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Hydropower – a panacea for energy demands and economic development of Nepal?

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List of Acronyms

ADB	Asian Development Bank
BOP	Balance of Payment
BOOT	Build, Own, Operate and Transfer
DDC	District Development Committees
EIA	Environment Impact Assessment
EPA	Environment Protection Act
EPR	Environment Protection Rules
FDI	Foreign Direct Investment
FY	Fiscal Year
GoN	Government of Nepal
GDP	Gross Domestic Product
ha	Hectares
IPPs	Independent Power Producers
NEA	Nepal Electricity Authority
PPP	Public Private Partnership
PAFs	Project Affected Families
ROR	Run of River
SAP	Structural Adjustment Program
SPAFs	Seriously Project Affected Families
USD	United States Dollar
VDC	Village Development Committee
WSHP	West Seti Hydropower Project

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Abstract

The hydropower potential of Nepal is one of the most discussed sector within the country. In the absence of other natural resources coupled with the current severe power outage, the State aims to exploit the water resources to not only supply the domestic energy needs but also to sell it in near future to generate revenues for economic development of the country. In this pursuit, the State has made several policies to facilitate hydropower development. The research hence aims to make an attempt to have a holistic understanding of the current development surrounding hydropower sector and analyse the looming issues at different level and present the challenges henceforth.

Relevance to Development Studies

The State led hydropower development in Nepal entails several impact on the natural resources and affect the predominantly rural livelihood of the country. While the State strives for economic development of the country with such developmental ventures, its impacts on the rural livelihood and other important economic sectors cannot be ignored. Hence, with this research paper, my aim is to analyse the existing challenges and address the issues that needs due attention.

Keywords

Hydropower, Privatization, Resource Grabbing, Displacement, Resistance, Economic Development

Chapter 1 Introduction

1.1 Context

Millions of people around the world are still deprived of access to energy and relies on traditional fuels to meet their needs (Portale and de Wit in Khan *et al* 2015). With the growing trend of population and economic activities, the demand for energy is only going to rise (ADB in Khan *et al* 2015). Nepal is also facing similar challenges and is rampantly exploiting the hydropower potential of the country to meet the energy needs.

The study focuses on the development of hydropower sector after 1990s which is when the country transitioned from party less panchayat system to the establishment of multi-party democracy system (Gyawali in Dixit 2008). Democracy of Nepal in 1990 was during the time when the ideology of neoliberalism was proliferating. The recently found democracy of Nepal also followed the similar path which led to privatization of hydropower sector. Additionally, the then mainstream politics carried on with the historical notion of viewing hydro potential of Nepal as an export commodity for economic development of the country (Dixit 2008).

Nepal being a predominantly rural country with subsistence farmers, the issues surrounding expansion of the hydropower sector and its impact on natural resources and therefore the rural livelihood has been explored in this research. Similarly, the State's attempt towards integrating the affected parties in the development process and the challenges at national, regional and global level in regard to attaining economic development via these hydropower projects has also been researched.

1.2 Background

Majority of the Nepalese population i.e. around 83% as of 2011 live in the rural areas (Central Bureau of Statistics 2015). The most dominant form of energy presently being used is fuelwood accounting for 77% of the total energy consumption of which 99% was taken up by the residential sector for cooking and heating in the year 2008/09 (WECS 2010). In average, only 45% of the population have access to electricity through the State owned utility - National Electricity Authority (NEA) grid (Shrestha 2015). Nepal remains one of the lowest ranked countries in terms of net electricity generated per capita (Bhandari and Stadler in Dhakal *et al* 2011).

According to a recently published NEA report, Nepal suffers from an average power cut of 14 hours a day per annum (Nepal Electricity Authority 2015) which has impacted several industries and commercial sectors (Intern-

tional Finance Corporation 2012). The power demand of the country on the other hand has been continuously increasing. In the year 2014/2015, there was an increase of 7.56% in the annual peak power demand as compared to that of the year 2013/2014 (Nepal Electricity Authority 2015). By 2020, the peak demand of electricity in Nepal is expected to be more than 2000MW (Nepal Electricity Authority in Lord 2014). One of the approaches adopted by the State to address the current energy need is through electricity import from India which stood at 224.21 MW in 2014/2015 (Nepal Electricity Authority 2015). Hence, the petroleum products accounted for 19.6% of the total import in the year 2013 (Marslen 2014).

In the midst of these issues, the hydropower sector has been seen as an alternative solution for two important reasons. Firstly, Nepal holds no other fossil fuel reserves (Bergner 2013) and secondly, it has abundance of water resources (Fast 2015). The rivers of the country have annual surface runoff of 224 billion cubic meter i.e. around 9000 cubic meter per capita while the internationally recognized norm is only 1750 cubic meter per capita (Karmacharya 2007). Accordingly, the hydropower potential of the country is estimated to be 83000 MW as shown in Appendix 1 of which around 43000MW is feasible economically (World Bank 2015). Currently, only 2% of the total energy so consumed is supplied by hydropower (Water and Energy Commission Secretariat in Koirala 2015). The State adopted Hydropower Development Policy 2001 has considered hydropower as an alternative for both biomass and heat energy (Hydro Consult Engineering Limited 2013). Currently, there are 53 hydropower projects generating a total capacity 784.499 MW (Department of Electricity Development 2016).

History of hydropower development in Nepal

Nepal have heavily relied on bilateral aid for the development of its infrastructures including the hydropower. The first hydropower project of the country was commissioned in 1911 in the Kathmandu Valley with British assistance (Dhungel 2016) which had a capacity of 500KW. The second project was commissioned in 1934 with a capacity of 900 KW in Sundarjal. Similarly, the third hydropower plant established in 1942 in Manang district with a capacity of 1600 KW (Pradhan in WECS 2010). These were all done through bilateral assistance and were built to serve the capital city (Gyawali and Dixit 2008).

Before 1960s, countries like former USSR, India and China helped with the construction of small scale hydropower projects (not more than 21 MW) in Nepal by providing grants in the form of direct investment (Dhungel 2016). During the 1960s, electrification started with small hydropower plants (Cromwell; Pandey and Cromwell in Dhakal *et al* 2011) while in 1970s, multilateral and bilateral funding started in Nepal mainly in the form of loans. During this time, larger projects were observed such as Kali Gandaki 'A' of 144 MW ca-

capacity (Dhungel 2016). As of mid-1980s, the country witnessed installation of huge hydropower systems (Cromwell in Sovacool *et al* 2011). Similarly, in 1986, Nepal adopted Structural Adjustment Programs (SAPs) under the recommendation of donors which then led to privatization of many sectors including the hydropower (Sharma and Awal 2013). Most importantly, the country went through a major political transition in 1990s shifting from monarchy to democracy which gave a speed to the involvement of private sectors as well as the IFIs in the hydropower sector (Dhungel 2016).

Increasing hydropower projects

Following democracy, Nepal went through a decade long internal conflict which ended in 2006 (Bergner 2013). After the conflict, the country witnessed Maoist-led government who promised to expand the hydropower capacity of the country to 10,000 MW by 2020 (Lacoul in Bergner 2013). Following the fall of this government, the next government in power revised the target to 25000 MW (Dixit and Gyawali 2010). This is beyond what the domestic market can consume and Nepal intends to sell the electricity so generated to India (Karmachyara 2007).

The hydropower projects can be broadly divided into two types: run-of-river (ROR) and storage projects. For the ROR projects, electricity generation depends on the river discharge and hence is less reliable during low river discharge. Its impact on the natural environment is also expected to be minimal (Gautam and Karki in Bergner 2013). Similarly, the storage projects are expensive due to the requirement to construct large reservoir dams to store water so that it can generate electricity even during the dry season (McCully; Gautam and Karki in Bergner 2013). This is especially of high importance for the projects aimed at exporting electricity as envisioned by the Nepalese State (Sharma in Koirala 2015).

Nepal is teaming up with the neighbouring countries for hydropower projects so that the high upfront cost is taken care of (Khan *et al* 2015). In order to address the impacts brought about by the projects, the State has implemented social inclusion mechanism such as royalty and shares (Guragain *et al* 2013) as discussed in Chapter 4.

1.3 Research Problem

The privatization of hydropower sector has led to increasing hydropower projects in Nepal invested by both private and international investors. While the focus has been on meeting the energy needs and selling electricity to generate revenues, such projects also requires access to land and water resources which are of utmost importance for the rural livelihood of Nepal. Similarly, attaining

economic development from the hydropower sector is associated with several challenges at the national, regional and international level.

1.4 Research Objectives

The overall objective of the research paper is to contribute to the effective implementation of policies in the Hydropower sector which would increase electricity as well as improve the livelihoods of the rural people in Nepal. To this effect the paper aims to analyse the role of the State and the privatization policies resulting in land and water resource deprivation as well as displacement of the rural communities.

1.5 Research Questions

How has privatization affected electricity generation and rural communities that experienced displacement, resource grabbing in the process of the construction of dams and run-of river hydropower projects?

- a) How has privatization impacted the productivity and delivery of electricity services?
- b) How has the agreement between the State, the private hydropower companies and the international investors affected the access to land and water resources of the rural population?
- c) How has the State responded to the resource grabbing and displacement issues in Nepal?
- d) In which ways has the local population resisted the hydropower development projects?
- e) What are the challenges in regard to hydropower being perceived as a driver of economic development of Nepal?

1.6 Research Methods and Methodology

In order to address the research questions, I have followed qualitative research method since it allows me to have a pluralistic approach (Denzin and Lincoln in Punch 2005) and analyse issues from multiple perspectives to have a holistic understanding (O'Leary 2014). Similarly, as rightly put by Denzin and Lincoln, "paradigm developments within qualitative research continue, so that we do not yet have a final picture" (Punch 2005:134). Hence, the focus of the current research has also been towards exploring the developments around hydropower sector and adjoining issues after 1990 in Nepal. It is likely that the current hydropower development paradigm might follow a different pattern in future.

The relevant information required to study the current form of development paradigm surrounding the hydropower projects has been collected from various mediums as discussed herewith.

Document analysis

Document analysis has been defined as a “systematic procedure for reviewing or evaluating documents - both printed and electronic (computer-based and internet-transmitted) material” (Corbin and Strauss; Rapley in Bowen 2009:27). These documents help to gain deeper understanding and insights into the research area (Merriam in Bowen 2009). In this regard, I have explored few Environment Impact Assessment (EIA) reports of hydropower projects in Nepal. These reports were retrieved from the government website of National Electricity Authority (NEA) and also through contacts in Nepal.

Significance of EIA in Nepal

Given the environmental and social challenges associated with developmental projects, feasibility assessments of such projects have been deemed necessary prior to its implementation in Nepal. Of all the tools, one of the most commonly used tool is the Environment Impact Assessment (EIA). Major development projects in Nepal started incorporating EIA in early 1980s. However, it was only in the eighth developmental plan of the country (1992-1997) that EIA was institutionalized in all developmental plans (Government of Nepal in Bhatt and Khanal 2010). In this regard, the Environment Protection Act (EPA) 1997 and the Environment Protection Rules (EPR) 1997 of Nepal have made the adoption of environment assessment mandatory for all developmental projects (Bhatt and Khanal 2010).

Following this, in the ninth development plan (1997-2002), participatory policy was adopted making it possible for the involvement of local bodies and other private sectors and NGOs (NPC in Bhatt and Khanal 2010). According to the EPR 1997 Sub Rule 2, a public hearing about the hydropower project should be done so as to collect the opinions and suggestions of the local stakeholders once the draft EIA report is prepared (Hydro Consult Pvt. Ltd 2011).

Besides the possible impacts that the development project is likely to bring about, EIA report also incorporates the protective measures that need to be taken into account followed by the process of its implementation, monitoring and evaluation and auditing. Eventually, the final EIA report is approved by the Ministry of Environment, Science and Technology (Bhatt and Khanal 2010) (MoEST 2006). The Ministry is also responsible to carry out environment audit two years after the approved project has begun. Additionally, the Ministry of Energy is liable to carry out the monitoring of such projects (EPR in Gaudel 2015).

Relevance of EIA reports with the research

The EIA reports have helped me gain information on displacement issues and associated impacts in relation to land and water resources accessibility. Similarly, the EIA report encompasses a range of legal provisions in regard to devel-

oping hydropower projects. In line with the current research, I have briefly explored the land acquisition Act 1977, Water Resource Act 1992, Hydropower Development Policy 1992 and 2001. These policies and acts were reflected upon to understand the role of State in expansion of the hydropower sector and therefore the impacts on local's livelihood which is not always explicitly dealt with in these reports.

Secondary Information

In Nepal, as oppose to the national hydropower projects, the donor funded projects are believed to have followed the national EIA requirements (Bhatt and Khanal 2010). In this regard, besides the EIA reports, I have done extensive study of literatures on ADB supported Kali Gandaki 'A' and the China Three Gorge Company led West Seti Hydropower Project to study the impacts of these projects on land and water resources and therefore the local livelihood.

West Seti Hydropower Project

The West Seti Hydropower Project (WSHP) was chosen also because it is still new and has not been constructed yet. However, the project has been appreciated for adopting land acquisition compensation mechanism beyond the requirement of the Nepalese law as it was influenced by Asian Development Bank (ADB) policy and other agreements between the NEA/GoN and the donors (Upadhyaya and Sharma in Koirala 2015). China recently secured the license to build West Seti dam project in 2011 with the agreement that they invest 75% and NEA invest 25% respectively (Bhusal 2016).

Kali Gandaki 'A'

It is the largest power plant in operation in Nepal since 2002 with a capacity of 144MW and financed by the Asian Development Bank, Japan Bank for International Cooperation, NEA and the GoN (Asian Development Bank in Koirala 2015). It is highly significant given the massive contribution it makes to the national grid.

Snow ball sampling

The findings of document analysis are useful for triangulation (Denzin in Bowen 2009) i.e. comparing it with the information attained via other mediums such as interviews (Yin in Bowen 2009). Triangulation or in other words data and information from various methods and sources is generally carried out in qualitative studies (Denzin in Maxwell 2009) to ensure a better assessment (Maxwell 2009). In this regard, I have carried out three semi-structured interviews and one email interview to support the analysis.

The respondents were identified with snow ball sampling. Sampling of this nature involves finding respondents through referrals. Here, with the help of initial respondents, the other respondents are identified based on their con-

tacts (O'Leary 2014). Hence, being a former student of natural science and having worked in environmental sector before, it has been relatively easy to develop contacts in Nepal. I started snow ball sampling with my colleagues working in environmental sector of Nepal to identify the respondents who were either working or directly associated with hydropower sector.

Semi-structured interviews

One of the most important source of information in this process has been the use of 'Skype' and 'Phone' to conduct interviews (Evans, Elford and Wiggins in Amirav and Higginbottom 2014). The open ended nature of such interviews (O'Leary 2014) has been helpful for the respondents to share their opinion and elaborate further in the research area especially in regard to the impending impacts and challenges of the growing hydropower sector.

Email interviews

I conducted one email interview with a resident of Rasuwa district particularly because the district now hosts a number of hydropower projects. Though there was a single respondent, my aim here was to compare the information with the literatures on changing resistance against hydropower projects in Rasuwa district. Furthermore, I have also paid particular attention to the cases of other two hydropower projects Arun III and WSHP since these projects were cancelled earlier due to protests but has been revived lately. My attempt in this regard has also been towards drawing similarities between these projects and resulting changing resistance.

Ethical Issues

As a student researching on one of the most talked about sector in Nepal, my point here is to put the current issues and challenges relevant to hydropower upfront which has not usually been discussed comprehensively or has gone unnoticed.

The information in regard to the current challenges surrounding the hydropower sector were obtained from the skype respondents who currently are working in the National Electricity Authority (NEA) and Butwal Power Company. Hence, with their consent, the information they provided has been used while maintaining their anonymity.

Challenges

The response from all the interviewees in regard to the hydropower projects were mostly positive. Hence, I had to refer to secondary information to explore the impending impacts on the locals since it is not explicitly dealt with in the EIA reports. Furthermore, the expansion of hydropower sector and its im-

plication on other economic sectors of the country has been explored via secondary information.

Chapter 2 Political Economy and Ecology of Water Resource Management

Water management issues has not been commonly viewed as a political process (Mollinga *et al* in Mollinga 2008) despite of it involving a mediation process through which interest of one group of people rides over the interest of other groups (Mollinga 2008). The State's role in managing the natural resources of the country is of utmost importance and so is hence equally responsible for water related issues as well (Mollinga 2008) (Mehta *et al* 2012). As defined by the New Collins Concise English Dictionary, politics is “the art and science of directing and administering states and other political units” (Mollinga 2008:8). The very notion of water control in terms of water resource management also sets a tone for it being political in nature. Though controlling use of water resources is not a new phenomenon *per se*, today's water control varies in great degree. Its control today has led to several implications on the physicality of the water resource and incurred socio-economic impacts on a large scale which is reinforced by regulatory dimension (Mollinga 2008).

The construction of dams is increasing worldwide (Zarfl *et al* in Kirchherr and Charles 2016) and dam building for hydropower generation in particular is very common (Gleick in Nüsser 2003). Some developments incur huge costs on the local environment. Of the many, the most pronounced ones are “fragmentation of riverine ecosystems, changes in flow patterns, modification of erosion and deposition processes, species extinction in freshwater and wildlife habitats, and loss of water by evaporation and contamination” (Nüsser 2003:21). At the same time, it also results in social costs due to the associated involuntary resettlement of many. Similarly, dam related flooding leads to loss of settlements, and loss of access to natural resources (World Commission on Dams in Nüsser 2003). Several case studies have shown that the dam construction have had negative impact on subsistence farmers and indigenous groups who rely on communal resources for their livelihood (Chao in Nüsser 2003). Its impacts have in fact been observed in different levels. For e.g. the upstream population is likely to suffer from not having access to water use due to the need to fill up the reservoir (Duflo and Pande in Kirchherr and Charles 2016). Similarly, the downstream population might benefit from irrigation, flood control and on the national level, many might benefit from electricity so generated (Platts in Kirchherr and Charles 2016). Hence, the political ecology of resource management helps to uncover the impacts these development projects have on the “local economy, environment and culture” (Osterweil in Escobar 2006:11).

As discussed above, the capture of water resources and decision around allocation of water resources is likely to have multitude of impacts at different level. Hence within the framework of political economy and ecology, I intend to explore the developments around the hydropower sector and analyse the

impacts it has had in accessing natural resources and therefore the rural livelihood in Nepal. In this regard, I have used the concepts of ‘development induced displacement’, ‘resource grabbing’ and ‘privatization’. Following the impacts, I have also analysed the subsequent resistance to these projects and the issues that needs to be readily addressed.

2.1 Development Induced Displacement

Development induced displacement increased after World War II resulting from rapid infrastructure development (Dwivedi in Koirala 2015). With neo-liberal development policies, the displaced population has increased further in numbers (Cernea in Koirala 2015). In the similar line, dams which are perceived as an important instrument of development and built to provide several human needs, namely irrigation, drinking water, hydropower (Linsley *et al* in Dixit, Tumbahangfe and Bisangkhe 2005) and other benefits such as fisheries, recreation etc, have led to involuntary resettlement of many (World Bank in Gutman 1994). Despite of this, the construction of dams is increasing worldwide and displacement of around 40-80 million people has been linked to dam building (World Commission on Dams in Cernea 2004).

Displacement and its consequences

Displacement do not only imply losing the material wealth such as land. It involves losing other “embodied and relational wealth” (Wang *et al* in Kirchherr and Charles 2016:16) such as their livelihood skills like agriculture, fishery along with their network of social relationships, customs and traditions respectively (Kirchherr and Charles 2016). In many countries, the displaced parties were neither acknowledged nor was granted a proper rehabilitation scheme. They were also not entitled to any benefits from the development projects (Dixit, Tumbahangfe and Bisangkhe 2005). Furthermore, though there has been several resettlement plans for the displaced population, the cost associated with resettlement has been usually labeled as “non-essential expenditures” (Gutman 1994:200). Hence despite of the promised compensation or rehabilitation, its effectiveness in practice has remained questionable (Cernea 2004). Even if the compensation scheme is to be implemented effectively, money alone is not going to solve the problems associated with displacement (Cernea 2007).

Similarly, the place being used for relocation of the project affected population has often faced the risk of congestion and competition for access to resources with the host population thereby leading to conflicts (Gutman 1994). Relocating the displaced population hence is more than just logistical arrangement (Cernea 2004). However, research in regard to assessing the negative impacts associated with development forced displacement and resettlement started only during the 1990s (Dwivedi in Fast 2015). Hence, these impending impacts on displaced population has been less analysed (Cernea 2007). Also,

development projects have in many instance led to impoverishment of people around the globe (Cernea 2004) by incurring negative impacts on their livelihood (Gutman 1994). The role of State in advocating development projects and inducing this new form of poverty by displacement has also been less researched (Cernea 2007).

2.2 Neo-liberal reforms, privatization in the water sector and resulting resource grabbing

The donor agencies pushed for water sector privatization given the deteriorating performance of water sector where most of the services were being provided by the public agencies (World Bank in Kirkpatrick, Parker and Zhang 2006). This changing discourse on water governance coincided with the neo liberal ideologies that was on the rise during the 1990s. It viewed the State as more of a facilitator and regulator rather than the service provider (Finger and Allouche in Franco *et al* 2013). Consequently, under the auspices of donor agencies, the trend of water privatization increased significantly during the 1990s (World Bank in Kirkpatrick, Parker and Zhang 2006) (Lobina and Hall in Hall, Lobina and de la Motte 2005). Privatization was hence meant to provide efficient services and increase access of service facilities while reducing the burden on government budgets (Robbins 2003).

Privatization opened up various water related services for private capital (Harris; World Bank in Kirkpatrick, Parker and Zhang 2006) including hydro-power. Besides the private sector, the investment from foreign direct investment (FDI) was seen as a source of capital flow to the developing countries leading to increased foreign exchange (Robbins 2003). The inclusion of transnational corporations during the 1990s was very much fostered by the notion of water being perceived as an ‘economic good’ as proclaimed in the 1992 Dublin Conference on Water and Environment (Finger and Allouche in Robbins 2003). This according to the members of the global water community, gave justification for exploiting water as a commodity thereby leading to increased investments and consequently leading to resource grabbing (Mehta in Franco *et al* 2013).

Resource Grabbing

With the advent of free market and trade liberalization, the State policies have allowed large scale developments to take place especially in today’s dire need of cheaper options especially food, fuel etc. This has led to exploitation of the available resources (Wolford *et al* in Scoones 2015) thereby leading to resource grabbing under the pretext of development (Borras and Franco in Islar 2012). Furthermore, the use of natural resources has been very much influenced by the global needs as well. In the light of growing concern towards mitigating climate change while meeting the global energy need, the hydropower sector

has been seen as an alternative. The prospect for developing this sector was widely discussed in the Paris climate change deal of 2015 (Manibo 2016). Besides addressing the energy need and dealing with climate change issues, hydropower is also seen as one of the many sectors holding the potential to contribute to economic growth in contrast to small scale farming or traditional fisheries. Such scenario and understanding has been encouraging hydropower development leading to resource grabs (Beekman and Veldwisch in Franco *et al* 2013).

Natural resources which were once openly available resources have now been transformed into a private commodity (Kay and Franco 2014) and allowed certain groups of people with legal rights as entrusted upon by the State to maneuver the use of these resources (Franco *et al* 2012). In the process of commercialization of natural resources, there has been changing ownership over natural resources that has failed to take into account the prevailing traditional and/or communal rights which is still very much prevalent in the rural communities (Zerrouk 2013). In most of the cases, such grabbing has been facilitated by the State (Franco *et al* 2012). In the case of hydropower projects, it requires control over both water and land resources.

Water grabbing and land acquisition in hydropower projects

Water grabbing occurs for various purposes and one of them being for hydropower (Franco *et al* 2013). Even though ‘run of the river’ hydropower projects are meant to have minimal impacts on nature as opposed to other hydropower projects, there has been cases of serious environmental destruction and conflicts. Furthermore, water diversion has disrupted the river ecosystems, fish migrations and the livelihood of those locals living in the vicinity of river area (Sekercioglu *et al* in Islar 2012). Since the inflow of investment from private and foreign bodies are usually given higher priority over the needs of locals, the locals are hence marginalized in this negotiation process (Kay and Franco 2014).

Most of the debates of resource grabbing has focused on land allocation and less on water which is very apparent in the hydropower sector (Islar 2012). The global discourse on land grabbing for agricultural production shows that it is always accompanied by access to water resources without which farming will be impossible. In many cases, these lands so grabbed are in proximity to dams to ensure access to water for irrigation (Borras *et al* 2011) (Franco *et al* 2013). However, appropriation of water resources is not new. As of 2010, there has been growing evidences whereby controlling water resources has been both cause and effect of the global phenomenon of land grabbing. This has also been triggered by the interconnectedness between land and water resources (Franco *et al* 2012).

Unlike agriculture, in hydropower, water resources become “the primary object of the grabbing” (Franco *et al* 2013:1652). Here with the virtue of neoliberal reforms, it has been argued that the rights to use the free flowing rivers and streams are given to private companies for a certain amount of time (Islar 2012). Water grabbing is taking place globally (Franco *et al* 2013). This phenomenon has been described by Franco *et al* as, “the capturing of control not just of the water itself, but also of the power to decide how this will be used-by whom, when, for how long and for what purposes-in order to control the benefits of use” (2013:1654). Such nature of grabbing has had serious repercussion on various forms of property rights regimes be it private (Houdret; Sosa and Zwartveen in Franco *et al* 2013) or communal (Duvail *et al* in Franco *et al* 2013). Grabbing of resources do not take into account the traditional water rights but rather is subjected to a formalization process (Koppen in Franco *et al* 2013) which leads to another form of dispossession by introducing new form of rights to water use as witnessed around the globe (Franco *et al* 2013). The State through its legal measures has gone ahead with the development projects without taking into account the rights of the people living in the vicinity of the river area (Islar 2012).

Structure of the research paper

In an attempt to answering the research questions with the help of the above discussed concepts, the Chapter 3 deals with the issues of privatization and its resulting impact on natural resources and rural livelihood. Similarly, Chapter 4 deals with the initiatives taken by the State to address the issues discussed in Chapter 3 while Chapter 5 explains further on the challenges borne by the State’s agenda of developing the country by selling electricity in near future. The conclusion in Chapter 6 sums up the findings of the research.

Chapter 3 Privatization of the hydropower sector and its implication on livelihood and natural resources

This chapter deals with the privatization of the hydropower sector in Nepal and the state's role in the expansion of this sector. This is followed by a discussion about privatization and changes witnessed in terms of electricity productivity and its reach. The associated impacts of these changes on the land and water resources are also briefly discussed. The information in this regard been derived from secondary sources and interviews.

3.1 Privatization of the hydropower sector

Privatization implies the transfer of publicly owned goods or assets to the private sector (Paudel 2006). In Nepal's case, the adoption of the Structural Adjustment Program (SAP) in 1986 led to privatization of its public enterprises (World Bank in Paudel 2006). Privatization, however, gained its momentum later in 1990s (Paudel 2006) with the newly founded multi-party democracy (Gyawali in Dixit 2008). The Privatization Act 1994 of Nepal has defined privatization as "involving private sector in the management of the enterprise, or to sell or lease it, or to transfer government ownership into public ownership, or an act to infuse participation by any means, either wholly or partly, or private sector or of the employees or workers, or of all desirous groups" (Article 2.b in Paudel 2006:1). Consequently, this privatization act facilitated participation of private sector in hydropower (Sharma and Awal 2013) which was otherwise state controlled by the public entity - National Electricity Authority (Dixit 2008). The rationale of privatization of the hydropower sector has been to improve electricity production and also to improve its reach throughout the country.

3.1.1 Role of the State in expansion of hydropower sector

The changing political scenario followed by the privatization of the hydropower sector has witnessed changes in policies concerning the electricity sector with several national plans to enable its development (GoN in Khan et al 2015). As of 1990s, the government started to promote the development of large scale hydropower projects (Dixit and Gyawali in Koirala 2015). The state introduced several laws of which the Hydropower Development Policy (HDP) 1992, the Water Resources Act 1992 and the Electricity Act 1992 are the main policies that paved a way for the involvement of the private sector. Similarly, the hydropower development policy of Nepal recognized the mechanism of

build, own, operate and transfer (BOOT) as a modality of public private partnerships (PPP) for the investment of the private sector in building hydropower plants. With PPP, the private sector was able to invest in public resources such as water, either in the form of a combination of human and financial resources or one of the two for the delivery of services. This nature of arrangements required the hydropower plants to be eventually passed down to the Government of Nepal (GoN) (Shrestha 2016).

The role played by the private sector – the Independent Power Producers (IPPs) in electricity generation has been crucial in Nepal even though their participation commenced from 1990s onwards only. Till 1991 i.e. before the private sectors participated, the installed capacity since the State's first project in 1911 stood at 244.43 MW. With the inclusion of the private sector, within 22 years (1992-2014), an additional 494,247 MW was added to the national grid of which NEA contributed 238.6 MW while the private sectors contributed 250.547 MW respectively. Today, the private sector is accountable for 32% of the total installed capacity in the country and many are still under construction (Shrestha 2016). Hence, the efficiency of the hydropower sectors in terms of its productivity has improved tremendously.

3.1.2 Roles of private sector in addressing regional disparity of electricity accessibility

According to the annual household survey 2014/15, the population with access to electricity is around 93.5% in the urban areas and 73.2% in the rural areas respectively. It also states that around 59.3% are still predominantly using fuelwood for cooking (Central Bureau of Statistics 2016). However, according to the Hydropower Policy 1992 adopted after privatization, the state intends to use hydropower as an alternative for both cooking and lighting (Hydro Consult Private Limited 2011). Furthermore, the hydropower development policy 2001 intends to supply reliable electricity at a reasonable price for all (Ministry of Water Resources 2001). For this to happen, increased electricity generation as discussed in the earlier section does not necessarily guarantee the fulfillment of the electricity needs of all since the hydropower development involves: generation, transmission and distribution (Nepal Electricity Authority 2015). While the NEA, private sector and international investors are involved in electricity generation, NEA is the one solely responsible for the other two departments i.e. transmission and distribution (Skype Interviewee 1, 25th August 2016). As of now, the NEA buys electricity generated by the other parties through the Power Purchase Agreements (Shrestha 2016). This could also be the reason why, unlike the privatization of electricity utilities leading to price hikes in other parts of the world (Hall, Lobina and de la Motte 2005), it has not been the

case in Nepal though it already has one of the highest electricity tariff in South Asia as shown in Annex 2 (Bergner 2013).

In order to improve the reach of facilities, NEA currently is “in the process of unbundling NEA thereby limiting its role to the operation of the existing projects and transmission/distribution of electricity (less than 33KV) on a regional basis” (Skype Interviewee 1, 25th August 2016). The skype respondent however also stressed on the current technical and non-technical issues to be reflected upon before looking for private sector participation in the transmission and distribution department.

Technical losses

The scattered settlement pattern, common especially in the hilly areas of Nepal, has made providing electricity for this population both challenging and expensive. Though the private sectors made incredible contribution to the total electricity generated, their projects have been mostly concentrated in areas with good infrastructure such as road and bridges (Guragain *et al* 2013) to minimize their project expenditure (Skype Interviewee 1, 25th August 2016). Evidently so, the Central and Western Development Region of the country¹ hosts the majority of the hydropower projects (Skype Interviewee 1, 25th August 2016) (Department of Electricity Development in Shrestha *et al* 2016). Globally as well, small cities or rural areas have not been lucrative enough to attract investments though privatization promised to make the services available for a wider range of public (Hukka and Katko 2003). Additionally, due to poor infrastructure for transmitting energy, Nepal has one of the highest system losses in the world standing at 34% (Poudyal 2016) which is likely to make the transmission department of little interest for the private sectors (Skype Interviewee 1, 25th August 2016).

Non-technical losses

Non-technical losses are the ones contributed by human actions such as theft of electricity, not paying the electricity bills or tampering of the meter and so on (Navani, Sharma and Sapra 2012), which is also very common to Nepal (Skype Interviewee 1, 25th August 2016). The pending bills from the Government ministries are high and are in many instances worse than those of the private actors (The Kathmandu Post 2016). Besides, many big industries in Nepal do not clear their due and use political alliances as a shield to exempt them-

¹ As of 2015, Nepal do not have the earlier designated development regions. Instead, there are seven States (Central Bureau of Statistics 2015)

selves from paying the bills. Furthermore, within the NEA itself, some of the employees are involved in tampering the bills and given the current political instability of the country, it has become a difficult area to intervene (Skype Interviewee 1, 25th August 2016). Since the distribution department currently under the NEA is solely responsible to collect money, it is unlikely that the private sectors will readily enter the distribution department given the current context.

The existing technical and non-technical issues of the hydropower sector has made the transmission and distribution departments less attractive for the private sectors, as they are solely profit driven, unlike the public entity NEA which holds social obligations (Skype Interviewee 1, 25th August 2016). Despite of the private sector's significant role in improving electricity generation, their role in addressing the regional disparity has remained minimal. Nonetheless, the country is witnessing increasing numbers of hydropower projects which bears huge implication for its land and water resources.

3.2 Role of the State in resource grabbing and its impending impacts on livelihood

Post privatization, the State adopted hydropower development policy 1992 emphasized on exploiting the water resources not just to generate electricity for the domestic needs but also to sell it (Government of Nepal in Koirala 2015) and generate revenues for economic development of the country. The policies developed in this regard and its repercussion on rural livelihood has been discussed herewith.

3.2.1 Role of the State in water grabbing

With privatization which led to the adoption of BOOT modality, the State now grants 35 years' license for electricity generation to the private sector if it is meant for local consumption while for export purposes, the license lasts till 30 years (MoWR in Guragain *et al* 2013). The State imposes royalties on water use for hydropower purposes as mentioned in the Nepal Electricity Act 1992 (Shrestha *et al* 2016). According to the revised Hydropower Policy 2001, the projects meant for domestic consumption pay less royalty than the ones that are meant for export (MoWR in Guragain *et al* 2013). Evidently, commodification of water resources leading to increased hydropower projects has led to increased royalty for the State. Since the implementation of the royalty mechanism in 1993 till the year 2010, the royalty increase per annum was found to have increased three fold (Balasubramanya *et al* in Shrestha *et al* 2016). In the midst of such economic interests, the hydropower developers have neglected

the issues of affected parties especially of the marginal and ethnic groups (Mahato and Ogunlana 2011) whereby their customary rights have been greatly neglected. This issue has been discussed in the light of the consequences brought about by Kali Gandaki 'A' hydropower project in Nepal.

Kali Gandaki 'A'

Kali Gandaki 'A' followed a global pattern of negotiation in terms of dam construction (Rai in Koirala 2015). One of the severe impacts Kali Gandaki had was on the 'Bote' community – a socially marginalized and poor indigenous community dependent on water related livelihood opportunities such as fishing and boating for their survival. With the construction of suspension bridges alongside the rivers of Nepal followed by the arrival of hydropower projects and its infrastructure, it affected their fishing activities and were hence forced to change their traditional way of living (Thanju 2007). A group of this community had to be relocated since the State owned the river bank resided by the Bote community, which was submerged for the project (Sapkota 2001). In total, it led to the displacement of 18 Bote households (Rai in Pfaff-Czarnecka 2007).

The fishermen and rafters were not considered as directly affected people since the affected families accounted for only those who lost their land and/or houses. In the process, the Bote's lost access to water resources (Sapkota 2001). Of all the displaced Bote's, only 8 were provided with houses while the rest remained not relocated even after the completion of the project (Rai in Koirala 2015). Furthermore, the houses provided were not of good quality and did not fit their lifestyle (Sapkota in Koirala 2015).

Hence, if one is to contextualize water grabbing in the Nepalese context, some of its similar attributes in line with the global discussion are: The State has viewed water as a commodity and given prescriptive rights (Pant *et al* in Shrestha *et al* 2016) of its use for various purposes while disregarding the traditional form of rights and usage as observed globally (Zerrouk 2013). Besides the water grab, hydropower sector also had repercussion on land use.

3.2.2 Role of the State in land acquisition

Unlike global land grab where the discussions have been around using land for agricultural production, in Nepal, the development of hydropower sector has led to increasing land acquisition. All hydropower projects require land for the construction of its required amenities and the transmission lines. Globally, the State has played crucial role in justifying the ongoing land grab by making "systematic policy and administrative tasks" (Borras and Franco 2013:1729). In Nepal, the Land Acquisition Act 1977 is being used as a basis to acquire land for "public as well as institutional purposes" (Dixit in Koirala 2015:95). Hence,

if any property is deemed necessary to be acquired for public purpose, the act allows the State to do so after paying a certain compensation. The State can do the same if requested by a private institution given the expenses are covered by the private institutions (Government of Nepal in Koirala 2015). This Act has empowered the State to acquire land for both public and institutional purposes (Bhattarai in Koirala 2015). The Law has further authorized the State to acquire land before paying the compensation along with the provisions of paying the compensation in instalments (Bhattarai, Government of Nepal in Koirala 2015). This manifests the absolute power of the State over the land resources.

Land as a main support system

Evidence of expropriation of agricultural land, change in livelihood strategies, and risk of being landless have been observed in Nepal (Cernea 2004). Land for most in Nepal is not just an asset to make their living from but it also “give them the capability to be and to act” (Nepali and Pyakuryal 2011:2) and serve as the main livelihood supporting resource (Khadka 2010). As explained by Sen (1981), population with no land access or limited land access will be subjected to deprivation of their socioeconomic needs. Especially in the rural agrarian society where there is a lack of another medium to sustain livelihood, landlessness or having limited land serves as both cause and effect contributing to further poverty (Nepali and Pyakuryal 2011). Land and agricultural skills remains their key livelihood sustaining asset (United Nations Development Program in Nepali and Pyakuryal 2011).

As of 2001, 32.1% of the total population in Nepal were either landless or near to landless (Central Bureau of Statistics; United Nations Development Program in Nepali and Pyakuryal 2011). Similarly, 37% of the arable land were held by 5% of the households while 15% of it were held by around 47% of the households respectively implying an average farm size of around 0.5 hectares (Government of Nepal in Joshi and Mason 2007). Majority of the farmers i.e. 53% were small farmers holding less than 0.5 ha (Central Bureau of Statistics 2011). As argued by Oya and Edelman, the focus hence should not only be on the magnitude of land areas acquired (Scoones *et al* 2013) as discussed here with the case of Kali Gandaki ‘A’.

Kali Gandaki ‘A’

The project is considered to have dealt with a compensation scheme beyond the requirement of the Nepalese law whereby cash compensation was provided for land, houses, crops and even cowsheds acquired by the project. The majority of the population were peasants and the project acquired 371 hectares of land (Upadhyaya and Sharma in Koirala 2015). The land lost involved cultivable land, grassland and had income generating asset trees like fruits trees. Post expropriation, the affected groups had 25-50% less land, 25-60% less fruit trees and 33-60% less fodder trees along with 50-60% less livestock respective-

ly. Besides, the lack of acknowledging customary rights had a negative repercussion on the 'Bote' community who used communal land and other land without holding any legal title to support their living (Sapkota 2001) which remains a common practice in Nepal (Dixit, Tumbahangfe and Bisangkhe 2005). However, in case of public land being acquisitioned, it becomes difficult to compensate the affected parties (Skype Interviewee 1, 25th August 2016). Though ADB funded this project and its resettlement policy of 1995 mentioned that legal title should not have been a hindrance for compensation, the 'Bote' community were not provided with any form of compensation (Sapkota 2001).

Despite of water management involving a mediation process (Mollinga 2008), the role of the State appears to be of paramount importance since the legal rights surrounding natural resources are laid out by the State (Ibid in Islar 2012). Hence, the economic interests around exploiting the water and land resources has led to changes in land use often leading to dispossession (Borras and Franco in Franco *et al* 2013) of which Kali Gandaki 'A' is a clear example.

3.3 Hydropower Induced Displacement

Resource grabbing has not only hindered the access of the locals to natural resources but have also resulted in their displacement globally (White *et al* in Scoones 2015). This nature of displacement started in 1960s in Nepal (Koirala 2015). By now, the country has witnessed thousands of people being displaced by hydropower projects (Dixit in Koirala 2015). The first hydropower project to induce displacement was the 24 MW Trishuli hydropower though the exact number of displaced population is unknown (Koirala 2015). Having said that, involuntary displacement has not been a prioritized in the discourse of hydropower development. Several writings on this issue along with some policy studies have been carried out but is limited to academic research only. The State still relies on the Land Acquisition Act 1977 to address displacement issues (Dixit, Tumbahangfe and Bisangkhe 2005).

The Land Acquisition Act 1977 does not take into account the loss of resources other than the immediate land and house that have been acquired. It has not duly addressed the resettlement and rehabilitation issues. Of the displaced people, not many have received proper rehabilitation (Skype Interviewee 1, 25th August 2016) (Koirala 2015). Furthermore, the resettlement aspect in the law also remains vaguely addressed (Koirala 2015) as discussed here with the case of West Seti Hydropower Project (WSHP). Besides, though multilateral agencies such as ADB and World Bank led hydropower projects have made some efforts to address the rehabilitation issues, its adequacy in address-

ing the problem has remained doubtful (Rai; Bisangkhe in Dixit, Tumbahangfe and Bisangkhe 2005).

West Seti Hydropower Project (WSHP)

The West Seti Hydropower Project of Nepal is a storage project with a capacity of 750MW (Shrestha in Koirala 2015). The dam of WSHP will destroy 1042 ha of natural vegetation amongst others while the diversion of river flow will have imminent impact on the aquatic life, agriculture and water need of the households (WSHL in Koirala 2015). Around 2326 ha of land is required for the project of which 659 ha is agricultural land. Similarly, inundation of 2060 ha of land due to dam building will also affect off farm activities as it comprises of water bodies, forest areas and grassland. Consequently, a total of 2125 household will be affected along with displacement of 1190 households. Furthermore, with the land required for hydropower construction and transmission lines, it is likely to result in displacement of additional local populations (WSHL in Koirala 2015). However, displacement entails losing more than just material wealth (Wang *et al* in Kirchherr and Charles 2016) and involves losing their livelihood skills and their network of social relationships, customs and traditions respectively (Kirchherr and Charles 2016). Hence, the issues to deal with becomes much more than just logistical arrangements.

Relocation of the displaced population

The fear of being displaced from ancestral land and moving to a new place (Hwang Xi, Cao, Feng and Qiao in Koirala 2015) is common. Also, moving to a new place has a potential of leading to physical and psychological stress and also in some instance acclimatizing to a new environment (Messerschmidt 2008) can be a big challenge. In the case of West Seti, the displaced population are to be relocated in the Terai² region, though the compensation, resettlement and rehabilitation aspect of the project have not been finalized yet (WSHL in Koirala 2015). It is important to reflect on the fact that while West Seti is a hilly area with altitude ranging from 700 to 4000m, Terai is flat and fertile with completely different weather and environmental conditions (Koirala 2015). The Terai region is considered apt for agricultural activities specially to grow the staple food of Nepal – rice. Because of these attributes, it has hence been witnessing increasing in-migration from other regions of the country (Shrestha *et al* in Gartaula, Chaudhary and Khadka 2014). Evidently so, Terai accounts for only 17% of the total land and it is already resided by around 50.27% of the

² Nepal is divided into three physiographic regions: Terai, Hills and the Mountains (Gartaula, Chaudhary and Khadka 2014).

total population of the country as of 2011 (Central Bureau of Statistics 2012). As mentioned by Gutman (1994), this imposes a risk of congestion and competition for resources.

Furthermore, as opposed to the hills, the Terai region comprises of a different ethnic group – the Tharus. Hence locals from West Seti also fear on the power dynamics between the two groups. Such fear is justified as the Tharus have revolted in the past on the decision of setting WSHP displaced people in the Terai (WSHL in Koirala 2015). One of the fears common amongst the Tharus has been the risk of a minority group forming with growing migration from the hills (Koirala 2015). The change in social, cultural and economic aspects of both groups needs to be considered seriously before preparing the resettlement plans.

Concluding Remark

Privatization of the hydropower sector in Nepal has invited several actors for investment and has evidently led to increased electricity production. However, the existing technical and non-technical issues have made it difficult to reach the whole population. This challenges the hydropower development policy 1992 and 2001 of using electricity for lighting and cooking and making the electricity facilities available in cheaper price.

The drive to generate revenues by selling electricity in future for the economic development of the country is a notion which has persisted through the times of monarch to multiparty democracy till today's republican State. The State has often proclaimed it as "passport out of poverty" (Dixit and Gyawali 2010:107) despite of it entailing several risks associated with its development that threatens both natural and social environment (Marslen 2014) as discussed above. At the same time, there have been no plans on how to invest and improve the production sector of the country with the generated revenues (Dixit 2008). In return, it has led to increasing resource grabbing followed by displacement of the locals thereby impacting rural livelihood.

Chapter 4 State's response to issues surrounding hydropower projects

The State has made numerous attempts towards social inclusion, ensuring environmental sustainability and incorporating the affected parties in the negotiation process in the light of the impending impacts brought about by the political economy and ecology of resource management. This chapter deals with the State's effort in addressing the need of affected parties along with the changing resistance around the hydropower projects. Most of the information has been derived from literature while the contribution of the email interviewee is also used in analyzing 'resistance'.

4.1 State' role in addressing the issues associated with affected parties

4.1.1 Social Inclusion

Royalty

The local self-governance Act and local self-governance regulations in 1999 acknowledged that the royalty received from the projects should be partly distributed to those communities that are affected by the project implementation. It allocated 10% of the royalty for the concerned district affected by generation of hydroelectricity (MoWR in Guragain *et al* 2013) which was later revised to 12% in the second amendment to the self-governance regulations in 2004 (Singh in Guragain *et al* 2013). Furthermore, additional 38% of the royalty was to be shared amongst the districts of the same developmental region (Dixit and Gyawali 2010) and 1% of the royalties was to be invested in rural electrification of the directly affected VDCs (Dixit *et al* in Dixit, Tumbahangfe and Bisangkhe 2005).

The Department of Electricity Development is responsible for mentioning the royalty amount allocated for the district in public. However, the district development committee (DDC)³ receive these royalties on an irregular basis without clear information on the source of the revenue. There has also been complaints against the central government for lacking transparency in delivering the royalty payments. For e.g. sometimes the royalty is delayed while sometimes the amount is sent in a bulk amount as a result of dues from previous years. This in return hinders the planning process in terms of allocating the use of royalty for the DDC (Shrestha *et al* 2016). Also, the provision of using 1%

³ DDC: Administrative Unit in Nepal

of the total royalty in rural electrification is only feasible in those cases where the projects are large in nature which amounts to significant royalties (Phone Interviewee, 22nd August 2016).

Another equally important issue in this regard is the unclear mechanism of distributing royalties at the village level (Dixit and Basnet in Shrestha *et al* 2016). Also, these funds are not being used for a particular purpose which makes it difficult to assess its effectiveness in terms of catering benefits to the affected parties. This to a large extent has been due to the political instability. Hence, though the royalty mechanism has been in place for years, not all locals are aware of its existence and consequently not aware of where royalty amounts are invested (Shrestha *et al* 2016).

Share distribution

Besides royalty, the securities registration and issuance regulation amended in 2008 required public limited companies to float at least 30% of its share. Of the 30%, the company staff, the local community affected by the project areas and the general public were entitled to 5%, 10% and 15% of the share respectively (Chalise in Guragain *et al* 2013). However, this mechanism also has several limitations.

First of all, the entitlement to shares of hydropower projects do not apply to all project affected communities. This facility is only available in the projects owned by the public limited companies (Chalise in Guragain *et al* 2013). Secondly, even in the projects where such facilities are available, the capacity of affected parties to exploit benefits of the development projects orchestrated by the State is usually limited (Pyakuryal in Nepali and Pyakuryal 2011). In order to buy the shares, one has to be aware of the process. Some buy more shares than the others not knowing the benefits of owning it while some have no knowledge on how to buy it. A study carried out in Rasuwa, Dolakha, Lamjung and Gulmi district showed that the participation of poor, socially excluded groups, landless people etc. were minimal in buying shares due to the lack of information. The locals lacked financial education to be able to make informed choices. Similarly, though the ones who have been able to invest in hydropower shares have found it to be beneficial rather than saving in a bank or cooperatives, similar cannot be said about the future. There is no clarity in regard to the changes that the shares and shareholders might have to cope with when the project is transferred to the State as per the BOOT model (Shrestha *et al* 2016).

4.1.2 Ensuring environmental sustainability

The hydropower projects bring about huge changes in the natural environment. The State is the main body responsible to verify the feasibility studies

and environmental impact assessments of development projects (Nüsser 2003). However, in many cases, it has been observed that the Environmental Impact Assessment (EIA) study has become merely “window dressing” (Franco *et al* 2013:1655). In Nepal as well, EIA study is the most important tool currently to analyze the feasibility of any development projects including hydropower and it is merely carried out as a requirement imposed by the law (MoFSC in Bhatt and Khanal 2010). The achievements of carrying out EIA studies have been questionable due to varying reasons.

Amongst the many issues, one of the most widely discussed is the considerable amount of time required for the approval of EIA. According to the EPR 11.5, the designated time to approve EIA reports for the implementation of projects is 60 days which can get pushed till 30 days (EPR 11.6) further on special circumstance. Despite of such provisions, the reports do not usually get approved in 90 days. This in many account has been associated with the lack of sufficient human resources (Bhatt and Khanal 2010) (Skype Interviewee 1, 25th August 2016 and Skype Interviewee 2, 11th September 2016) (Phone Interviewee, 22nd August 2016) which is followed by weak coordination amongst the related governmental sectors involved in validating the EIA report (Bhatt and Khanal 2010) (MoEST 2006).

Another equally important issue, if not more, has been the lack of an accreditation mechanism for experts or firms who can prepare the EIA report. Also, once the EIA reports have been cleared, the effectiveness of implementing the recommended activities has been weak due to less attention and resources directed towards the monitoring aspects by the State (Bhatt and Khanal 2010). In this regard, the quality of EIA report being produced as well as the monitoring and auditing aspect of EIA which is to ensure the required precautions are taken to curb the unprecedented consequences of hydropower projects has not taken place effectively (Mahato and Ogunlana 2011).

Evidently so, hydropower projects in Nepal have incurred substantial social and environmental costs (Cernea; World Commission on Dams in Koirala 2015) despite of its progress being monitored by the State. In the case of the earlier discussed case of Kali Gandaki ‘A’, attempts were made to address the negative impacts it had on fisheries by making reservoir fisheries. However, such constructions resulted on a long term impact on the aquatic life especially the migratory riverine species (Garcia 2007). Additionally, though agriculture intensification program was planned and annually USD 10000 was given for its implementation to reduce the impact on agriculture sector, it was never implemented (Sapkota 2001). Likewise, of the various other mitigation options in the EIA document to minimize the impacts, very few were implemented during the construction phase (Garcia 2007).

Hence, currently, EIA is mandatory only on a procedural level but it lacks substantive detail on how it is carried out in practice and the compliance in regard to the recommendations mentioned in the EIA report are minimal (Dixit, Tambahangfe and Bisangkhe 2005) (Skype Interviewee 1, 25th August 2016 and Skype Interviewee 2, 11th September 2016) (Phone Interviewee, 22nd August 2016). Most of the arguments in relation to EIA have been with regard to its cumbersomeness which restricts getting easy access to license of developing hydropower projects to meet the energy need (U.S. Department of State in Bergner 2013), however the focus on the quality of EIA itself has been not widely discussed. Similarly, without strengthening the monitoring and auditing department and taking strict measures against violation of these measures, the environmental and social consequences could be worse for the coming hydro-power projects given the State's ambition of generating 25000 MW.

4.1.3 Ensuring participation of affected parties

As explained by Mollinga, water management involves a mediation process (2008) since it affects different parties as observed in the case of hydropower projects which entails loss of land and house for the locals residing in the project area. In Nepal, not only is the property so acquired compensated with cash and not land (Skype Interviewee 1, 25th August 2016) (Koirala 2015) but also, the directly affected parties do not get to participate in deciding the compensation rate. It is solely carried out by the Government agencies and other project in charge (Koirala 2015). Having said that, in order to proceed with the project, locals need to give their consent. Hence, sharing of project information is conducted via public hearing to ensure the locals make informed decision.

Access to information on hydropower projects

One of the important features associated with EIA is to conduct mandatory stakeholder consultation and public hearing before the license for the project is granted (Bhatt and Khanal 2010) and make them an integral part of the mediation process. According to the Environment Protection Rule, a public notice is published in one of the national daily newspaper and accordingly, invitations for public hearing are sent out to the government and non-government bodies, local leaders, DDC, VDCs and the affected parties. During the public hearing, the impacts of project, namely: socio-economic, physical, biological, cultural as well as mitigation and enhancement measures are communicated (Hydro Consult Pvt. Ltd 2011). Subsequently, the submitted draft EIA report should, mandatorily, incorporate recommendations from the concerned VDCs or municipality. Upon receiving the draft EIA report, the Ministry of Science, Technology and Environment again publishes a public notice in the daily newspaper and grants 30 days' time for the general public and stakeholders to put forward their opinions and suggestions on the report (EPR in Gaudel 2015) since it is publicly available (Gaudel 2015). The State has adopted these measures to ena-

ble the concerned stakeholders to make informed choices (Bhatt and Khanal 2010). However, the experiences in this regard suggests otherwise as discussed herewith.

Kali Gandaki 'A'

The locals were mainly informed about the short term benefits of the project. The discussions were mainly around securing jobs for the locals in the project (Pfaff-Czarnecka 2007) while the impending long term impacts were kept un-discussed. Consequently, the locals failed to comprehend the idea that the construction work opportunities in the project area was a temporary setting. The locals hence failed to make proper investment of their compensation and at the same time they even failed to save the money earned in the construction site (Rai in Pfaff-Czarnecka 2007). By the end of the project, realizing the end of cash flow with the end of construction, the local's earnings were greatly altered. The locals realized too late that they have hastily traded their fertile land for cash (Pfaff-Czarnecka 2007).

West Seti Hydropower Project

Though the project has been revived for the second time, the majority of the locals are unaware of the project being handed to a new group, China Three Gorge Corporation, and hence are oblivious to the new terms and conditions. Also, if the locals are to access any information on the project, there are no State authorities in the project area to serve the purpose since most of the important bodies in relation to hydropower development are concentrated in the capital city - Kathmandu (Koirala 2015).

Currently, public hearing which is one of the most important tools with which the locals decide the faith of the project, it has not been effective in practice. More than addressing the issues, such flawed mechanism has made it easier to go ahead with the project (Franco *et al* 2013) and become a medium to legalize the resource grabs (Kemerink *et al* in Franco *et al* 2013). There is a growing fear that the voice of certain groups of people are superseding over others (Dixit 2008). Hence the nature of resistance against such projects has been explored in the following section.

4.2 Resistance around hydropower projects

The local communities around the globe threatened by displacement have involved in various forms of resistance (Moreda 2015) since “communities worldwide are increasingly steadfast, adamant and articulate about the defense of their places, environments, and ecosystems” (Escobar in Escobar 2006:6). The impact of resource grabbing has had differing impacts on locals depending on their socio-cultural, economic, and political context (Borras and Franco in

Moreda 2015). In general, the environmental movements and conflicts have increased tremendously globally (Escobar in Escobar 2006).

Changing resistance

In Nepal, prior to multi-party democracy in 1990, dam building was not contested since it was executed as a top-down approach (Verghese in Dixit and Gyawali 2010). During 1990s, with democracy and involvement of private sectors, it opened avenues to raise questions around planned hydropower projects (Bissel in Rest 2012). Accordingly, two projects led by the World bank – Arun III and Asian Development Bank – West Seti Hydropower Project were cancelled thereafter. Furthermore, with the advent of globalization, Nepal witnessed the participation of transnational alliances in activism. Arun III was the first hydropower project in Nepal that went through public hearing after which public consultation became a regular feature in the hydropower projects of Nepal (Dixit and Gyawali 2010). In the case of Arun III hydropower project, the economic viability of the project was questioned since the project cost threefold the costs borne by the private sectors of Nepal. With the opposition from not just local groups but also its transnational allies, the World bank was eventually forced to withdraw from this project in 1995 (Rest 2012). Similarly, in the case of West Seti Hydropower Project, though the EIA was approved by both GoN and ADB, issues related to the economic and environmental costs of the project were left unclear (Johnson 2010) which triggered several protests against this project carried out by local environmental NGOs forcing the ADB to pull out of the project (Koirala 2015).

4.2.1 Declining Resistance

In today's context, both Arun III (Rest 2012) and West Seti Hydropower Project (Koirala 2015) has been revived under new terms and conditions. Despite the increasing investment from the private sector and international investors leading to rampant resource grabbing, such civil society mobilization against big dam projects of the State have not been witnessed again (Rest 2012). This is in contrast to the rising conflicts surrounding dam construction around the globe. It could be attributed by the current power outage problems, where today such opposition is perceived as being “anti-developmental” (Rest 2012:108). However, the lack of resistance also shows other similar attributes amongst these hydropower projects.

Hydropower projects synonymous to development?

In case of Arun III, some of the locals have perceived the road connecting to industrial centers of the country and having access to the market as benefits of having the hydropower project. Some locals perceive wage opportunities during construction and also access to electricity as an advantage. Locals are eager-

ly awaiting for the project implementation and one of the main reasons has been the local interpretation of having hydropower project as synonymous to development of their village (Rest 2012). Similar is the case of Kali Gandaki 'A', the locals welcomed the project due to promised increased access to electricity, road, markets etc (Pfaff-Czarnecka 2007). This is likely since, in many remote areas, the idea of having employment opportunities is usually welcomed especially given the lack of important economic activities in the area (Borras *et al* 2011) as shown by these cases.

Access to hydropower shares

Rasuwa district of Nepal is witnessing growing numbers of hydropower projects (Lord 2016). Agriculture is the main occupation for around 88.83% of the total population. However, due to rugged terrain and unsuitable climate, the agricultural productivity of the area is low and food deficiency is common (Nepal Environmental and Scientific Services P. Ltd, n.d.). Many households in the district benefitted from the share of publicly traded stock of Chilime Hydropower Project. The number of project affected people purchasing shares of the Chilime project in 2010 was more than the population that voted for the national election held in 2013 (Lord 2016).

Income from shares of the hydropower project has been perceived by many as an alternative income in case of medical or personal emergency. Furthermore, these share certificates were also found to be used as a mortgage to get loan for business. The locals have been investing in transport business like trucks given the recently opened trade route between Nepal and China – the Kyirong Road (Email interviewee, 6th June 2016) (Lord *et al* in Lord 2016). With regard to the success of Chilime projects, another three Chilime financed hydropower projects, namely: Sanjen, Upper Sanjen and Rasuwaghadi hydropower projects has received strong community support (Lord 2016).

As mentioned by the Email Interviewee (6th June 2016)

“People are happy with a hydropower project for direct economic benefit and 24 hr. electricity service. As of now they are happy with share distribution from Chilime Hydropower. However, people expect similar benefit from upcoming hydropower projects such as Rasuwaghadi, Syangjen, Mailung, etc and incase if rule is subjected to change and people would not benefit economically as of now, then the situation can be disappointing and conflicting”.

Though it is not mandatory for private companies, shares are used as a means of obtaining approval from the locals and means of harnessing the local capital (SWECO in Shrestha *et al* 2016).

4.2.2 Differing resistance within the affected communities

The WSHP project is located in the far western development region of Nepal which is one of the least developed region, implying less accessibility to public services and other facilities like roads, schools, markets etc. Large number of people settled around the project areas are illiterate (Government of Nepal and United Nations Development Program in Koirala 2015). The locals depend on subsistence farming (68.1% of above 14 years), animal husbandry, and other off farm activities like business, service sectors and labor migration to India and other parts of the country and even gulf countries to support their living (WSHL in Koirala 2015).

There has been no protest against the project as many are now eagerly waiting for the benefits the project might offer (Koirala 2015) despite of the project facing financial issues (Bhusal 2016). However, the local's response has been different in regard to their dispossession. Globally, in the case of land grab as well, the resistance has been of varying nature within the same community. As discussed before, the locals within the same community are socially differentiated with varying resources and hence are subject to varying forms of impacts which shapes their reaction accordingly (Borras and Franco 2013).

Location wise

In the case of WSHP, two places were selected to research their response to the land acquisition, namely: Deura (market center) and Babina (remote area). In case of compensation provided, people from Babina were more eager to move than the people from Deura. It could be attributed by the existing push and pull factors (Kunz; Lee in Koirala 2015). People in Deura had easy access to required amenities and relied on farming and business to support their living. The land in Deura was also highly valued because of its fertility and hence the locals were not willing to move to a new place and start anew. While in case of Babina, this remote area was deprived of facilities, costing time to reach the market and other services. Amidst these hardships, the locals were willing to move in case of compensation provided (Koirala 2015).

Occupation wise

Displacement also poses a risk to the livelihood skills they possess such as agriculture or fisheries (Kirchherr and Charles 2016). Depriving the rural population from their main source of subsistence also makes it difficult for them to acclimatize in the productive sectors of the economy since they usually possess only agricultural skills (Borras, Monsalve and Fig in Borras and Franco 2013). Similar concerns were voiced by the farmer population of the WSHP. The farmer community were found to be concerned with moving as they possessed only agricultural skills and relied on it for their livelihood along with other off

farm activities like livestock raising, fishing etc. (WSHL in Koirala 2015). They were also concerned with the quality of land they were to receive in Terai area. Similarly, the business people in Deura market center who have been earning good income were also insecure with the new settings (Koirala 2015).

Concluding Remark

The effectiveness of State adopted measures to provide benefits to the directly affected parties due to growing number of hydropower projects have remained minimal. Similarly, EIA – the only instrument to ensure environmental integrity has also remained unsatisfactory. Despite of all the associated issues with the hydropower sector, the consequences have been perceived as acceptable for the larger good i.e. to meet national interests such as economic development (Dixit, Tumbahangfe and Bisangkhe 2005). Also, while the State is promoting hydropower for the economic development of the country, the project's affected locals also seem to relate hydropower projects to the development of their village. The lack of livelihood opportunities and development initiatives in the remote areas has led to the changing resistance over time. Access to hydropower shares have been perceived by some locals as an investment for their future. Furthermore, the hydropower companies are also seen as an alternative provider of the much needed social service which the State has failed to provide (Lord 2016). Nevertheless, there are several challenges at both national and regional level that Nepal has to overcome before referring to hydropower as a medium of accomplishing economic development.

Chapter 5 Challenges to hydropower driven economy

The power outage problem and the policies adopted after the privatization of the hydropower sector has facilitated hydropower development despite of its impending impacts on the land and water resources of the country. So much so, the Water Resource Act states, “Water resources are important natural resources for the economic development of Nepal” (Ministry of Energy 2001:2). However, besides the imagined contribution that the hydropower sector might make to the economy in near future, this chapter explores two current and most important economic sectors of the country and attempts to draw its link with hydropower and what it implies for the economy of the country. In this regard, this chapter deals with the challenges of developing the hydropower sector at national, regional and global level based on secondary information and information from skype respondent.

5.1 Challenges at the national level

The issues at national level have been discussed in relation to the changes concerning the agriculture and remittance sector since these sectors contribute highly to the GDP of the country.

5.1.1 Agriculture Sector

According to the national survey of 2010/11, around 76% of the total population are agricultural households (Central Bureau of Statistics 2011). The annual household survey of 2014/15 shows that around 64% of the total population are engaged in “skilled agriculture and forestry” (Central Bureau of Statistics 2016:VIII). However, in general, agriculture value added to the GDP has been declining over the years from 51.6% in 1990 to 32.8% in 2015 (World Bank (a) 2016) which is further expected to decline to 31.69% in fiscal year (FY) 2015/16 (Ministry of Finance 2016). Similarly, farmers are increasingly holding less land i.e. land holding of less than 0.5 ha increased from 40.1% in 1995/96 to 52.7% in 2010/11. During the same time line, average size of agricultural land has also declined from 1.1 ha to 0.7 ha (Central Bureau of Statistics 2011). Nepal’s gross food production (rice, wheat, maize, millet, barley and buckwheat) and paddy rice production is expected to decline by 6% and 10.2% respectively in the FY 2015/16 (Ministry of Finance 2016). Likewise, though the Water Resources Act Nepal 1992 has prioritized irrigation as the second most important sector for water use, the total irrigated land has not improved much. It stood at 27.5% in 2001 which increased insignificantly to around 29.7% in 2010 (World Bank (a) 2016). Today, amongst the South Asian countries, Nepal

has one of the lowest productivity of food crops and is increasingly relying on food import (Deshar 2013).

Hydropower projects, land acquisition and impact on agriculture

Though the expansion of the hydropower projects and its impact on the agriculture sector has not been explicitly studied, the EIA reports show increasing land acquisition and sometimes briefly deal with the impending impacts on the agriculture sector. For e.g. the Nyadi hydropower of 30MW required 29.20 ha of land. 19.19 ha was acquired permanently of which 16.78 ha was a cultivated land. Here, more than 82% of the population are engaged in subsistence agriculture as their main occupation (DDC in Hydro Consult Private Limited 2011). The EIA report states that the land acquired will result in the decline of agriculture productivity. Annual loss of 54.88 tons of paddy and wheat along with 43.07 tons of maize has been estimated (Hydro Consult Private Limited 2011). Similarly, the EIA study of lower Marsyangdi of 140MW shows that of the permanently acquisitioned land (64.03 ha), the majority was either being used for agriculture purpose (43.71 ha) or was covered with forest vegetation (7.17 ha). The report also states that the permanent acquisition of forest land is likely to restrict the locals from accessing their much needed supply like fodder, timber, firewood etc. (Hydro Consult Engineering Limited 2013). Likewise, the Upper Tamakoshi hydroelectric project with a capacity of 456 MW acquired 182 ha of land of which total agricultural land and forest land was 66 ha and 78 ha respectively (Ghimire 2012). In some of the hydropower projects like the earlier discussed Kali Gandaki 'A', after 4-5 years of expropriation, the majority of the families were still unable to recover from their loss. Due to the loss of productive land, agricultural production declined by 60% and 27% respectively for the Seriously Project Affected Families (SPAFs)⁴ and Project Affected Families (PAFs)⁵ respectively thereby worsening the already apparent food deficit problem of the project area (Sapkota 2001).

Though there has been no clear study linking hydropower induced water grabbing on water accessibility and therefore agriculture, several hydropower projects like Kulekhani I, Jhimruk and Khimti has led to decreasing water availability and hence lower productivity for farmers (Shrestha *et al* 2016).

5.1.2 Labour Migration

In South Asia, remittance from foreign labor migration is being increasingly perceived as an important contributor to economic growth of the country. It

⁴ Population who lost more than 50% of their possession (land and/or living quarters) (Sapkota 2001)

⁵ Population who lost less than 50% of their possession (land and/or living quarters) (Sapkota 2001)

brings foreign exchange for the country and helps to reduce unemployment pressure at the same time (Pant 2008). In the Nepalese context, the country is shifting from agriculture based economy and is investing more in the service sector and farmers are facing strong competition in the liberalized market (Adhikari 2006). Furthermore, democracy of 1990s has made the process of attaining a passport easy for all citizens, which otherwise was a difficult bureaucratic process. Evidently so, most of the labor migrants from Nepal are from agriculture background. Due to limited livelihood opportunities, migration has become a regular feature (Sijapati, Bhattarai and Pathak 2015). Also those who are land poor cannot sustain their living from agriculture and are into other wage earning opportunities and seasonal migration to other parts of Nepal and India (Müller-Böker; Chambers and Conway; Scoones; Ellis; DFID; Steimann; Subedi in Nepali and Pyakuryal 2011).

Annually, there has been an increasing surge of labor migrations from Nepal and this process is being facilitated by both the State and private institutions (Department of Foreign Employment 2014). The State has perceived labour migration as a way of creating employment opportunities (Sijapati, Bhattarai and Pathak 2015). Currently, Nepal is not only the country with the highest number of labor migrants per capita (Paoletti *et al* 2014) in Asia but is also the highest remittance recipients in the world in terms of its share in the GDP (Sapkota 2012). Though the share of remittance in the GDP was less than 3% in 1995, it surpassed the total share of foreign aid, tourism and exports by 2003 (World Bank in Lokshin, Bontch-Osmolovski and Glinskaya 2010). Hence, the contribution of remittance to GDP which was at 29.1% in 2014/15 is expected to rise to 32.1% in the FY 2015/16 (Ministry of Finance 2016). Migrant remittance has therefore also contributed to poverty reduction in Nepal from 42% to 31% respectively from the FY 1995/96 to FY 2003/04 (Pant in Cooray 2012).

Foreign migration, however, is not new to Nepal since many Nepalese have been traveling to India easily due to the open border system. Having said that, today's trend shows the Middle East serves as an important destination for many labor migrants (Sijapati and Limbu in Paoletti *et al* 2014). In the similar line, remittance from India is usually not recorded in the balance of payment (BOP) of Nepal since most of the income are brought in by the migrant themselves or through their relatives and friends. Consequently, a large share of the remittance is due to the income from countries other than India (Pant 2008). Remittance in general has helped to maintain surplus BOP for the country (Sapkota 2012). Declining job opportunities which is working as a push factor and comparatively high pay in foreign countries is working as a pull factor for many labor migrants (New Era in Sapkota 2012). Given the current contribution of remittance, the State has been prioritizing overseas employment. De-

spite of promoting labor migration, the use of remittance for the benefit of the wider society remains one of the challenges for the State (Pant 2008).

5.2 Geo-political interest and associated challenges of developing hydropower projects

Globally, coal and gas serves as the common source of electricity. Thus, in the power sector, electricity is one of the major contributing factor of the carbon emission which stood at 42% in 2013 (International Energy Agency in OECD/NEA 2015). In the similar line, according to the International Energy Agency, fossil fuels like coal, oil and oil products provides around 75% of the total energy demand in India (2015). Likewise, in the year 2013, China's total energy consumption were supplied by 68% coal and 18% oil respectively (Stocking and Dinan 2015). According to the US Energy Information Administration, in between 2008 and 2035, India and China's share of energy consumption in the world is expected to grow from 21% to 31% (US Energy Information Administration in Bergner 2013). In this regard, they have shown their interest in exploiting the hydropower potential of Nepal (Bergner 2013). India and China through private foreign investment are developing two hydropower projects of 900 MW each (Upper Karnali and Arun III) and one hydropower project of 750 MW (West Seti Hydropower project) respectively (Dhungel 2016).

5.2.1 Regional dynamics with India and China

In the quest of having a strong influence in the South Asian region, both India and China are working towards strong influence in Nepal, thereby investing in different sectors (Marslen 2014). Nepal being a landlocked country, has transit agreements with India and hence all imports come from India. India has monopoly in the fuel sector whereby Nepal relies totally on fuel imports from the Indian State owned Oil company (Bhushal 2016). However, in terms of FDI, China has overtaken India and has become the largest FDI contributor (Chowdhury 2014).

Role of China

China is showing its presence in Nepal whereby, in between the year 2007 and 2011, investment of China increased twofold in the sectors like transport and infrastructure including hydropower and military. With increased investment in the Nepalese military, it also intends Nepal to support it in its stance on Tibetan issues. In regard to the hydropower sector, India and Nepal have been trying to develop and reach an agreement on hydropower sector development since the 1990s while China's entry is as recent as 2012 (Marslen 2014).

Role of India

Nepal and India have three bilateral agreements in regard to water resource management: Koshi Project Agreement (1954), Gandak Irrigation and Power Project Agreement (1959) and the Mahakali Treaty (1996). Both Koshi and Gandak projects were criticized for unfair distribution of benefits to the Nepalese party (Devkota in Upadhyay and Gaudel 2014). As opposed to these projects, the Mahakali Treaty was ratified after the establishment of democracy. Nonetheless, it also resulted in disagreements of similar nature. Consequently, the 'Pancheswor Multipurpose Project' which was a part of the Mahakali Treaty did not materialize then (Upadhyay and Gaudel 2014) but has now been revived after a recent visit of the newly elected Prime Minister Modi to Nepal in 2014. He was the first head of India government to visit Nepal for the past 17 years. It stirred various developmental talks between the two countries including the hydropower sector. Though India is perceived as a potential trading partner, it remains a challenge for India to first go ahead with earlier commitments (Marslen 2014).

5.2.2 Alternative electricity sources other than hydropower

In the global context, hydropower as well as nuclear energy has been seen as the potential alternatives for electricity generation (OECD/NEA 2015). Presently, hydropower and nuclear power are responsible for 16% and 11% of global electricity supply respectively (International Energy Agency in OECD/NEA 2015). Both India and China are advancing rigorously in nuclear power development. China is expected to generate 250 GW of electricity by year 2050 thereby surpassing the USA while India is expected to be the third largest market for nuclear power, generating 100 GW of electricity by 2050 (IEA/NEA in OECD/NEA 2015). Also by 2050, India is expecting to supply 25% of electricity from nuclear energy sources (Roberts 2015). This has been strongly reinforced by a recent nuclear deal between India and the USA whereby USA is to help India with nuclear technology (Biswas 2015). The coming section deals with importance of electricity for India since currently, Nepal can only sell electricity to India.

Revenue generation via electricity export?

Unlike land, water resources do not have a fixed boundary and its availability varies in both time and scale. Also, its management requires great precaution given the fact that it can have serious impact on multitude of scales (Franco *et al* 2012). Water grabbing phenomenon in the upstream with building of dams will alter the natural river flow and affect the ecological processes downstream (Vagholikar and Das 2010). Headwaters of many rivers important to India are in Nepal (Upadhyay and Gaudel 2014). Rivers originating in Nepal contributes significantly to the Ganga river of India with an estimation of around 45% of its annual flow (Dhungel and Pun in Koirala 2015). Hence upstream storage

program will negatively hamper the water flow since such reservoirs are required to release only 10% of its mean annual runoff downstream for environmental purposes (Skype Interviewee 1, 25th August 2016) to maintain the “ecological system and river health” (Gaudel 2015:60).

Given the fact that India has 60.6% agricultural land as of 2013 of which only 36.3% was irrigated as of 2012 (World Bank (b) 2016) and hence heavily relying in rainwater and groundwater for irrigation (Sinha 2016), India’s need of water for irrigation is of paramount importance. It was also manifested by the recent water conflicts observed in India triggered due to the disagreement over water sharing agreement for irrigation and drinking purposes (Gowen 2016). According to the Government of India, its annual water demand will reach 1422 billion cubic meter by 2050 (NCIWRD in Upadhyay and Gaudel 2014). Also, fourteen out of its twenty major basins have been classified as water stressed with water availability per capita per annum standing at less than 2000 cubic meters (IDFC in Hill 2013).

With the current context of a nuclear deal between US and India, in the near future India can supply quite some electricity from nuclear power. However, dams built in Nepal will have huge implication on the agriculture and irrigation system of India. Due to the conflict of interest, some are sceptic about the idea of earning revenues from exporting electricity from hydropower to India. There are still major ambiguities in the Project Development Agreement and Power Trade Agreement of the hydropower projects signed between the two countries (Skype Interviewee 1, 25th August 2016). It is also further reinforced by the troubled long history of developing water related treaties between the two countries (Skype Interviewee 1, 25th August 2016) (Rest 2012).

5.3 Challenges at the global level

Hydropower has been promoted as a clean energy (Karmacharya 2007) in the light of climate change. Hence, the recent Paris Climate Change deal also pushed for hydropower as a potential source of electricity generation (Manibo 2016) since CO₂ is expected to be released only during the construction phase (Garcia 2007). However, this does not apply for the storage projects. Unlike the ROR projects, the storage projects like West Seti Hydropower Project emit methane; a greenhouse gas and around twenty-one times more potent (US EPA in Johnson 2010) than carbon dioxide in contributing to the global warming (EIA in Johnson 2010).

Vulnerability of hydropower sector to climate change

The rivers of Nepal are fed with snow, glaciers and monsoonal rain (Karmacharya 2007). Changes observed in the Himalayas of Nepal have been more

pronounced than changes observed on the global scale (Chaulagain in Manandhar *et al* 2011) leading to high temperature rise in the higher altitudes (Baidya *et al* in Manandhar *et al* 2011). Similarly, research in relation to the glaciers of Nepal and related studies have shown that the glaciers are receding and in some cases even dying (Chaulagain in Manandhar *et al* 2011). Furthermore, according to much research work carried out in Nepal, Nepal is predicted to have more intense monsoons along with dry winters with little rain and snow. This is eventually going to negatively impact water availability in near future. It bears huge implications on the ROR projects since the generation of electricity is totally dependent on the river discharge (Oxfam International in Bergner 2013). However, this will imminently impact the inflow into the reservoir (WWF in Johnson 2010) thereby affecting projects like West Seti and fundamentally altering the power generation capacity of such storage projects in a long run (EIA in Johnson 2010). The impact of climate change on water availability and therefore the hydropower sector is higher than the impact on other sectors (Agrawala *et al* in Gaudel 2015). However, this aspect has not been strictly taken into consideration in the environmental impact assessment reports, nor by the State (Gaudel 2015).

Concluding Remark

While Nepal is striving to attain economic development via hydropower development, there are several challenges at various levels besides having serious implication on the natural resources of the country and rural livelihood. On the national level, important economic sectors like agriculture have been declining in its performance. Hydropower projects triggered land acquisition which has also contributed to food deficiency in some cases. Similarly, the younger population increasingly drawn to labor migration in the search of employment are mostly from the farmer background.

Currently, India is the potential country Nepal can sell electricity to, however, the two countries have had a tenuous relationship in the past in terms of water resource management and has not been able to reach to power trade agreements for the current projects. Likewise, though hydropower has been seen as a potential sector to supply electricity from a clean source, the storage projects have contributed to the global warming phenomenon. Additionally, the hydropower sector itself is highly prone to climate change in the case of Nepal, given the rivers are mostly snow fed which is likely to impact hydropower generation potential in the near future.

Chapter 6 Conclusion

Water resources are the only natural resource owned by Nepal for electricity production. Given the abundance Nepal has and its availability, the hydropower sector has been increasingly advocated as a clean, sustainable resource to meet the energy needs. Additionally, it has also been presented as a potential sector that can take the country out of poverty by helping generate revenues from selling electricity. Noticeably, privatization of hydropower sector led to increased number of private and international actors that contributed to increased electricity production. However, the existing technical and non-technical issues have made it difficult to reach all of the population, especially the rural population who heavily relies on firewood. This in return has challenged the objective of hydropower development policy 1992 and 2001 of providing electricity at an affordable price as an alternative for cooking and lighting.

The commodification of water resources has resulted in increased revenue for the State from the current running hydropower projects meant for domestic consumption. Similarly, the Water Resource Act 1992 and Land Acquisition Act 1997 has provided the State with absolute power to use land and water resources when deemed necessary for the benefits of the public. In this process, as shown in multiple cases, the State has shown meagre attention towards the social and environmental issues. Hence, the expansion of hydropower projects has led to increased ‘resource grabbing’ and made the already vulnerable people of rural Nepal more vulnerable. Though the size of the acquisitioned land appears to be small, the consequences it entails on the dispossessed parties is much adverse (Oya in Scoones *et al* 2013) for a country like Nepal since the rural communities are heavily dependent on subsistence farming and usually possess only agricultural skills. Likewise, though the Water Resource Act has prioritized different sectors for water resources, in practice the hydropower projects have had serious repercussion on several aspects of rural livelihood (Sojamo and Larson in Franco *et al* 2013). Though the current magnitude of hydropower displaced population is small in Nepal compared to that of its neighboring countries, it is expected to increase with the current hydropower expectation of the State (Dixit *et al* in Koirala 2015). The dynamic between customary rights vis-à-vis the State law has been very complex in this regard.

The State adopted measures of addressing the impacts of hydropower by sharing information about the project to enable the affected parties to make informed decision and making them part of social inclusion initiative has also been flawed. Correspondingly, the EIA carried out to ensure the feasibility of the projects have been failing on several grounds, mostly due to weak monitoring and insufficient resources directed by the State. While speeding up of EIA

process is one issue, another equally if not more important issue has been the quality of the EIA reports currently being produced. However, the nature of resistance against such projects has changed over time in the midst of power outage problem that has deeply engrossed the country (Rest 2012). Additionally, low human development indices of the rural areas (Murshed and Gates 2005) has contributed largely to changing resistance whereby some of the locals have perceived hydropower projects as an alternative way of getting access to services such as road and schools.

Amidst all these issues, even if the large scale hydropower projects are to go ahead, Nepal does not have the domestic capacity of consuming all of the electricity and for now, the only country that Nepal can sell to is India (Gyawali; Shrestha in Koirala 2015). As discussed earlier, the increasing investment of India and China in this sector has been highly contested and the likelihood of selling electricity appears slim. In this quest, the State has not given due attention to the current important agriculture sector and the State has been increasingly relying on imported food products. Furthermore, discussion around the hydropower sector has been more about exploiting it as a commodity and generating revenues in future rather than focusing on using it as a tool to enhance the production sector of the country itself (Dixit 2008). Given the lack of employment opportunities, there has been increasing surge of labor migrants from Nepal. Oddly, the State has been playing a role of facilitator in labor migration and vying for the remittance brought about by migrant workers which now have huge implication on the country's economy. It is difficult to comprehend the idea of economic development from the, imagined, yet to be exported electricity from big scale hydropower projects without taking into account the current important economic sectors. Similarly, these big reservoir projects have been found to be an active contributor of methane – a potent greenhouse though the hydropower sector has been seen as a source of clean alternative energy. Equally important is the fact that climate change imposes serious implications on the hydropower potential of Nepal.

In order to meet the current energy needs, it is logical for the State to exploit the water resources given the absence of any other resources. However, for its persistent pursuance of achieving economic development by selling electricity and generating revenues in future, it has to have a proper plan in place in order to ensure the resources are allocated in the sectors which need it most. One of the challenges for the State here is to ensure these projects do not worsen the socio-economic conditions of the rural community as shown in some cases. These issues have to be explicitly dealt with in the State's law while ensuring it materializes since the existing provisions and laws safeguarding environment and ensuring people's participation has been ineffective.

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Appendix 1 Hydropower Potential of Nepal

Basin	Theoretical Potential (GW)	Economic Potential (GW)
Koshi	23	11
Gandaki	21	5
Karnali and Mahakali	35	25
Others	4	1
Total	83	42

Source: Shrestha in Upadhaya 2008

Appendix 2 Consumer Tariff Rates in South Asia (US cents per KWh)

	Nepal	India	Pakistan	Bangladesh	Sri Lanka
Domes- tic Consumer tariff	0- 20KWh: 5.6 21-250: 10.3 >250: 13.9	0-200KWh: 5.5 201-400: 8.8 >400: 10.4	0-50KWh: 2.2 0-100: 5.1 101-300: 7.6 301-700: 12.4 >700: 15.4	0- 100KWh: 3.3 101-400: 4.2 >400: 7.0	0-30 KWh: 2.7 31-60: 4.3 61-90: 6.8 91-120: 19.1 121-180: 21.8 >180: 32.8

Source: Websites of Ministry of Power, India; Nepal Electricity Authority, Nepal; Bangladesh Power Development Board; Ceylon Electricity Board; Sri Lanka and Pakistan Economic Survey, 2010-2011 (Bergner 2013)

Appendix 3 Questionnaire

Q. Why is NEA solely responsible for transmission and distribution of hydropower sector?

Q. Are there any specific impacts after private sectors came to the scene besides increment in electricity supply?

Q. Why are some projects concentrated in some areas and only 66 districts so far receive royalty?

Q. Government has clearly prioritized the usage of water resources (Water Resources Act 1992) but how effective are they in practice?

Q. For how long is the water resource leased out to the investors?

Q. Is there any mechanism for compensating the loss of access to water usage?

Q. How effectively does the Land Acquisition Act 1977 address rehabilitation or resettlement plan and issues of displaced population?

Q. What happens to the locals holding no legal papers to land?

Q. Who decides proper compensation as stated in the land acquisition act?

Q. Are there any environmental consequences brought about by dams and hydropower projects so far in Nepal?

Q. Why is EIA report taking long to be approved?

Q. Why are there complains about weak monitoring and weak environmental audit?

Q. How has the local livelihood changed with the arrival of hydropower projects?

Q. How have the hydropower projects impacted the agricultural sector?

Q. What is the implication of political instability hydropower development?

Q. How feasible is the idea of generating revenues and attaining economic development?

Appendix 4 Respondents list

List of Respondents	Affiliated organization/background	Date of Interview
Skype Interviewee 1	National Electricity Authority	25 th August 2016
Skype Interviewee 2	Butwal Power company	11 th September 2016
Phone Interviewee	Hydropower Consultant	22 nd August 2016
Email Interviewee	Resident of Rasuwa District	6 th June 2016