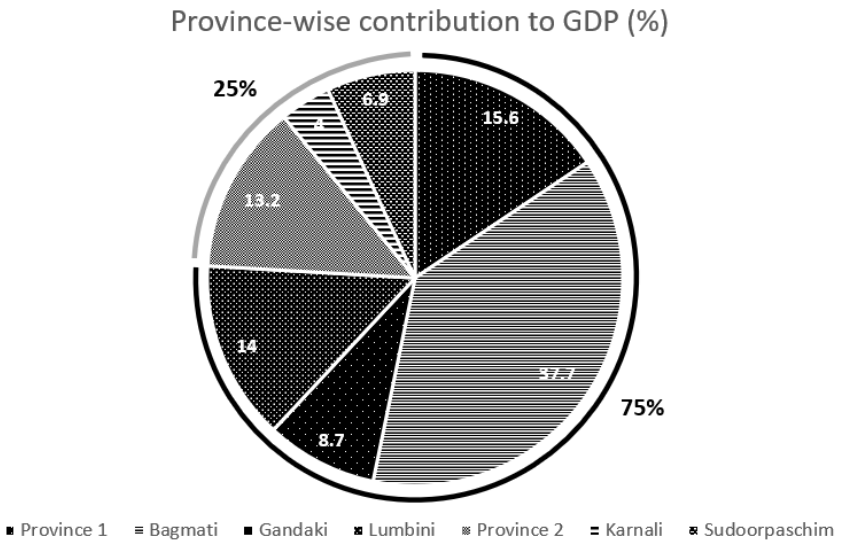
compensate communities hosting extractive resource exploitation for direct and indirect impact suffered.

However, the chances for the volatility of such revenue or gain to thwart the fiscal balance of national and subnational governments (at the provincial-level) at present is highly unlikely given the limited economic significance of the resource revenue or gain obtained from extractive resources in the Nepalese economy. Also, it is unlikely for such resource revenue or gain to aggravate regional income inequalities by having some provinces lavishly enjoy the windfall from extractive resources while others are deprived of basic infrastructural services amid the unavailability of extractive resources. One can picture such unfortunate events only in countries heavily dependent on natural resource exports as a source of GDP and to operate public finance.

On such consideration, the study explores a simplistic derivation-based sharing regime instead of building and operating a comprehensive equalization formula requiring a significant amount of resources and time as warranted by an indicator-based sharing regime. Hence, the analysis regarding the observed criteria specific to extractive natural resources in Nepal confirms the need for resource revenue obtained from extractive natural resources to be shared based on a derivation-based sharing regime amid its limited economic per se.

However, economic background analysis of the provinces considered rich in extractive natural resources compared to those deemed poor in extractive natural resources can further test the ingenuity of the decision to base the sharing framework upon the derivation-based sharing regime. On such grounds, it appears that the collective prosperity of provinces richer in extractive mineral resources (i.e., Province 1, Bagmati, Gandaki, and Province 5) is drastically higher than their counterpart poorer in extractive mineral resources on data provided in Figure 14.

Figure 14: Province-wise contribution to National GDP during FY 2020/21 in percentage



Source: Ministry of Finance (2021)

Hence, the national economic objective of interregional equality of development enshrined in the Constitution of Nepal may warrant resource revenue or gain from extractive natural resources to be also shared with economically poor provinces based upon an indicator-based sharing regime.

Regardless, it only informs the likely necessity to set the stage for qualifying resource revenue obtained from mines and mineral resource exploitation for tackling interregional economic inequality in the future. Such, if required, will have to be achieved by conceptualizing and adopting a robust revenue-sharing equalization formula to equitably share the fruits of mines and mineral resources explored and extracted across Nepal. Most importantly, the discovery and explorations of mines and minerals along the same geological & provincial concentration enough to generate sales revenue significant to national GDP shall be the prerequisite to trigger a transition from derivation-based sharing regime explored under

the present pretext to indicator-based sharing regime sharing of resource revenue obtained from mines and mineral resources.

Level of governance advisable for the administration of resource revenue achieved from exploitation of extractive natural resources

The study persistently explores the application of a derivation-based sharing regime to guide the sharing framework of resource revenue obtained from extractive natural resources. Hence, subnational governance at the provincial level appears effective in administering resource revenue emanating from the exploitation of all nature of mines and mineral resources after consulting the Suitability matrix and other literary observation that maintains such proposition.

Case VI: Addressing royalty leakages through devolution of royalty administration authority

DMG, at present, has allowed deviation between the reported and actual amount of monthly mineral resource extraction/production by mineral exploiting entities. Ultimately, it has caused substantial inaccuracies in calculating the due royalty amount for mineral exploitation entities mining afar from Kathmandu. With no direct regional and local avenues of the federal agency, the occasional field-based verification has remained inconvenient and ineffective to address such inaccuracies, says the current Deputy-Executive Director of DMG.

Therefore, authorizing provincial governments to validate monthly mineral resource extractions and royalty collection is likely to improve accuracy in identifying the actual extraction/production volume as provincial governments are relatively closer to the regional minefields belonging within their jurisdiction. On account of the principle of subsidiarity, provincial governments are more effective in monitoring the mineral resource exploitation work and royalty leakages than the federal government, as affirmed by the current Vice-chairperson of Lumbini Province Planning Commission.

After all, accuracy regarding royalty amount determination when levied from regional authority than central authority appears to be a crucial advantage of devolving royalty administration task to subnational government as discussed in Case I.

Such an arrangement ultimately requires concerned the federal authority to devolve its role of raising and sharing royalties obtained from such exploitation projects across the country to concerned provincial authorities. At present, Mines and mineral resources regulation, 1999 in rule 21 authorizes DMG, a federal agency, to raise royalties from resource exploiting enterprises based on the royalty rates enlisted in the schedule-10 of the same regulation. Similarly, FCGO is responsible for disseminating collected royalty revenues among other levels of governance, as also exhibited in Figure 2 of this paper.

However, as discussed in the earlier section, the immediate applicability and enforceability of the given advice to devolve authority concerning the administration of royalty revenue amassing from extractive mineral resources are heavily dependent on the provisions provided by the Constitution. The Cabinet unbundling report dictates the authority of the provincial governments regarding the mines and mineral resources sector as listed in item 17 of the Schedule – 6 of the Constitution to formulate plans, policies, laws, and mandates regarding the nature of mines and mineral resources that do not explicitly fall within the authority of federal government along with other types of extractive earth resources useful for construction purpose. As such, apart from radioactive and petroleum mineral resources considered as being within the jurisdiction of the federal government based on the elaboration of item 26 of Schedule – 5 by the unbundling report, the Constitution also devotes the provincial governments with authority to license and regulate exploration and extraction of mineral resources that are also not classified as being useful for construction purpose.

However, such elaboration of the constitutional provision does not clarify the likely provision for the provincial government to assume authority to raise, retain, and share royalty revenue amassing from extractive mineral resources authorized by the Constitution. Instead, the federal government's authority in formulating and administering royalty revenue from all nature of natural resources as awarded to it by the unbundling report from item listed as "royalty from natural resources" in schedule – 9 prevails. And therefore, the Constitution preempts the possibility to devolve authority

relating to the administration of royalty of mineral resources to provincial governments, at least of which is authorized to them by the Constitution for licensing and regulation. Yet, this unfavorable provision does not deem the exploration of the study entirely irrelevant. Instead, it sets the basis for the amendment of the Constitution on the grounds of provided advocacy.

Case VII: On the ease of paying royalties

The devolution of authority to administer royalty at the provincial level not only supports the effective execution of the derivation-based sharing framework for the royalty earned from extractive mineral resources. In fact, it also eases the logistical or administrative procedure to pay royalties for mineral resource exploiting enterprises.

At present, rule 21(2) of the Mines and mineral resource regulations 1999 requires a representative of all mineral resource exploiting enterprises with minefield(s) located in any region of the country to physically pay a visit to DMG located in Kathmandu to submit and verify monthly production details along with a receipt copy of royalty payment in the concerned revenue account of the department not later than the fifteen days of the subsequent month. However, the royalty can be paid in the regionally located outlets of banks that service the revenue account of DMG. But the monthly royalty payments have to be made within seven days of the subsequent month to avoid penalty fees enlisted in rule 21(30) of the Mines and mineral resource regulations 1999.

While the actual payment of royalties in the concerned revenue account of the department is not a logistical hassle, the need to send a representative to visit DMG monthly is certainly a travel-intensive commitment for resource-exploiting entities located afar from Kathmandu. Hence, entities were found to have been deliberately skipping the monthly payment procedure for the cost of paying fines to avoid travel hassles because the necessary documents to verify and approve the royalty payments cannot be sent via email presently or entrusted with the quiescence postal system of the country,

Hence, the arrangement for regionally located resource exploiting enterprises to make such royalty payments at the respective provincial avenue can visibly reduce logistical hassles to complete the procedure of royalty payments. Such provisions may even marginally incentivize investment in the sector of mineral resource exploitation.

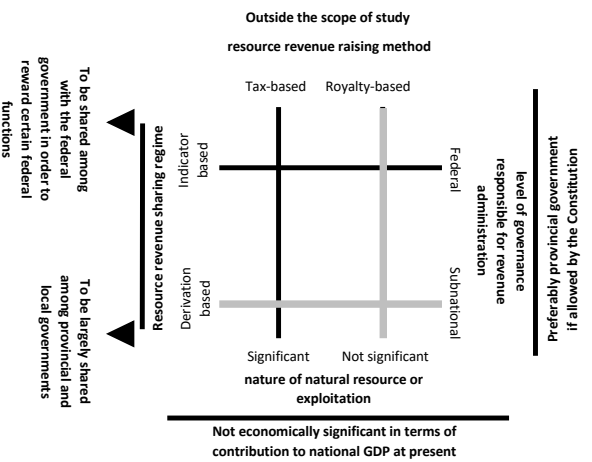
Nepal observes multiple minefields that cut across more than one province. As such, resource revenue arising from such nature of minefields falls beyond the jurisdictions of a single provincial government and therefore is likely to brew interprovincial dispute in case the entire royalty administration concerning extractive mineral resources is handed to the provincial governments. While the international communities have mediated such subnational disputes elsewhere (as observed in the case study of Peru), mechanisms that recognize federal participation can be sufficient to address, coordinate, and govern instances of such interprovincial developments or disputes. On such consideration, the study again advises the role of a federal agency for managing the interprovincial impact arising from the exploitation of minefields straddling provinces. Specific commissions such as Mine Development Committee (MDC) or Mineral Resources Development Center (MRDC) provisioned respectively in sections 35 and 39 of Mines and Minerals regulation, 1999 or other constitutional councils of interprovincial nature with a federal vote as previously discussed in the earlier section can be commissioned or authorized for such functions.

Meanwhile, the study also recommends the provincial governments remunerate such federal functions by sharing a certain amount of royalties obtained from extractive natural resources. However, the concerned subnational governments (i.e., provincial and local-level) need to reserve more than 50% of royalties emanating from extractive minerals to uphold the spirit of the derivation-based sharing regime. So, the study prescribes sharing less than 50% of the resource royalty to be deposited at the Federal Consolidated Fund. Furthermore, Provincial authorities can directly deal with the interjurisdictional externality occurring at the intra-provincial level through the mobilization of resource revenue directly reserved by the provinces. The provincial government hosting the mineral exploitation projects can compensate most of the directly and indirectly affected local entities within and outside the quarry and lease area based on the criteria/indicators established by the NNRFC also detailed in Table E of Appendix-A of this study.

Table 8: Proportion of royalty from the exploitation of extractive resources to be shared among various areas[57]

Areas for sharing royalties	Proportion of royalty to be shared[57]	Crucial objectives
Federal government	Less than 1/2	Federal vote for addressing interprovincial externalities from exploitation works
Subnational governments	More than 1/2	• Engaging in the administration of royalty revenue from the extraction of mines and mineral resources • Arranging crucial benefit-sharing needs for local entities hosting the projects • Involvement in addressing interprovincial and intra-provincial externalities that can appear as a byproduct of certain projects

Figure 15: Resource revenue sharing provision advised for the royalty obtained from extractive resources



57 The numbers recommended are very tentative and are result of a crude calculation. Sophisticated analysis of the exact proportion of royalty to be shared is beyond the scope of this study

The above diagram in Figure 15 exhibits the resource revenue-sharing provision explored for sharing royalty obtained from extractive resources. The significance of the resource exploitations in the national economy and the method to be applied for resource revenue determination are provided at the bottom and top of the diagram, respectively. Meanwhile, the nature of sharing regime advised and the level of governance recommended for the administration of resource revenue are provided on the left and right sides of the diagram, respectively. As discussed earlier, the diagram exhibits resource revenue obtained from extractive resources to be shared based on a derivation-based sharing regime with specific provisions to reward certain federal functions. Likewise, as discussed earlier, the diagram also conveys the need to devolve the role of administering resource revenue emanating from extractive mineral resources to subnational governments.

Apart from extractive resources, the study also hints at other manners of exploitation concerning renewable natural resources as Intra-provincial navigations, Mountaineering, and other uses of water resources[58] that do not significantly contribute to the national GDP but reserve the potentiality for such activities to be conducted across the county to adopt the very idea of resource revenue sharing framework. Though such resource exploitation activities are relatively inconsequential to national GDP, their significance in the regional economy and socio-economic livelihood deserve sharing framework led by regional governance.

Sharing provisions of royalties received from artisanal and small-scale exploitations

Analysis concerning the significance of the nature of resource exploitation for the national economy or the potentiality of conducting such nature of resource exploitation across the geographical regions of the country does not appear necessarily relevant in exploring the sharing regime that is suggestible for royalties obtained from artisanal and small-scale

58 While the criteria/indicator for distributing compensation among the affected and indirectly affected local entities of the said provinces is specifically provided for mountaineering activities as also detailed in the Table A of Appendix-A of this study, such provision is not yet existent for other manner of exploitation of water resources apart for hydroelectricity generation

exploitation[59] of natural resources. Given that such nature of resource exploitations is definitively small with concern and potential effect limited within the local jurisdiction, the study conceptualizes a derivation-based sharing regime with special provisions for local entities to administer resource revenue emanating from such scale of resource exploitations by this study.

Besides, literature observed in the earlier chapter also discussed some countries to have devolved the authority to administer resource revenue obtained from artisanal and small-scale exploitation to subnational entities. Although, such countries were observed to have reserved centralized control of exploitation projects that surpass the artisanal and small-scale natural resource exploitation.

On the same note, the prevailing arrangement in the federal context of Nepal already devolves governance and administration of royalties concerning artisanal and small-scale exploitation of extractive earth resources useful for construction purposes to local governments. As such, the current subnational arrangement allows local government to authorize the extraction of sand, gravel, stone, and other earth resources useful for construction purposes of undefined scale within the jurisdiction of the concerned local government. The arrangement also allows local governments to draw royalty revenue from such projects based on the royalty rates published by the provincial governments hosting the local jurisdictions in their respective finance Acts.

Conventionally, local governments are authorized to independently invite private parties to bid[60] for extraction of such earth resources from certain minefields that have already received environmental clearances [i.e., Initial Environment Examination (IEE) or EIA] and fall within the mandates set by the concerned provincial government[61] or federal government.

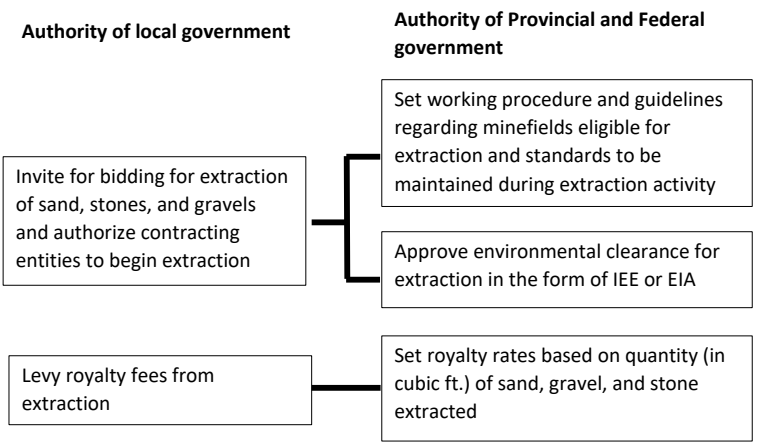
59 Schedule 2 of Mines and Mineral resource regulation, 1999 pertaining to very small and small scale of mineral exploitation can be referenced to define artisanal and small-scale resource exploitation (See Appendix - G)

60 See Appendix-F for a specimen of notice for the invitation of bid published by Madi Rural Municipality of Gandaki on September 14, 2020, to independent contractors for extraction of sand, gravel, and stones in respective locations within the local jurisdiction

61 See finance Acts 2020/21 of Province 1, Bagmati, Gandaki, Lumbini, and Karnali specifically in section concerning fees from extraction of stone, gravel, and sand for specimen

Following this, the constitution authorizes the local governments to charge royalties from the exploiting entities based on the royalty rates set by their respective provincial governments[62]. Meanwhile, it is essential to note that the royalty rates published by the provincial governments based on the quantity (specifically in cubic feet) of the stone, gravel, and sand extracted could vary from one province to another.

Figure 16: Devolved process[63] for authorization and levying of royalties from artisanal and small-scale exploitation of earth resources useful for construction purposes



This study particularly supports the prevailing arrangements that specifically devolve the administration of resource revenues emanating from numerous locally functioning artisanal and small-scale earth resources extraction projects to local governments. Apart from artisanal and small-scale extraction of earth resources for construction purposes, this study also recommends devolution of administration of resource revenues emanating from artisanal and small-scale exploitation of other nature of extractive resources and surface water for local fishing, local navigation[64],

62 See Appendix-E for a specimen of royalty rates published by Gandaki in its finance Act 2020/21 that guides local governments within Gandaki to charge royalties from all extractive earth resources useful for construction purpose

63 See Rai, Neupane, Rana, Belbase, & Khawas (n.d.) for detailed account of sand exploitation authorization process in Federal Nepal

64 Charges in terms of service fee for manner of river use in terms of Kayaking, Canoeing, and Rafting completely fall within the jurisdiction of local government based on item 4 of Schedule – 8 of the Constitution further elaborated by the LGO Act, 2017 in section – 62(1)

generating hydroelectricity at micro-scale[65] (micro-hydro electricity projects), and small-scale exploitation of groundwater[66] for commercial or industrial use to local governments. Notably, issues concerning such scale of exploitation are comparable with artisanal and small-scale exploitation of earth resources.

However, schedule – 10 of the Mines and minerals resource regulations, 1999 yet enlists the royalty rates to be charged by the DMG from the extraction of earth resources for construction purposes (See Appendix-H for royalty rates[67] for extraction of such earth resources). This arrangement in the federal mining regulation directly reserves the federal government's authority to administer royalties emanating from the exploitation of earth resources useful for construction purposes.

Undoubtedly, the contradictory provisions between the prevailing devolved subnational arrangement for the administration of resource revenue emanating from the extraction of earth resources for construction purposes and the arrangement discussed in the Mines and mineral resources regulation, 1999 creates a scenario of legal confusion and uncertainty in the given sub-sector. And, this study finds such a regulatory scenario to depict incoordination between levels of governance in the current federal system.

Hence, this study explores the idea of enabling local governments to at least administer royalties emanating from the extraction of earth resources useful for construction as practiced presently to override the provision

65 The recently submitted electricity bill, 2020 proposes to authorize local governments to authorize licensing procedure for hydroelectricity projects below 3MW. However, it is necessary for the river stream hosting the project to be within the territorial jurisdiction of the concerned local government. Also, the Constitution in item 19 of Schedule – 8 titled as "Water supply, small hydropower projects, and alternative energy" grants local governments to formulate plans, policies, laws, and mandates regarding small-scale hydroelectricity projects and govern exploration and exploitation works relating to such

66 Clause C of Section 8(7) of Drinking Water Management Board Act, 2006 detailed further by Chapter 4 of Kathmandu Valley Water Management Board (KVWMB) Regulation, 2007 dictates the authority of Kathmandu Valley Drinking Water Supply Management Board (KVDWSMB) for licensing and regulating the utilization of groundwater within the jurisdiction of Kathmandu Valley

67 The royalty rates are calculated based on per square meter (sq. m) instead of cubic feet (cu. Ft.) provided in the royalty rates enlisted in the finance Acts of provincial governments

in the Mines and mineral resources regulations, 1999 devised during the erstwhile centralistic arrangement. As exploitation of such nature of earth resources majorly represents mineral resource exploitation works at artisanal and small scale.

On the same note, the Cabinet unbundling report, 2017 dictates the authority of local governments to formulate plans, policies, laws, and mandates and govern the exploration and exploitation of specifically stone, sand, gravel, salt, earth, clay, and slates based on item 21 of Schedule – 9 of the Constitution titled as "Protection of watersheds, wildlife, and mines and minerals." The given explanation implies devolution of authority regarding licensing and regulation of earth resources useful for construction purposes to local governments.

However, the Constitution still does not explicitly authorize local governments to administer royalty revenue amassing from the extraction of earth resources useful for construction purposes. But the unbundling report grants the local government to collect and retain royalty revenue from mineral resources considered to be of low value based on item 6 of Schedule – 9 titled "Service fee, charge, penalty, and royalty from natural resources, tourism fee." While it implies the authority of the local governments to administer royalty revenue amassing from artisanal and small-scale exploitation of earth resources, it still does not explicitly guarantee such. Meanwhile, the Local Government Operations (LGO) Act, 2017 does not come to much avail in confirming the royalty authority of local governments regarding such extractive earth resources as the Act only establishes the authority of local governments to administer royalty from certain natural resources only under the bounds and authority of federal and provincial governments as per clause (a) & (j) of section 11(4) of the very Act.

Addressing interjurisdictional externality occurring from artisanal and small-scale resource exploitation

Amid the prevailing practice to sustain the role of local governments in authorizing and administering royalties emanating from the extraction of local earth resources for construction purposes, there seems to be no

astute provision for addressing interjurisdictional externality at an inter-local level that may arise from such resource exploitation works commonly occurring at artisanal and small scale.

In the meantime, consultations with representatives of local governments inform that enterprises contracted for extractions are themselves responsible for compensating or sharing revenue from the sale of extracted earth resources with other local governments or private parties for interferences caused due to exploitation works. Such haphazard provision for addressing interjurisdictional externality maintains a situation of uncertainty and discourages resource exploiting enterprises from engaging in such exploitation works.

However, provincial governments cannot be held accountable to arrange compensations to address interjurisdictional issues occurring at the inter-local level regarding resource exploitations of which the current legislative arrangements devolve local governments for governance and administration. Instead, Inter-local mechanisms with the additional signatory, vote, or oversee of the relevant provincial government can be deployed to address inter-local externalities and issues that arise from artisanal and small-scale exploitation projects authorized at the local level. This study conceptualizes the idea of commissioning Province Coordination Councils (PCC)[68] with sufficient participation of the concerned provincial government and local governments within the province to be an effective interlocal agency to swiftly address, arbitrate, and resolve such interlocal externality or disputes.

Meanwhile, such arbitration mechanisms can refer to criteria/indicators for redistributing resource revenue obtained from mineral resource exploitation as detailed in Table E of Appendix-A among local governments to address inter-local externalities, particularly in the case of artisanal and small-scale earth exploitation projects.

68 Local Government Operations Act, 2017 in section 105 provisions the establishment of PCC with representation of the concerned provincial government and local governments within the province in each province as the body to also assist in coordinating between local governments within a province in matters of natural resource utilization and sharing

Also, compensation for indirect impacts to neighboring local governments not addressed under the criteria/indicator for redistributing resource revenue obtained from mineral resource exploitation as detailed in Table E of Appendix-A should come under the responsibility of the local governments in the specific case of artisanal and small-scale mining.

Sharing regime advisable for revenue obtained from artisanal and small-scale exploitation of earth or water resources

Given the limited economic significance of such scale of exploitation projects for the national economy, the study explores the sharing framework with the tendency toward a derivation-based regime for sharing resource revenue emanating from the artisanal and small-scale mineral resource exploitation. Moreover, given the advised roles of local governments in the administration of resource revenue obtained from artisanal and small-scale resource exploitation, a significant proportion of resource revenue is expected to be reserved by the local governments. Meanwhile, a lesser proportion of resource revenue should be shared with the provincial governments hosting such artisanal and small-scale exploitation projects to reward their functions in addressing interlocal externality or disputes arising from such exploitation through PCC.

The prevailing sharing framework mandated by provincial governments maintains the provision for local governments authorizing and collecting royalty revenues from earth resource-exploiting entities to retain 60% of the resource revenue while sharing the remaining 40% with the concerned provincial government[69]. Analytically, the sharing provision is precisely similar to the sharing provision for entertainment tax and Land & building registration fees that fall within the single tax administration approach[70] between local and provincial governments. The study recommends the very sharing framework to be appropriate for sharing royalty revenue obtained from artisanal and small-scale earth resource exploitation projects along with all artisanal and small-scale resource exploitation activities.

69 See Finance Act 2020/21 of Province 1, Province 2, Bagmati, and Karnali as specimen

70 See NNRFC information guide for 2018 (specifically p. 79)

Table 9: Suggested proportion of royalty received from artisanal and small-scale exploitation of both extractive and renewable (water) resources to be shared among various areas

Areas for sharing royalties	Proportion of royalty to be shared[71]	Crucial objectives
Provincial governments	40%	• Provincial vote or signatory for addressing interlocal externalities from exploitation works • Authorizing environmental clearances and setting guidelines regarding concerned nature of resource operation
Local governments	60%	• Licensing and regulating artisanal and small-exploitation of earth resources • Raising and sharing royalty revenue among concerned local governments and provincial government obtained from artisanal and small-exploitation of earth resources • Addressing inter-local externality and disputes arising from artisanal and small-scale exploitation of earth resources

71 The numbers recommended are very tentative and are result of a crude calculation. Sophisticated analysis of the exact proportion of royalty to be shared is beyond the scope of this study

Chapter 5

Summary of Findings and Explorations

The earlier chapter proposed a sharing framework for resource revenues emanating from the particular nature of natural resources, manner of resource exploitation, and the scale of exploitation, along with recommendations regarding the level of governance suitable to govern certain scales of exploitation works. The explored sharing frameworks notably were analogous given their stronger gradient towards derivation-based sharing regimes to be administered by the subnational governments. The commonality mostly stems from the similarity in the economic significance and the geographical distribution of the source of resource revenue.

This chapter shall now briefly discuss the paper's findings regarding the sharing frameworks that have been explored for the kind of resource revenues observed by the study.

For resource revenue emanating from hydroelectricity projects:

- Regarding the adoption of sharing regime
  - Sharing framework for resource revenue obtained from the hydroelectric project is explored to require a strong tendency toward the derivation-based sharing regime
  - Partial equalization of the resource revenue to share a certain proportion of resource revenue obtained from hydroelectricity projects with the government of Province 2 is explored to be slightly provisioned
  - The specific proportion of resource revenue obtained from

hydroelectricity projects is explored to be shared explicitly with the federal government to reward its function for mediating and compensating interjurisdictional externalities and disputes that arise from the exploitation of interprovincial river networks

- Higher proportions of resource revenue ought to be shared with or reserved by subnational governments, including provincial and local governments hosting the exploitation projects to reward its function of
  - administering resource revenues amassing from hydroelectricity projects
  - sharing benefits with directly impacted local entities
  - compensating other entities affected by the exploitation work

o Regarding the level of jurisdiction responsible for revenue administration

- Provincial authorities should hold the authority and responsibility to administrate resource revenue originating from hydroelectricity projects by making certain amendments to the Constitution.

o Regarding the resolution of interjurisdictional impact caused by exploitation projects

- Federal authority or interprovincial compacts with federal signatory can be leveraged to compensate and reward interprovincial externality caused by the exploitation of river basins for the generation of hydroelectricity
- Provincial authority can directly deal with interjurisdictional effect or externality occurring at an intra-provincial level in terms of indirect impact on local communities afar from exploitation projects. .

For resource revenue emanating from extractive resources:

- Regarding the adoption of sharing regime
  - Sharing framework for resource revenue obtained from extractive resources is explored to have a strong tendency toward a derivation-based sharing regime
  - The specific proportion of resource revenue or gain obtained from such resources or manner of exploitation to be shared with the federal government to reward its function for addressing and compensating interjurisdictional externalities or issues that can arise during exploitation of interprovincial minefields or minefields that create environmental degradation in the territory of other provinces
- Regarding the level of jurisdiction responsible for revenue administration
  - Provincial governments should hold the authority and responsibility of administration of resource revenue originating from all natures of extractive mines and mineral resources apart from mines and mineral resources useful for construction purposes by making certain amendments in the Constitution
  - Similar provision should also be held for all other manners of exploitation concerning renewable natural resources such as Intra-provincial navigations, Mountaineering, and other uses of water resources.
- Regarding the resolution of interjurisdictional impact caused by exploitation projects
  - Specific commissions or other constitutional councils advised to manage the exploitation of minefields straddling provinces or to address interprovincial impacts from the exploitation of particular minefields
  - Interjurisdictional externality occurring at the intra-provincial

level can be directly dealt with under the provincial authority through the mobilization of resource revenue directly reserved by the provinces

For resource revenue emanating from artisanal and small-scale exploitation projects:

- Regarding the adoption of sharing regime
  - Sharing framework with a heavier tendency towards derivation-based regime is explored to be beneficial for share royalties emanating from artisanal and small-scale exploitation works
  - A major proportion of resource revenue is expected to be reserved by the local governments to reward their functions to
    - Administer royalty revenue obtained from artisanal and small-exploitation of earth resources useful for construction purposes
    - Address inter-local externality and dispute arising from artisanal and small-scale exploitation of earth resources useful for construction purposes
  - A lesser proportion of resource revenue ought to be shared with the concerned provincial governments to reward their functions to
    - Address interlocal externalities from exploitation works
    - Authorize environmental clearances and set guidelines regarding the concerned nature of resource operation
- Regarding the level of jurisdiction responsible for revenue administration
  - Local governments should be authorized to administer resource revenues obtained from numerous locally functioning artisanal earth extraction projects or businesses by making certain amendments to the Constitution

- Also, the provision in Mines and mineral resources regulation, 1999 needs to be overridden by the prevailing provincial provisions to devolve the authority regarding the administration of resource revenue emanating from artisanal and small-scale earth resource exploitation
- Similar provision should also be held for artisanal and small-scale exploitation of other natures of extractive resources and surface water exploited in the form of local fishing, local navigation, generating hydroelectricity at micro-scale

o Regarding the resolution of interjurisdictional impact caused by exploitation projects

- Inter-local mechanism with a provincial signatory can be employed to resolve and address interlocal jurisdictional impact caused by artisanal scale exploitation of extractive and renewable resources

Chapter 6

Concluding Remarks

As the study explores sharing provisions that identify the role of subnational governance in resource revenue administration, it directly contributes toward fiscal devolution in natural resource governance. Meanwhile, natural resource governance undoubtedly is one of the important aspects of fiscal federalism in Nepal.

The study has majorly explored and identified a devolved arrangement or sharing framework through the analyses that determine the suitability of derivation-based sharing regimes for the nature of resources being exploited and their manner or scale of exploitation. And, literatures identify subnational governments to be most suitable for administering resource revenue when such revenue is to be shared among the levels of governance by the principle of the derivation-based regime and raised in the form of royalty.

In recognizing the principle of subsidiarity, the study even recommends devolving resource revenue administration authority to local-level governance regarding artisanal and small-scale exploitation of all kinds of natural resources. From multiple literatures, the study has come to recognize that local governments can be relatively effective in closely monitoring and governing such scale of extraction works and the resource revenue arising from it.

However, certain amendments in the concerned legislation are warranted to enable the legislative pathway to incorporate such devolution. In such contexts, Constitutional amendments are required to allow constitutional provisions for subnational governments to authorize the raising, retaining,

and sharing of royalty revenue as explored by the study. Also, the rigid authority of the nation or federal government towards natural resource assets based upon the principle of permanent sovereignty over natural resources needs to imply the authority of subnational government in certain nature of natural resources within their territorial jurisdiction

Moving forward, it is in the purview of the NNRFC in cooperation with other federal authorities, intergovernmental councils, and relevant subnational authorities to progress the current nascent resource revenue sharing framework, possibly by considering the findings and the analysis of this study. Meanwhile, the eligibility of the current sharing framework to be revisited every five years, and the explicitly mentioned motive of the NNRFC to reconsider the criteria for resource revenue sharing provisions by conducting a detailed study of other resource revenue sharing modalities practiced worldwide allows ample opportunity to consider the proposition of this study.

In conclusion, this study provides a preliminary ground for building resource revenue-sharing frameworks based on the nature of natural resources in consideration, the manner of exploitation of the very natural resource, and the scale of exploitation. The study believes this concept for formulating sharing frameworks in the future is justifiable compared to the present sharing framework provided in the IGFA, 2017 that provides a wholesale resource revenue sharing formula for royalty obtained from selected natural resources or their manner of exploitation. The current framework visibly ignores the need for addressing each nature of resources or the nature of operation of such resources uniquely. Whereas abundant literatures and case observations recognize the need for sharing frameworks to be very toned with the unique nature of resources and their operations.

References

Anderson, G. (n.d.). Natural Resource in Federal and Devolved countries. Ottawa: Forum of Federations.

Aresti Lasa, M. (2016). Mineral Revenue Sharing in Peru. Peru: Natural Resources Governance Institute.

Aresti, M. L. (2016). Oil and Gas revenue sharing in Iraq. Washington DC: Natural Resource Governance Institute.

Arora, N., Ghose, J., & Bakshi, S. K. (n.d.). Managing revenue from natural resources: A multi -country analysis of sharing resources revenue with sub-national levels. Retrieved from ippapublicpolicy. org: https://www.brookings.edu/opinions/devolution-and-resource-sharing-in-kenya/

Asian Development Bank. (2018). Impact of Dam on Fish in the Rivers of Nepal. Manila: ADB.

Basu, R., & Pegg, S. (2020). Minerals are a shared inheritance: Accounting for the resource curse. The Extractive Industries and Societies, 7(4), 1369-1376.

Bhadari, D., Joshi, N. K., & Shrestha, S. M. (2019). Infrastructure and Financing Need: Nepal Infrastructure 2030. Kathmandu: Institute of Integrated Development Studies.

Bhandari, D. (2015). Benefit sharing in hydropower projects in Nepal. Kathmandu: Samriddhi Foundation.

(2016). Bolivia Revenue Sharing. Bolivia: Natural Resources Governance Institute.

Cairo, R. A. (1998). Dealing with Interstate water issues: Federal-Interstate Compact experience. In R. E. Just, & S. Netanyahu, Conflict and Cooperation on Transboundary Water Resource (pp. 115-130). New York: Springer Science .

Chapagain, P. S., & Ghimire, P. K. (2019). Ekta School Atlas. Kathmandu: Ekta books.

Clark, D. H. (1975). Note on Equalization and Resource rents. In A. Scott, Natural Resource Revenues: A Test of Federalism (pp. 108-111). Vancouver: University of British Columbia.

Collier, P., Ploeg, R. V., Spence, M., & Venables, A. J. (2010). Managing Resource Revenue in Developing Economies. Palgrave Macmillan Journals, 84-118.

Cornell Law School. (2020). Legal Information Institute. Retrieved from Cornell Law School: https://www.law.cornell.edu/wex/prior_appropriation_doctrine

Courchene, T. J. (1975). Equalization payments and energy royalties. In A. Scott, Natural Resource Revenues; A Test of Federalism (pp. 73-107). Vancouver: University of British Columbia.

Easter, K. W., Rosegrant, M. W., & Dinar, A. (1998). Markets for Water: Potential and Performance. Boston: Kluwer Academic Publishers.

Fischman, R. L. (2006). Cooperative Federalism and Natural Resource Law. Environmental Law Journal, 180 - 229.

Gardner, B. D. (1983). Water Pricing and Rent Seeking in California Agriculture. In T. Anderson , Water Rights: Scarce Allocation, Bureaucracy, and the Environment. Cambridge, Mass.: Ballinger Publishing Company.

Griffin, R. C. (1998). The Application of Water Market Doctrines in

Texas. In K. W. Easter, M. W. Rosegrant, & A. Dinar, Markets for Water: Potential and Performance (pp. 51-61). Boston: Kluwer Academic Publishers.

Iwerks, R., & Toroskainen, K. (2017). Subnational Revenue sharing in Democratic Republic of Congo (DRC) . Natural Resource Governance Institute.

Kandel, K. (2018). A Comprehensive study of Hydropower potential of Nepal. Kathmandu.

Kaphle, K. P. (2020). Mineral Resource of Nepal and their Present Status. Kathmandu: Nepal Geological Society .

Khalid, R. M. (2018). Federalism Concepts and Issues in Managing the Malyasian water sector . International Journal of Engineering & Technology, 163-168.

Kimenyi, M. S. (2013, October 22). Brookings. Retrieved from OP-ED: https://www.brookings.edu/opinions/devolution-and-resource-sharing-in-kenya/

Lederman, W. R. (1975). The Constitution: A basis for bargaining. In A. Scott, Natural Resource Revenues: A Test of Federalism (pp. 52-60). Vancouver: University of British Columbia.

Mai, N. P., Kantoush, S., Sumi , T., Thang, T. D., Trung, L. V., & Binh, D. V. (2018). Impacts of Cascade Hydropower Development on Salinity intrusion into Vietnamese Mekong Delta. Indonesia Multi-perspective Water for Sustainable Development (pp. 503-511). Yogyakarta: ResearchGate.

Mazzucato, M., Kattel, R., O'Riley, T., & Entsminger, J. (2021, Feb 5). Reimagining the Platform Economy. Retrieved from Project Syndicate: https://www.project-syndicate.org/onpoint/platform-economy-data-generation-and-value-extraction-by-mariana-mazzucato-et-al-2021-02?barrier=accesspaylog

McCully, P. (1996). Rivers No More: The Environmental effects of Dam.

In M. Patrick, Silenced Rivers: The Ecology and Politics of Large Dams (pp. 29-58). London, United Kingdom: Zed Books Ltd.

Ministry of Finance. (2016). Budget speech of Fiscal Year 2016/17. Kathmandu: Ministry of Finance.

Ministry of Finance. (2020). Economic Survey Report 2019/20. Kathmandu: Government of Nepal.

Ministry of Finance. (2021). Economic Survey Report 2020/21. Kathmandu: Government of Nepal.

Moore, A. M. (1975). The Concept of a Nation and Entitlements to Economic rent. In A. Scott, Natural Resource Revenues: A Test of Federalism (pp. 240-245). Vancouver: University of British Columbia.

Nepal Police official facebook page. (2020, August 16). Nepal Police. Retrieved from facebook.com: https://www.facebook.com/NepalPolicePHQ

NNRFC. (2020). National Natural Resource and Fiscal Arrangement guide. Kathmandu: Government of Nepal.

NRGI. (2016). Natural Resource Revenue Sharing. Washington DC: Natural Resource Governance Institute .

OECD, & UCLG. (2019). 2019 Report World Observatory on Subnational Government Finance and Investment. World: OECD.

Pigram, J., & Musgrave, W. (1998). Sharing the water of Murray-Darling basin. In R. E. Just, & S. Netanyahu, Conflict and Cooperation in Transboundary Water Resources (pp. 131-154). New York: Springer Science.

Rai, N., Neupane, S., Rana, S., Belbase, D., & Khawas, V. (n.d.). Built on Sand. Kathmandu: Policy Entreprenuers, Inc.

Ryskeldi, S. (2016, feburary 19). Retrieved from ALJAZEERA: https://www.aljazeera.com/features/2016/02/19/conflict-continues-at-

kyrgyzstans-massive-gold-mine/

Scott, A. (1975). Who should get natural resource revenue? In A. Scott, Natural Resource Revenues: A Test of Federalism (pp. 1-51). Vancouver: University of Bristish Columbia.

Scott, A., Campbell, H. F., & Gainer, W. D. (1975). Resource Rent: How much and for whom? In A. Scott, Natural Resource Revenues: A Test of Federalism (pp. 118 - 136). Vancouver: University of Bristish Columbia.

Setopati. (2019, March 17). Nepal utilizes only 20 percent water available to it. Setopati.

Shah, A., & Qiao, B. (2018). Natural Resources Revenue Sharing: Principles and Practices.

Statistics Canada. (2020, 9 22). GDP at basic prices, by industry, annual average . Retrieved from Statistics Canada: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action? pid=3610043403&pickMembers%5B0%5D=2.1&pickMembers%5B1%5D=3.1&cubeTimeFrame.startYear=2015&cubeTimeFrame.endYear=2020&referencePeriods=20150101%2C20200101

Thompson, A. R. (1975). Natural Resource Revenue Sharing: A Dissecting view. In A. Scott, Natural Resource Revenues: A Test of Federalism (pp. 112-117). Vancouver: University of British Columbia.

UNEP. (2015). Natural Resources and Conflict. USA: United Nations Departments of Political Affairs and United Nations Environment Programme.

Wayland, R., & Lewicki, C. (1998). Evolving legal and institutional reponses to Interjurisdictional water management issues in the US. In R. E. Just, & S. Netanyahu, Conflict and Cooperation in Transboundary Water Resources (pp. 109-114). New York: Springer Science .

Ziberman, D., & Parker, D. (1998). Internal water dispute cases and

solutions. In R. E. Just, & S. Netanyahu, Conflict and Cooperation on Transboundary Water Resource (pp. 89-108). New York: Springer Science .

Appendix

Appendix 1: Criteria for distributing resource revenue among affected local entities

A. Criteria/indicator for distributing resource revenue obtained from Mountaineering

No.	Criteria/Indicator	Weight of sub-indicator for resource revenue sharing	Weight of indicator for resource revenue sharing
1.	Geographic Status i. Locality(s) hosting the mountain ii. Locality(s) neighboring the locality hosting the mountain	 60% 40%	40%
2.	Locality(s) hosting the base camp No. 1		10%
3.	Territorial area of affected localities i. Locality(s) hosting the mountain ii. Locality(s) neighboring the locality hosting the mountain	 60% 40%	25%
4.	Population size of affected localities i. Locality(s) hosting the mountain ii. Locality(s) neighboring the locality hosting the mountain	 60% 40%	25%
Total			100%

Source: NNRFC, 2020

B. Criteria/indicator for distributing resource revenue obtained from Hydroelectricity generation

No.	Criteria/Indicator	Weight of sub-indicator for resource revenue sharing	Weight of indicator for resource revenue sharing
1.	Geographic Status i. Locality hosting the hydroelectricity infrastructure ii. Locality(s) affected by the hydroelectricity project iii. Locality(s) neighboring (at upstream or downstream) the hydroelectricity project	 50% 30% 20%	50%
2.	Territorial area of affected localities i. Locality hosting the hydroelectricity infrastructure. ii. Locality(s) affected by the hydroelectricity project iii. Locality(s) neighboring (at upstream or downstream) the hydroelectricity project	 50% 30% 20%	25%
3.	Population size of affected localities i. Locality hosting the hydroelectricity infrastructure ii. Locality(s) affected by the hydroelectricity project iii. Locality(s) neighboring (at upstream or downstream) the hydroelectricity project	 50% 30% 20%	25%
Total			100%

Source: NNRFC, 2020

C. Criteria/indicator for distributing resource revenue obtained from Forest exploitation

No.	Criteria/Indicator	Weight of indicator for resource revenue sharing
1.	Locality(s) hosting the forest	20%
2.	Territorial area of the forest straddling each hosting locality(s)	40%
3.	Population size of the affected locality(s)	20%
4.	Population dependent upon the forest	10%
5.	Participation in conservation and sustainable management of the forest	10%
Total		100%

Source: NNRFC, 2020

D. Criteria/indicator for distributing resource revenue obtained from Conservation area:

No.	Criteria/Indicator	Weight of indicator for resource revenue sharing
1.	Status of buffer zone within the locality	10%
2.	Territorial area of buffer zone within the locality	40%
3.	Size of population within the buffer zone of the affected locality	35%
4.	Participation in conservation and sustainable management of the forest	15%
Total		100%

Source: NNRFC, 2020

E. Criteria/indicator for distributing resource revenue obtained from Mineral resource exploitation:

No.	Criteria/Indicator	Weight of sub-indicator for resource revenue sharing	Weight of indicator for resource revenue sharing
5.	Geographic Status iii. Locality(s) hosting the exploitation area (quarry area) iv. Locality(s) falling within the area permitted for exploitation (Lease area)	 60% 40%	50%
6.	Territorial area of affected area falling within a locality		30%
7.	Population size falling within the affected area		20%
Total			100%

Source: NNRFC, 2020

Appendix 2: Summarization of Country Cases

Row	Country/ Administrative system	Administrative details	Resource revenue generation basis & sharing regime	Sharing methodology	Dispute handling mechanism deployed
A	Kenya (*Africa*) Unitary	• 1 Central government • 47 Administrative counties	Royalty-based/ Tax-based Indicator-based sharing regime	20 % of all revenue (taxes, non-taxes, royalties) is **paid into Sovereign Wealth Fund (SWF)** 80% of the revenue is shared between the central government and the 47 counties **with a ratio of 60-40%, respectively** Five important parameters for revenue sharing across counties Population – 45% Poverty Index – 20% Land Area – 8% Basic equal share – 25% Fiscal responsibility – 2%	**Provision for resolving Inter-communal conflict regarding compensation from resource exploitation** • **CRA determines the ratio of revenue to be shared between the counties** in case of the inconveniences caused to another county because of the exploitation of the natural resources occurring in a particular county
B	Indonesia (*Southeast Asia*) Unitary	• 1 Central government • 32 States • 434 Districts	Tax-based Derivation-based sharing regime **with provision for non-producing jurisdictions**	Mining Central government – 20% States – 16% Districts – 64% • 32% for producing districts • 32% for non-producing districts (Equally distributed) Oil Central government – 84.5% States – 3.1% Districts – 12.4% • 6.2% for producing districts • 6.2% for non-producing districts (Equally distributed) Gas Central Government – 69.5% States – 6.1%	**The conflict between Aceh State and the Indonesian government regarding sharing of extractive resource revenue present in Aceh jurisdiction** • Dealt with negotiation **between the Indonesian government and Aceh government mediated by the international institutions** to form o Memorandum of Understanding (MoU), 2005 that allowed the Aceh government to retain 70% of its oil and natural gas revenues for the next eight years following the resources to be jointly controlled in mutual understanding

				Districts – 24.4% • 12.2% for producing districts • 12.2% for non-producing districts (Equally distributed)	
C	Kyrgyzstan (*Central Asia*)	• 1 Central government • 7 States • 40 Districts • 453 Municipalities	Royalty-based	50% of resource revenue from all mines (excluding gold and petroleum) directly transferred to municipalities hosting the extractions by the central government Additional 20% of the remaining 50% resource revenue for development and maintenance of the local infrastructure of the municipalities hosting the extractions by the central government	**Conflict between Kumtor Gold Mine Company, central government, and the local community** • Dealt with **negotiations between the domestic stakeholders,** after which o the government has taken certain **policy reforms in the mining licensing process enabling the** local communities also to get fully **involved in the licensing process**. o increased the **resource revenue available to the mineral-producing communities**. o **authorized the local communities with the power of monitoring the auction process,** given that each auction is held in the nearby towns rich with mineral resources.
	Unitary		Derivation-based sharing regime **with provision for non-producing jurisdictions**	Also, • Either, 50% of the remaining proportion of the revenue available to the central government (i.e., 40%) from large mines ONLY (excluding gold and petroleum) is transferred to joint State development funds that reach all municipalities in the country And, further 30% of the remaining proportion of the revenue available to the central government (i.e., 6%) from large mines ONLY (excluding gold and petroleum) is transferred to joint district development funds that reach all municipalities in the country • Or, 80% of the remaining 50% of the remaining proportion of the revenue available to the central government (i.e.,40%) from small mines ONLY (excluding gold and petroleum) is	

				transferred to district development funds that reach all municipalities in the country	
D	Canada (*North America*)	• 1 Central government • 10 States • 3 Territories	Tax-based (applied by central government)/ royalty-based (applied by State government)	Precise formula exists for **equalizing revenue over each of the twenty-odd revenue sources** that come under the purview of the agreement For a particular revenue source**, if a State's proportion of Canada's total population exceeds its proportion of the aggregate revenue source base, then it is entitled to an equalization payment** Entitled from each revenue source is summed, and **the resulting figure (if positive) is the amount of a State's equalization payment**. Or else, no equalization is paid. **If a State has no tax for a particular revenue source, the fiscal capacity deficiency equals its population share**. Only 50% of the natural resource revenue is brought into fiscal equalization scheme	**The conflict between first nation community and the State concerning exploitation of Great bear rain forest in the State of British Columbia** • Dealt with **negotiations at the presence of non-governmental agencies, affected communities, State government, and resource exploiting enterprises** leading to o Logging deferrals in 100 valleys in the region o Establishment of an Independent group of scientists to advise the best use of the land and rainforest safeguard o Adoption of ecosystem-based management approach to maintain ecological integrity during forest resource exploitation o Creation of financial base and package to support the biodiversity and the local economy of the region
	Federal		Indicator based [Partial equalization (50%)]		

E	Peru (*South America*) Unitary	• 1 Central government • 25 Regions (alike States) • 196 Provinces • 1868 Districts	A mix of royalty-based and tax-based	Sharing framework with provision to share 50% of the Corporate Income Tax from the mining firms (i.e., *Canon Minero*) in **proportion to the amount of land removed to extract the minerals from a particular jurisdictional territory.** Of which, • 10% allocated to the municipal governments of the producing districts	**Conflict about *Canon Minero* (tax-based resource revenue) sharing between Moquegua region (Regional government) and the Peru government whereby inhabitants of the Moquegua region grieved about the unfair methodology of the derivation-based sharing regime of *Canon Minero*** • Dealt with **negotiation between central government and inhabitants of Moquegua** resulting to o central government agreeing to transfer US$147 million to the grieving region o reexamination of the mining companies that extract minerals in more than one region o enactment a Congress Bill 2713 requiring resource exploiting enterprises to draft separate accounts for each mine and *Cannon Minero* to be shared with regard to the sale of minerals extracted in each region (which regardless is the principle of the derivation-based sharing regime with altered methodology)
			Derivation-based sharing regime with slight provision for indicator-based sharing	• 25% allocated to the municipal governments of the producing province (inclusive of municipals of the producing districts but distributed in terms of population and needs) • 40% allocated to the municipal governments of the producing regions (inclusive of municipals of the producing districts and provinces but distributed in terms of population and needs) • 25% allocated to the regional government of the Producing region o 80% of it retained o 20% of it allocated to the public universities of the region **Royalty revenue sharing** with the account to population, basic needs, and infrastructure deficits • Producing regional government – 15% • Public University in the producing regional government – 5% • Producing province government – 20% • Producing district government – 20% • Producing municipal government – 40% Resource revenue is transferred to the subnational government hosting the exploited resource **on a derivation based**. Although, **certain indicators are also taken into account** while calculating the derivation of revenue.	

F	Democratic Republic of Congo (DRC) (*Africa*)	• 1 Central government • 26 States	A mix of royalty-based and tax-based	<u>Tax-based revenue sharing framework</u> For **Category A** resource revenues • Central government – 60% • State Government of producing region – 40% For **Category B** resource revenue (including oil production) • Central government – 40% • State government (indicator-based) – 40% • State government of producing region – additional 10% to compensate for environmental impact • 10% to a fund with the goal of supporting equal development across States Fiscal equalization elements for Indicator-basis • Production capacity • Demographics • Other factors <u>Royalty-based revenue sharing framework</u> Central government – 60% State government of producing region – 25% Municipal government of producing region – 15%	**Inappropriate calculation of resource revenue to be shared across States** • Dealt with the reassessment of resource revenue sharing practice carried out by the local governments through the use of the **national Extractive Industries Transparency Initiative (EITI) process to compare what they were receiving with what they were entitled to receive and the timing of the transfers** • Also, controversially dealt with **the imposition of local taxes by States on resource mining enterprises** to self-compensate for deferral in sharing of resource revenue by the central government
	Unitary		Indicator based sharing regime with the provision of derivation based in terms of sharing resource revenue from the tax basis Derivation based sharing regime for sharing resource revenue from royalty basis		
G	Bolivia (*South America*)	• 1 Central government • 9 Regional departments • 339 Municipalities • 1374 Cantons	A mix of royalty-based and tax-based regime	More than half of the government revenue is generated via the oil and gas sector in **royalties and direct taxes on Hydrocarbons (IDH)**. **Hydrocarbon royalties** are only distributed to four producing regional departments and two non-producing regional departments (i.e., quite a derivation-based sharing regime) 66.9% of the **IDH revenue is shared with the Municipalities based on the population (i.e., indicator-based)** of the respective municipality	
	Unitary		Indicator based sharing regime		

				Population classification of municipalities: Municipality A: population less than 5000 Municipality B: population between 5001 – 15000 Municipality C: population between 15001 – 50000 Municipality D: population between 50001 or more	
H	Iraq (Middle-east Asia) Federal	• 1 Central government • 18 States (incl. 3 KRG State governates)	Direct resource gain from sales Mix of derivation-based, indicator-based sharing regime and budgetary transfer provisions for special region	**Iraq Federal Government's (IFG) Ministry of Oil (MoO) collects most of the revenue from oil and gas** (except for the mines under the region of KRG) and **then transfers it to the IFG's General Taxation Commission (GTC)** **State governments** (outside the KRG) **obtain revenue from oil and gas operations only through the transfers from the IFG** <u>Derivation-based sharing regime (petrodollar allocations)</u>: The provision of IFG 2010 State Budget Law (SBL) require **IFG to pay USD 1 to oil-producing State governorates** for o each barrel of oil produced o each barrel of oil refined o every 150 cubic meters of natural gas produced [this derivation-based sharing regime **excludes State governates within Kurdistan Regional Government (KRG)**] <u>Indicator-based sharing regime (Regional Development Program (RDP)</u>: Oil resource revenue **is shared with all State governates of Iraq (including States governates within KRG) based on population present in the districts and sub-districts of each governates** for the purpose to finance the reconstruction and development of development projects <u>Budgetary transfer to the special region of KRG</u>: As per December 2014 agreement, IFG will o allocate **a percentage of the Iraqi budget (actual expenditure based on 2015 SBL) to the KRG, benchmarking the Kurdish population's percentage of the total national**	**Debates on petrodollar allocation to State governates among the experts of the federal government** • Dealt within **the provision of executive governance and parliamentary setting with assistance from the supreme court** regarding whether a fixed petrodollar allocation should be enshrined in the country's legal framework and replace the current system of ad hoc allocation decided fiscally by the Ministry of Finance through the SBL (resolution unreached yet)

				population following each population census. o allocate a **percentage of the budget for the federal ground forces of the Iraqi army to the Peshmerga (i.e., Kurdish military) to fight against Islamic State** in return for o **KRG providing 250,000 barrels of KRG's export blend per day to Iraqi State Organization for Marketing of oil (SOMO)** which SOMO would then sell on using the same mechanisms used for selling oil from any other federally administered oil field. o **KRG facilitating SOMO's export of 300,000 barrels per day from the federally administered Kirkuk oil fields via KRG's secure internal pipeline network** to Turkey	
		Kurdistan Regional Government (KRG)	Direct resource gain from sales/ royalty-based/tax-based	<u>Direct Sales revenue</u>: Additional exports of oil obtained from Independent Oil Companies (IOCs) through Production Sharing Contract (PSCs) apart from RDP and budgetary transfer from IFG KRG's oil sales are carried out through its own regional Ministry of Natural Resources (MoNR), also responsible for sharing resource revenue with three State governates within it <u>Royalty/tax-based</u>: **Signature bonuses, corporate income tax, and royalties** are also received from IOCs active in the autonomous region of KRG as per the PSC between the two parties	

Appendix 3: Important Insight obtained from the literature review

This appendix is prepared to provide a quick overview of the critical knowledge obtained from the earlier chapters to aid ideas explored in the study.

Regarding the nature of resource revenue determination/raising methods and the level of governance most suitable for undertaking such roles

- Resource revenue determination in taxes on resource rent is complex to calculate as they are also subject to tax deductions and tax-avoidance measures. As such, robust models, technical capacity, and sufficient information is required to make accurate estimations.

  Henceforth, the central government is the most suitable entity to lead such revenue assignment based on its technical capacity to deal with demanding tax calculation methods and obtain detailed accounting information.

- On the other hand, determining the base for calculating the royalty is relatively easier. Royalties can be easily linked to a particular exploitation project, whereby it only requires information concerning production volume, quality, and market prices to estimate the resource revenues.

  Henceforth, subnational governments are most suitable for such revenue assignments as the central government may also not effectively monitor production volumes staged at local/regional jurisdictions. And therefore, subnational governments closer to the exploitation projects can more effectively monitor and make an accurate measurement of output and good measures of the market value of resource extracted or exploited.

- Particular literatures identify regional governments to be most suitable for raising resource revenue on grounds that

  - Regional governments, through royalty basis, provide much sharper and defter instruments for collecting the government's

share of resource revenues in comparison to complicated federally imposed income taxes with the appendage of incentives, concessions, and loopholes

- Regions/provinces reserve the privilege to apply distinct royalty rates and framework within their jurisdiction that is most suitable to the unique situation of a particular region.

Regarding resource revenue sharing regime and the level of governance most suitable for undertaking such roles

o Derivation-based allocations are usually derived from royalty-based charges for the amount of resource extracted or exploited or rent earned from extraction or exploitation of local or regional natural resources. Therefore, subnational governments are most suitable to undertake sharing frameworks based on derivation-based regimes. However, it is essential to note that royalty-based charges do not strictly precede the derivation-based sharing regime. Therefore, the central government may also practice a derivation-based sharing regime for sharing resource revenue raised via a tax-based resource revenue-sharing method.

  In the case observation of Bolivia, all resource revenue raised through royalty charges is shared through a derivation-based regime, whereas resource revenue raised through taxation is shared through an indicator-based regime. However, the entire resource revenue administration is practiced by the central government.

o On the other hand, Indicator-based sharing regimes require a very robust and scientific interregional resource revenue equalization formula to achieve its interregional fiscal equality objectives. Also, such vigorous equalization formula demands enormous amounts of cross-country regional data often beyond the reach of subnational authorities.

  Therefore, the central government, the most capable of fulfilling such technical complexity of generating an effective resource revenue equalization formula with access to cross-country data, can

be recognized as the most suitable level of governance for sharing resource revenue through an indicator-based sharing regime. Also, given that the administration of an interregional sharing regime requires sharing of resource revenue across an entire nation, the level of government with the ability to oversee the governance of a whole nation to administer such an interregional sharing regime is only eligible.

- However, instead of adhering to a particular sharing regime, case observations of Canada and the Republic of Iraq exhibit resource revenue sharing practice whereby a partial amount of all resource revenue raised within the immediate national jurisdiction is allocated for indicator-based sharing regime leaving the rest to be reserved for producing subnational jurisdictions.

Regarding compensating or sharing benefits with local communities directly affected by the exploitation of natural resources

- It is imperative to emancipate resource exploiting enterprises from the role of providing non-monetary benefit services (i.e., an aspect of the derivation-based sharing regime) to the communities directly affected by the exploitation of local or regional natural resources.

- Case observations exhibit that disputes erupted due to disruptions caused to the local community(s) from the exploitation of natural resources are better handled through negotiation and mediation between all stakeholders concerned with or without the support of international and domestic expert agencies.

  It further appears that resolution for such disputes often draws in the form of MoU that provides local governments with more resource revenue and the authority to oversee the licensing and operational standards guiding the resource exploitation projects.

Regarding the selection of resource revenue sharing regime based on the economic and geographic nature of natural resources and the manner of resource exploitation:

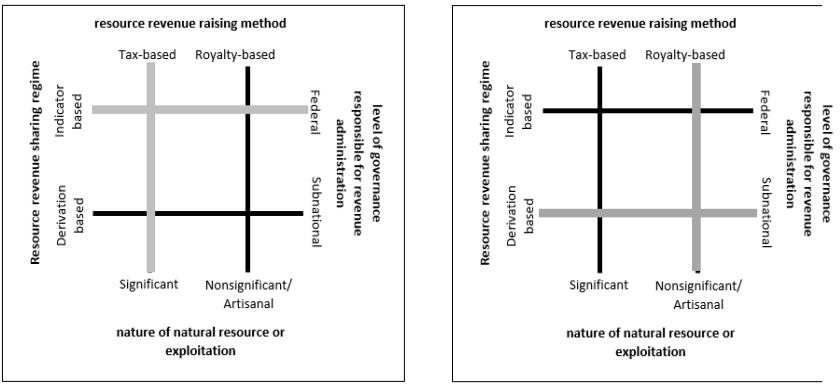
- An indicator-based sharing regime must be applied for sharing resource revenues if the revenue gain from the sale of natural resources significantly contributes towards the national GDP and is concentrated within certain geographic regions of the country.

  Given the recommendation for an indicator-based sharing regime for such natural resources or manner of resource exploitation, the federal government's role in the sharing of resource revenue is advised.

- In contrast, a derivation-based sharing regime can be applied for revenues arising from natural resources or manner of resource exploitation if such revenues are inconsequential to the national economy and distributed rather uniformly. For such natural resources or manner of resource exploitation, either of the levels of governance may undertake the sharing regime.

- Case observation of the Republic of Indonesia with an abundant presence of extractive resources, in particular, observes a separate sharing framework for sharing resource revenue or gain obtained from the exploitation of oil and gas resources that often play a significant role in contributing towards the national economy. A similar observation is made in DRC, whereby resource revenue obtained from oil exploitation is shared based on a separate sharing mechanism with provision for the indicator-based sharing regime.

Figure A: Suitability matrix providing most suitable setting to administer economically significant and non-significant natural resource or manner of resource exploitation



Note: The nature of natural resources or exploitation of it represents both extractive and renewable kind of resources

Regarding the level of government most suitable to capture resource revenues, specifically in the case of extractive resource

o Rowell-Sirois Commission advocates entire natural resource gain or resource revenue obtained from extractive natural resources to be assigned to subnational governments on grounds that

- enough proportion of the resource revenue is made available to amortize the debt incurred in the development of subnational infrastructure carried out also for the purpose to assist development or exploitation of such resources
- enough reserve is held to prepare for the expenditures necessary when the resources are entirely depleted

As such, the shorter the life of the resources (i.e., quickly exhaustible), the larger the percentage of the resource revenue to be directed towards the subnational government closest to the natural resource under extraction

Given this particular advocacy of subnational authority regarding the extractive nature of resources, a royalty-based resource revenue-

raising method with a derivation-based sharing regime may be common practice or advised.

o On the other hand, experts on fiscal federalism appear to have very largely supported the view that jurisdiction over extractive resources should be within the federal government on grounds that

- Extractive resources are often of economic significance to the national economy and is therefore expected to be squared across all regions or States of a country (regardless of geographic distribution) by integrating the revenue with interregional fiscal equalization principle or formula as previously discussed.

Also, most modern federations identify constitutional control over the resource revenue yielding from the extractive sector.

Particular literatures identify a constant need for channeling the resource revenue or the entire resource gain raised through the exploitation of extractive resources to finance public capital expenditure or the social transfer programs to combat poverty, specifically in underdeveloped and developing economies

Particular literatures advocate all nature of resource revenue be captured by the level of governance that is responsible for providing the most important and direct services to the public. And, the asserting literatures identify State government services to be much more important, dollar for dollar, than expenditure on federal functions in the specific case of the Canadian federation.

Regarding special arrangements for small/artisanal exploitation

o Few federal and devolved countries have engaged in limited devolution of revenue administration authority emanating from a small scale or artisanal mining involving extraction of mineral resources such as sand and gravel for local use to States or local entities

Case observation of Kyrgyz Republic exhibits that although the central government administers resource revenue from all nature

of resource exploitation, a separate sharing mechanism is allowed for revenue arising from small and large-scale resource exploitation. Such that, slightly more resource revenue arising from the small-scale resource exploitation is shared with the subnational governance.

Regarding the correlation between the levels of governance responsible for revenue raising and the proportion of revenue shared among the levels of governance

- Case observations exhibit the proportion of revenue raised among the levels of governance to be somewhat dependent on the level of government authorized for raising the resource revenue. As such, consistently higher proportions of resource revenue were shared with or reserved by subnational governments when authorized to raise revenue from resources exploited within their jurisdictions.

  Case observations indicated central government to be mostly responsible for resource revenue administration in most countries.

Regarding addressing interjurisdictional externality within the river basin from the exploitation of river networks:

- Federal-Interstate compact or Interstate compacts with federal signatory as an Interjurisdictional executive arrangement formed solely to resolve issues related to interjurisdictional externality from large-scale exploitation of water bodies are observed to be visibly effective (also through the method of water markets) in arranging fair compensation and revenue sharing provision across concerned subnational jurisdictions in the particular context of USA.

  Particular literature observes that neither judicial solutions nor voluntary cooperation of States sharing the shared water basin through coordination and integration can create the most effective resolution for sharing resource revenue raised from the exploitation of interjurisdictional water basins. And therefore, a federal vote representing the interest of all subnational jurisdictions involved in such delicate matters is warranted

- For the nature of interjurisdictional effect or externality occurring at the intra-regional level, the compensation provisioned for the affected local jurisdiction may be dealt with directly under the regional authority through mobilization of resource revenue directly shared with the regions/provinces.
- Since artisanal exploitation of groundwater from a shared aquifer, or any other minor exploitation of surface water, is likely to have its externality implication limited across local jurisdictions, local jurisdiction that may autonomously allow exploitation of a particular shared aquifer may undertake the role of compensating or rewarding other local jurisdiction (with the signatory of regional government) affected by such groundwater exploitation

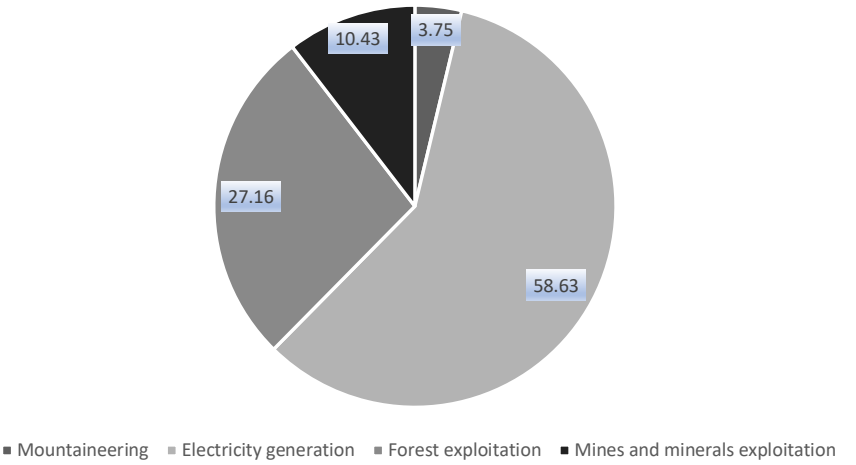
Appendix 4: Estimations of royalties for FY 2019/20

S.no.	Type of Royalty	Estimated royalty for FY 2019/20	Proportion to total royalty revenue	Proportion of royalty to federal government revenue for FY 2019/20
1	Mountaineering	NRs 167,346,414	3.75%	0.0031%
2	Electricity generation	NRs 2,611,126,164	58.63%	0.049%
3	Forest exploitation a) Conservation Area b) National Forest	NRs 1,209,946,566 NRs 400,382,784 NRs 809,563,782	27.16%	0.023%
4	Mines and minerals exploitation	NRs 464,926,457	10.43%	0.008%
Total		NRs 4,453,345,601	100%	0.084%

NNRFC (2020) & Ministry of Finance (2020)

Contribution percentage of royalty received from various natural resources or manner of resource exploitation on total royalty received from

Contribution to total royalty revenue in percentage



Appendix 5: Royalty rate set by Gandaki for extraction for sand, gravel, and stone within the provincial jurisdiction

Schedule 6

Under article 8

The fees for mining and riverine materials such as gravel, slate stone, ballast stone, cutting stone, chips, bricklaying clay, other common clay, sand, limestone, river, river timber, firewood Collection will be done as follows

S. No.	Title	Unit	Rate in Rs.
1	Ballast, Gravel	Per cubic ft.	7
2	Slate stone	Per cubic ft.	7
3	Gravel stone	Per cubic ft.	7
4	Rock	Per cubic ft.	7
5	Cutting stone	Per cubic ft.	7
6	Chips	Per cubic ft.	7

7	Brick soil	Per cubic ft.	3
8	Other ordinary soil	Per cubic ft.	2
9	Sand	Per cubic ft.	7
10	Limestone	Per cubic ft.	10
11	Wood brought by river streams	Per cubic ft.	300
12	Kukaath brought by river streams	Per cubic ft.	50
13	Firewood brought by river streams	Per cubic ft.	4

Note: The original list has been translated to the English Language

Source: Finance Act 2020/21 of Gandaki

Appendix 6: Open invitation for bid submitted by Madi Rural Municipality for extraction of Sand, stone, and gravel

Madi Rural Municipality
Office of the Rural Municipal Executive
Thumakodanda, Kaski
Gandaki Province, Nepal

Invitation for Bids

First Date of publication:- September-14, 2020 (2077/05/29)

Madi Rural Municipality, Office of the Rural Municipal Executive, Thumakodanda, Kaski invites online bids under e/procurement system from eligible bidders for the Extraction of Sand, Stone & Gravel project mentioned below under national competitive bidding mention bidding procedures all other information and bid document can be downloaded from PPMO's website: www.bolpatra.gov.np/egp or may obtain at office. All eligible bidders are requested to submit E - Bid online as per instruction within mentioned period.

S. No.	Contract ID No.	Name of Project	Bid Document Fee Details	Bid validity	Bid Security Amount & Validity
1.	06/NCB/MRM/GHAT/ 077-78	Jamdu Chittre Ghat	NRs. 3000.00 Bank :Machhapuchhre Bank Ltd. Thumakodanda, Kaski Account No: 830152514729072 Account name: GA 1.1 ANTARIK RAJASHWO KHATA	90 days	1,45,000.00 30 days after bid validity
2.	07/NCB/MRM/GHAT/ 077-78	Chittre Indi Doban Ghat		90 days	1,75,000.00 30 days after bid validity
3.	08/NCB/MRM/GHAT/ 077-78	Indi Doban Wardi Doban Ghat		90 days	1,64,000.00 30 days after bid validity
4.	09/NCB/MRM/GHAT/ 077-78	Wardi Doban Rudi Doban Ghat		90 days	1,47,000.00 30 days after bid validity

Chief Administrative officer

Appendix 7: Classification of extraction projects

Schedule -2

Relating to sub role 2 of rule 4

Scale of Minerals

A) Scales of metallic minerals: the scales of metallic minerals shall be as follows

Methods of excavation	Very small scale	Small scale	Medium scale	Large scale
a) Land excavation	Up to 10 tons	Up to 100 tons	Up to 500 tons	Above than 500 tons
b) Surface Excavation	Up to 25 tons	Up to 250 tons	Up to 1000 tons	Above than 1000 tons

B) Scale of Non-metallic Minerals: The scale of non-metallic minerals shall be as follows:

Minerals	Very small scale	Small scale	Medium scale	Large scale
1. Decorative Stone	Up to 3 Cubic meters	Up to 15 cubic meters	Up to 60 Cubic meters	Above than 60 Cubic meters
2. Soil	Up to 25 Cubic meters	Up to 100 Cubic meters	Up to 400 Cubic meters	Above than 400 Cubic meters
3. General Construction Stone				
a. Stone	Up to 25 Cubic meters	Up to 150 Cubic meters	Up to 500 Cubic meters	Above than 500 Cubic meters
b. Sediment Rock	Up to 50 Cubic meters	Up to 600 Cubic meters	Up to 2400 Cubic meters	Above than 2400 Cubic meters

c. Aggregate	Up to 20 Cubic meters	Up to 100 Cubic meters	Up to 400 Cubic meters	Above than 400 Cubic meters
4. Sand and Gravel	Up to 50 Cubic meters	Up to 200 Cubic meters	Up to 800 Cubic meters	Above than 800 Cubic meters
5. Natural (Biogenic gas)	Up to 100 Cubic meters	Up to 10000 Cubic meters	Up to 50000 Cubic meters	Above than 50000 Cubic meters
6. Non-metallic minerals				
a. Land excavation	Up to 10 tons	Up to 100 tons	Up to 500 tons	Above than 500 tons
b. Surface excavation	Up to 20 tons	Up to 200 tons	Up to 1000 tons	Above than 1000 tons

Note: The table has been translated to the English Language

Source: Mines and minerals resource regulation, 1999

Appendix 8: Royalty rates for exploitation of earth-based resources for construction purpose

Schedule 10

Relating to sub rule 1 of rule 21

Royalty rate

Class of minerals	Name of mineral substance	The rate of royalty in Rs.
Non metallic	18) Construction minerals (Granite, Marble, Amphibolite etc.)	
	a) Dress block	
	b) Chips	2140 per cubic meters 250 per cubic meters
	19) Soil	
	a) Industrial soil	35 per cubic meters
	b) Ordinary soil	25 per cubic meters
	20) Ordinary construction stone	
	a) Ordinary stone	25 per cubic meters
	b) Slab stone	20 per cubic meters
	c) Slate	5 per cubic meters
	d) Ballast	60 per cubic meters
	e) Sand	20 per cubic meters
	f) Gravel	15 per cubic meters

Class of minerals	Name of mineral substance	The rate of royalty in Rs.
Non metallic	15. General construction stone	
	a) Ordinary stone	5.00 per cubic meters
	b) Sedimentary stone	
	• Slab stone	4.00 per square meters
	• Slate stone	1.00 per square meters
	c) Aggregate	12.00 per square meters
	d) Sand and gravel	
	• Sand	2.00 per cubic meters
	• Gravel	3.00 per cubic meters

Note: The table has been translated to the English language

Source: Mines and minerals resource regulation, 1999

Appendix 9: Royalty rates for generation of hydroelectricity for internal consumption and export-oriented projects

a) Internal consumption hydroelectricity projects:

S.N.	Electricity Capacity	Up to 15 years		After 15 years	
		Annual capacity Royalty, per KW	Energy Royalty, per KW/h	Annual capacity Royalty, per KW	Energy Royalty, per KW/h
1	Up to 1MW	None			
2	From 1MW to 10MW	NRs 100	1.75%	NRs 1000	10%
3	From 10 MW to 100 MW	NRs 150	1.85%	NRs 1200	10%
4	Above 100MW	NRs 200	2.00%	NRs 1500	10%
5	For captive use	NRs 1500	-	NRs 3000	-

Source: Hydropower Development Policy, 2001

b) Export-oriented hydroelectricity projects:

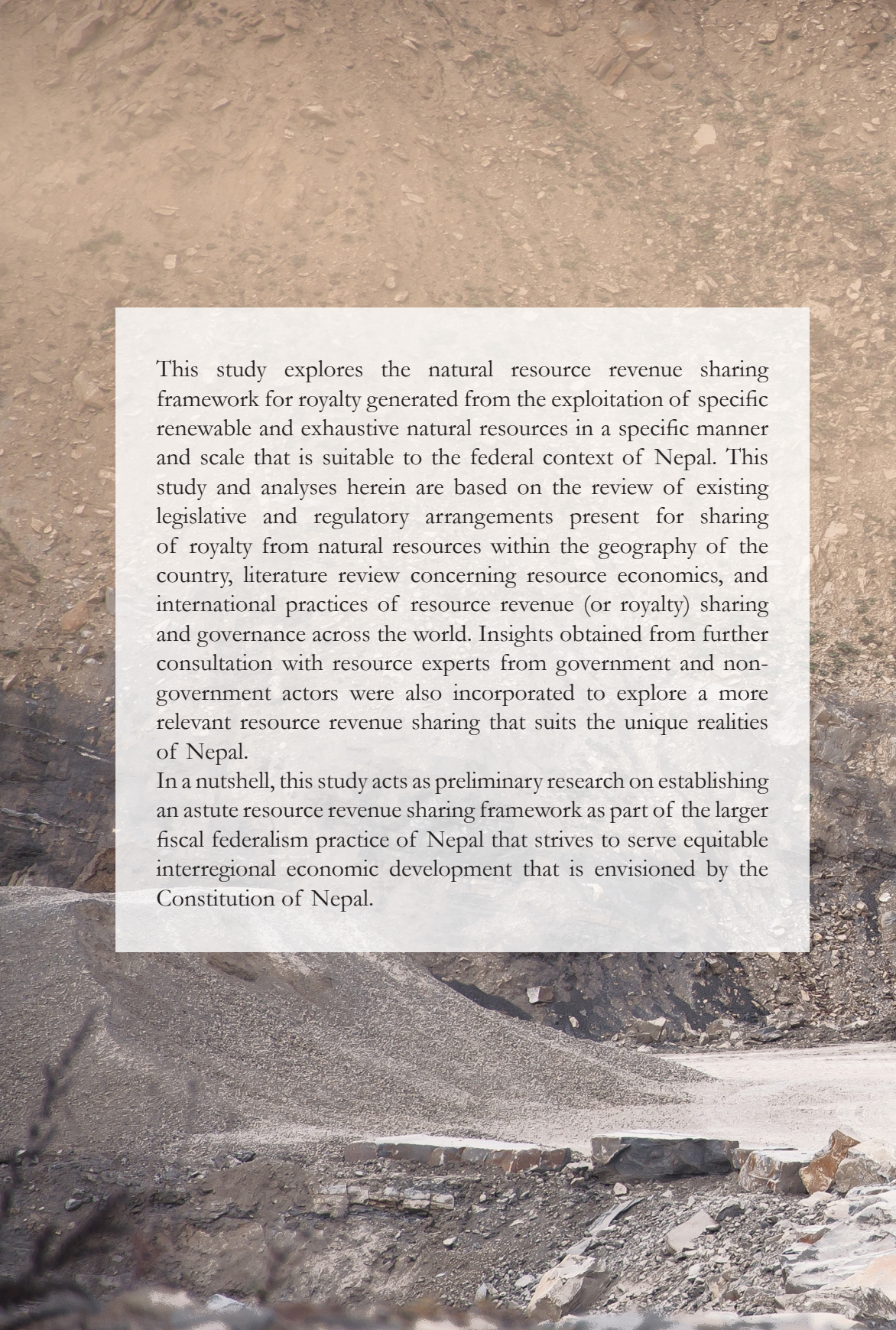
S.N.	Electricity Capacity	Up to 15 years		After 15 years	
		Annual capacity Royalty, per KW	Energy Royalty, per KW/h	Annual capacity Royalty, per KW	Energy Royalty, per KW/h
1	Export-oriented run-of-the-river project	NRs 400	7.5%	NRs 1800	12%
2	Export-oriented storage project	NRs 500	10%	NRs 2000	15%

Source: Hydropower Development Policy, 2001

Note:

- The royalty rates referred to in clause (b) above shall be applied to projects built on a commercial basis with an installed capacity of up to 1000 MW. In the case of the projects with capacities up to 1000 MW and built on a noncommercial basis, 15% (fifteen percent) of electricity and energy shall be charged as royalty per annum based on monthly power and energy generation capacity from t he date of commencement of production.

- In the case of the export-oriented project with an installed capacity of more than 1,000 MW, the rate of royalty shall be settled by negotiations.



This study explores the natural resource revenue sharing framework for royalty generated from the exploitation of specific renewable and exhaustive natural resources in a specific manner and scale that is suitable to the federal context of Nepal. This study and analyses herein are based on the review of existing legislative and regulatory arrangements present for sharing of royalty from natural resources within the geography of the country, literature review concerning resource economics, and international practices of resource revenue (or royalty) sharing and governance across the world. Insights obtained from further consultation with resource experts from government and non-government actors were also incorporated to explore a more relevant resource revenue sharing that suits the unique realities of Nepal.

In a nutshell, this study acts as preliminary research on establishing an astute resource revenue sharing framework as part of the larger fiscal federalism practice of Nepal that strives to serve equitable interregional economic development that is envisioned by the Constitution of Nepal.