

Review Article

Changing the perception of forest value and attitude toward management in the conservation area in Nepal and sustainable forest energy: A Review

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ABSTRACT

This review paper analyzes the results of articles highlighting people's perceptions of the forest and its products, such as bioenergy. A keyword search identified 10 peer-reviewed articles focusing on perceptions, attitudes, and potential in the region from 2015 to 2022. An overview of the knowledge concerning the effects of bioenergy production on sustainable development and the people's perception of nearby Protected Areas will be presented. Due to climate change and the increasing scarcity of other natural resources, demand for biomass will inevitably increase, and so will the challenges of conserving and protecting forests. The positive attitude of people living in or around forests can contribute to preserving forest resources while helping locals to their standard of living, thus contributing to sustainable development. The biomass model used in Nepal is insouciant food security, sustainability, and the satisfaction of basic human needs and implies intragenerational equity. Conservation and management of protected areas are at risk, and the local governments need to identify the source of conflict and the relationship between local and protected areas when laws are against the preference of nearby communities in protected areas. Thus, devising rules on an ad hoc basis might reduce the conflict and help in sustainable development without endangering protected areas and the locals. Relationships that local communities have with protected areas are important to the success of those areas. However, it is difficult to capture park-people relationships at the spatial scale that make them useful for management and conservation planning.

Key words: Forest Value, Sustainable, Forest energy, Protected area, Perception

INTRODUCTION

Protected areas (PAs) have been established in Nepal to protect the biological process and species of the ecosystem. The protected area is "a clearly defined geographical space, recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated services and cultural values" (Dudley, 2008). According to the UN Environment World Conservation Monitoring Center, 2385,563 areas were designated worldwide as protected areas as of July 2018. Modern protected area management in Nepal was introduced in 1973 with the promulgation of the National Park Conservation Act 1973. Following the adoption and implementation of the convention on biological diversity in 1993 and the UN framework convention on climate change UNFCCC in 1994, the governance and management of PA became recognized as a fundamental political and ecological theme globally (UNFCCC, 2015).

Nepal's total area under PAs is 34193 km² (23.39 % of the total landmass). According to the government of Nepal, there are 33 protected areas, which include 12

national forest parks, one wildlife reserve, one hunting reserve, six conservation areas, and 13 Madhyaavatri conservation areas. Out of six conservation areas, three are managed by the government of Nepal. In 1958 wildlife conservation act came into effect, while in 1973 national park and wildlife conservation act was implemented. Likewise, the most significant law, the national park and wildlife conservation regulation restricted the use of resources in lowlands in 1974. However, limited rights to forest resources were provided to the local community in 1979. PAs are expected to contribute to community livelihoods and well-being, which is an important aspect of advancing sustainable development. Asia's PAs have great ecological value [9] while maintaining large concentrations of people, supporting local livelihoods and development, yet suffering from commercial pressures such as tourism and the construction of roads, mines, and dams (Chang et al., 2022) Community involvement is recognized as one of the key components of effective forest management in tropical countries. (Chen et al., 2021)

Balancing the needs of people and the welfare of wildlife are inherently conflicting goals and can

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therefore present unique challenges to tourism development in PA (kc *et al.*, 2021). Attitudes of households and the relationship between attitudes and illicit resource extraction behavior in Nepal's Bardia National Park. Despite a variety of issues, households generally had favorable sentiments regarding the park and wildlife. Instead of being influenced by rewards received, attitudes were influenced by the respondents' values toward conservation. Nonetheless, while having an optimistic outlook and generally supporting conservation initiatives, households continued to engage in unlawful resource exploitation (Thapa Karki & Hubacek, 2015). Overall positive household attitudes towards PAs and conservation despite high loss of life around PAs suggest that local residents can support conservation if their livelihood needs are met. Comparisons of household attitudes and perceptions suggest that local strategies rather than top-down approaches are likely to be more effective (Karanth & Nepal, 2011). Many respondents suggested that the increase in forest cover has significantly enhanced the infiltration capacity of the land and, consequently, freshwater flow has increased, sedimentation has decreased and the quality and quantity of water for irrigation and hydropower consumers downstream has increased (Poudyal *et al.* 2015).

Climate change perceptions of Indigenous peoples (IP) are important because of their close connection with nature and the environment. This study assesses climate change insights of the Tharu in Bardiya district of Nepal in relation to climate variability and water sector related hazards, focussing on Indigenous knowledge for adaptation and mitigation in agriculture (Chaudhary *et al.*, 2021).

The campaign to protect biodiverse parks and reserves in developing countries expose political tension between interest group that surface for other international problem such as environmental or climate change (Naughton-Treves *et al.*, 2005). Local people near the PAs depend highly on natural resources for their livelihood. Nevertheless, the restrictions on using resources sometimes lead to confrontation and clashes with the management officials. Due to the stringent policies, conservation prioritizes safeguarding natural resources over the needs of local stakeholders, which in turn plays a role in demoralizing local people. The support of the local community, without a doubt, is of utmost importance in the conservation process. The challenge of managing natural resources has increased due to rapid population growth and contradictions between conservation policies and local stakeholders. Realizing the mismatch, Nepal's policy has been revised, which has led to reform and conversion of the administrative authority into local government institutions (Jumbe *et al.*, 2007) to involve locals in the planning and execution of policies and distribution of resources.

People depend on natural resources such as food, shelter, and other ecosystem services, and the quality of their natural resources affects their daily lives (Dave *et al.*, 2017). Thus, their involvement cannot be understated. A successful decentralization program is

carried out at the community level, with all user groups in equal shares during the participatory planning and management of financial development and maintenance, including all benefits (Bradon & Wells, 1992). Due to rapid population growth demands of using natural resource is increasing day by day as result overwhelming pressure on biodiversity, people living near protected area can lose crop yields wildlife grazing and may not have access resource collection and indigenous communities are restricted in protected area due to the reason local and management have conflict in different uses for using a natural resources (Nepal *et al.*, 2021).

Establishing Buffer Zones (BZs) outside of PAs has created a midway solution for government agencies and local stakeholders. BZs is considered the flagship program of the Nepalese conservation sector (Thing & Poudel, 2017). In Nepal, 30 to 50 percent of PA revenue is utilized for conservation awareness and local community development in BZs. It has created a climate for empowerment that effectively helps protect and appropriately use forest areas. After the formation of a pa, there are various prohibitive restrictions on the use of land that are required by law to achieve a goal, but these elements cause a problem with stakeholders and pa management (Phomma *et al.*, 2019). Conflicts occurs when one or more users compete for the same resources resulting in defective (Patel *et al.*, 2013).

People near the conservation area has positive social impacts on ecotourism also with the income of tourism people has quality of life and good education and they develop a skill for attracting visitor (Upadhyaya *et al.*, 2022). Environmental education is a practical activity of social aspects, The focus is on the relationship between people and the environment. Institutions must work to solve environmental problems while striving for sustainable development, which implies efforts to improve environmental awareness and effective citizen participation. Environmental education serves the sustainable development of environmental protection (Zhou *et al.*, 2021). To protect biodiversity, protected areas have been created by excluding local people from reserves, enacting regulations that limit resource use and require a strict 'fence and fine' approach (Yang *et al.*, 2015). Conflicts between people and wildlife has been widely accept as one of the most issues for wildlife conservation in Nepal near protected area (Acharya *et al.*, 2016)

The forest as a trailblazer for the rural population

The forest-based economy is valuable in fulfilling the increasing demand for material goods such as biomass, wood, and water. All aspects of societies are benefited from the respectful use of forest products; however, some conservationists suggest that native people better safeguard protected areas in developing countries because their approaches are more holistic, effective, and less expensive. The relationship of rural/native/indigenous peoples with forest and its sustainable use connects to the lifestyle they adopt, more importantly, the values of things they follow. Forest values can be divided into two categories: material (economic and life-sustaining) and immaterial (not economical and not

not life-sustaining) (sociocultural, ethical, spiritual, and aesthetic). They can also be divided into intrinsic and instrumental categories (Buijs, 2009). Intrinsic values refer to how an action contributes to the protection and dignity of a forest ecosystem (holistic, not anthropocentric values) or the downsides of an effort. At the same time, instrumental principles deal with fulfilling individual needs or wishes (anthropocentric values). In the last few decades, no instrumental values such as aesthetic, cultural, and moral have gained importance due to anthropocentric values (Patel et al., 1999). Plans to promote a "green economy" have sparked discussions between authorities and native forest residents in many tropical countries. Steps to reduce fossil fuel by-products by avoiding deforestation or increasing carbon sequestration through reforestation have sparked an energetic discussion between people in the vicinity who are directly affected by changes in land use and the administrations who decide on changes in land use (Larson et al., 2010).

People's behavior toward forests

The underlying reasons why people participate in conservation practices are based on their values. Although previous research is still in the theoretical phase, the analytical properties of happiness value measurement have not been examined (Takahashi et al., 2021). The PAs has become an important conservation strategy for all aspects of ecological conservation. However, illegal activities by locals in and around the PAs could jeopardize conservation goals (Bhattarai et al., 2017). Social psychological models such as the rational choice theory and its extension, the theory of planned behavior (Aizen, 2012), have been used to understand and explain human behavior towards the forest and its sustainable use. Some conservation studies have used these models to investigate multiple behavioral predictions, for example, John et al. (2010). A recent study by Empidi and Emang (2021) showed that the theory of planned behavior constructs of subjective norm and perceived behavioral control affects intention, and attitude plays the most significant role in explaining behavioral intention. This behavior may explain how rural/native/indigenous people have developed to co-exist with forests more sustainably than their urban counterparts.

Number of forest-dependent people

The term forest-dependent people are often used to describe people that benefit from forests in some way. In particular, people of developing countries living near or around forests are usually involved in agriculture outside the forest but go to the forest for daily purposes such as for grass, timber, fuelwood, and medicine are known as forest-dependent people. Rural/indigenous/native and poor are labeled in this category. An Indigenous group cannot survive without using forest products and their derivatives (FAO, 1997).

There is uncertainty about the number of forest-dependent people worldwide (Chao, 2012). Different estimates exist at national and global levels and vary by orders of magnitude, partly because of the wide variance

in definitions. Beyond the lack of clarity over who counts as a forest-dependent, challenge in generating meaningful estimates lies in the difficulties in bringing together demographic, socioeconomic, and forest cover data (Calibre Consultant, 2012). However, an assessment by the World Bank suggests that around 1.6 billion people worldwide depend on forests: about 350 million live inside or around dense forests.

The link between the forestry sector and sustainable development goals (SDG)

Forest supplies medicine, fuel, food, and wood for more than a billion people worldwide. It is a significant income source for rural, indigenous peoples, and small household areas (FAO, 2014). Nepal is an example of how important the forest sector is to sustainable development. The entire rural livelihood and economic development of Nepal rely on the forests. The forest plays a crucial role in mitigating and adapting to climate change. Protecting soil, water, and forests contributes directly to social and economic development. The Nepalese government aims to achieve all aspects of SDG goal number 15, dealing with life on land within 2030. This goal addresses environmental problems, terrestrial ecosystems, sustainable management of forests, and forest degradation.

Forest energy sustainable for development

Forest biomass is the energy that contributes to ecological sustainability and forest bioproduct and contributes to society for bioeconomy (Titus et al., 2021). The demand for sustainable bioenergy is increasing daily to reduce greenhouse gas emissions (Yeh et al., 2016). In 2017, 14% of total energy worldwide came from biomass, a renewable energy source, and 85% of biomass energy from the forest (World Bioenergy Forum, 2019). There are two primary sources of forest-derived biomass: raw materials removed by the forest and raw materials obtained as a by-product of forest resources. Forests energy generated from small to large scale can supply the electricity grid faster than solar, wind, and other energy sources.

The renewable energy strategy aims to produce bioenergy and increase forest harvest (Bridget et al. 2009). The social costs and benefits of using forest biomass for the environment and climate change differed depending on the geographical region (Buchholz et al., 2017). Sustainability criteria and mechanisms show that the current use of biomass follows a standard protocol to ensure the environmental factor for carbon emissions and the social problem of the community

Bioenergy with sustainable development is one of the decisive factors for the global increase in bioenergy demand. In discussing the impact of bioenergy on sustainable development, it is concluded that the nature and extent of the effects of bioenergy implementation depend on the specific system, development context, and scope of the intervention" (Smith et al., 2014). Various studies suggest that expanding the production of

crops most commonly used to produce bioenergy may affect food security. The land with local income is used for commercial purposes, and the result of bioenergy production can be unevenly distributed to the local population (Persson, 2014).

Objective

The main aim of this article is to combine finding from the previous research on the perception of protected area using the systemic review. Following are the specific objective through this research article:

1. To know the impacts of risk and opportunities (economic, social, environmental, and technology).
2. To understand the positive and negative implications of social awareness
3. To evaluate the method and experiment used in the perception of protected area from previous studies.
4. To identify challenges and opportunities for researchers in the future (Table 1).

Table 1. Perception of protected area and their impacts

Social impacts of conservation	the type and scope of social repercussions (costs and benefits) distribution of social expenses and advantages fairly
Ecological outcomes of conservation	Environmental quality and productivity are impacted by ecological results of conservation. advantages and effects on the supply of ecosystem services
Validity of conservation governance	process quality in governance. the suitability and inclusivity of the governance frameworks. the reliability of decisions, laws, and decision-makers;
Acceptability of conservation management presence or absence of management	the suitability of conservation models. action taken by management is acceptable. quality of conservation interactions

Methodology

Attitude and conviction are theoretical attitudes from the field of social psychology. Attitude is a psychological tendency in which an individual evaluates a particular entity, called an attitude object, with a degree of favor or disfavor. Attitude consists of values, connections people make between their attitudes, and various attributes. For example, a national park is an attitude in expressing a national park that is part of a country's resources. An observational discriminant function technique was used to find the best predictors of attitude. This method is similar to logistic regression. The study took into account people's perceptions of benefits and problems in each region, as well as seven demographic and socio-economic variables (age, gender, social group, caste, education, family size, and land ownership size).

This review article was done to analyze the different literature on public awareness change in perception specially people living near in protected area. Different analyze tool is used for this study. This study creates a meta-analysis of the attitude, which could help future research. . Reviewing different articles published in this field systematically helps to identify the following key points, 1) understanding the image and multidimensionality through relevant studies, 2) knowledge perception and attitude to protected area and relation in a critical approach manner systemically. A systematic review's success depends on the ability to find relevant material. The method was used for the search article included google scholar for a peer-reviewed journal, web science, fifty papers focused on the public perception of protected area in Nepal using keywords. Peer-review paper published from 2015 to 2022. The 10 papers were focused on public perception in protected area in Nepal.

The search for a methodology and the extraction of articles (Figure 1).

Following the development of a selection strategy, the selection process is carried out in the same manner as a review of individual studies:

1. Examine the titles and abstracts that have been obtained for relevance and duplication.
2. Choose which ones you want to extract and evaluate further.
3. Obtain full-text versions of these potentially eligible reviews.
3. Obtain complete text copies of these potentially eligible reviews

Identification	Database	Articles included
	(n>50) Google scholar Web science	Peer-reviewed articles published between 2015 -2022

Keywords for search article	Forest value, protected area environmental conservation, renewable energy perception, attitude, forest management
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Screening	screen by title, abstract (n= 30)	Article excluded No stakeholder group includes There was no primary data collected.
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Included	Summarized study (n=10)	Studied based database response Focus on protected area and public perception
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Category of perceptions	Basics of evaluation
Social impacts of conservation	nature and magnitude of social impacts (costs and benefits). equity in distribution of social costs and benefits

Figure 1. the search for a methodology and extraction of article

Result and discussion

The published 10 articles were selected for criteria in the Table 2 with author name date of publication and sample size.

Data collection method and sampling was done by previous published article which was published in open access journal. Four type of method is used for this study survey method, interview, focus group discussion and mix method. Among reviewed articles, people's attitudes were the same in all protected areas. However, views varied depending on age, education, and occupation. People near the reserve are happy and positively perceive the forest and nature conservation. Most of them actively seek protection, some indigenous groups being exceptions and are disappointed with the conservation acts. While the development of PAs has created employment, some critical management shortcomings remain. Nearby people remain seriously concerned about their livestock feed; however, they are also optimistic and think that they have had less of a negative impact because of the benefits. The relationship between people and PAs in Nepal is complex and diverse.

Although the history, extent, management goals, and general attitudes of people towards them differ in these three protected areas, there are some common themes in people's opinions. These problems are detrimental, lack of management, and conflicts with management. At the same time, they are positive, for example, areas that provide the necessary resources for survival and entertainment, aesthetics, and environmental benefits. The positive opinions of the people play an essential role in

their positive attitude towards the region. Evidence is that recognizing incorporating and empowering non-utilitarian interests in strategies people develop to improve the relationship between parks and people, combined with more traditional methods such as an alternative to sustainable mining and livelihoods, improves residents' perception. These strategies can include, for example, field trips by schools, women's groups, and

local leaders to protected areas or environmental awareness programs based on the values people already have about the protected area and are promoted by them. The conservation strategy must consider the positive and negative perceptions of the residents of the protected area and strive to maintain and integrate different values to more accurately reflect reality and complexity. The figure shows the type of global energy consumption in percent. It helps to know how the world is using renewable energy sources.

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Figure 2 shows the contrasts by region of renewable energy compared to non-renewable energy. (The author could not identify a more updated global summary of the share of renewable and non-renewable energy by region for this study). Clearly, for many parts of Africa and Asia, the primary residential fuel is still from solid biomass, often forest-related.

Table 2. published an article by author – date

Serial no	Date of publication	Author	Sample size	Stakeholder
1	2022	Upadhaya et al., 2022	167	Chitwan national park Public
2	2021	Adhikari et al., 2021	68	Sindupalchowk district
3	2021	Nepal et al., 2021	188	Annauparna conservation area public
4	2021	Kc et al., 2021	871	Badardia national park resident
5	2021	Chaudhary et al., 2021	229	Bardiya distret
6	2016	Pandey et al.,	197	Mansalu conservation area
7	2016	Choudary et al.,2016	33	Koshi taphu conservation area
8	2016	Pandey et al., 2016	66	Gaurishankhar conservation are
9	2015	Thapa Karki & Hubacek, 2015	381	Bardarida national park
10	2015	Paudyal et al 2015	10	Dolkha cummity forest group

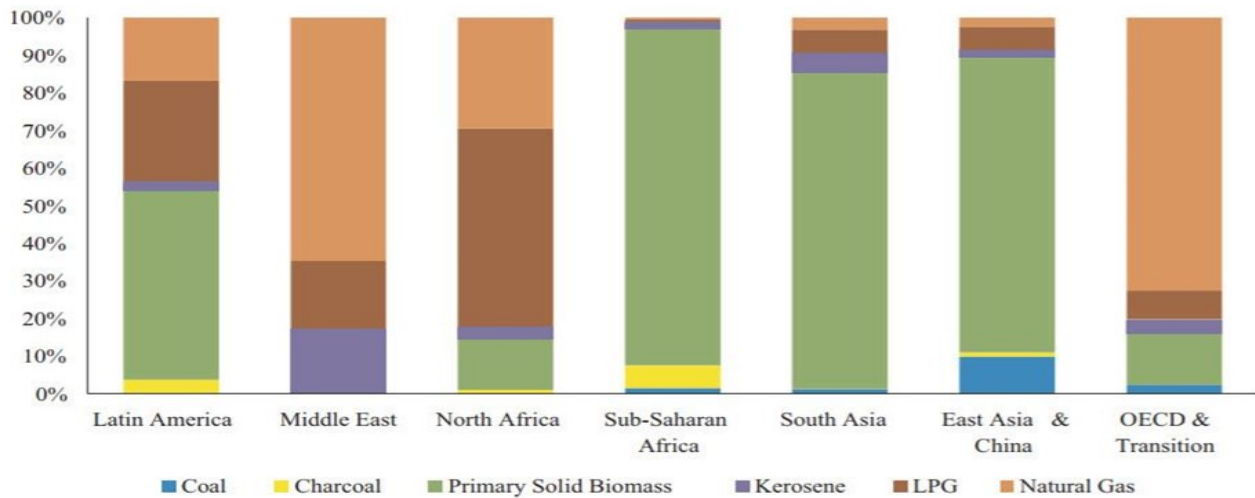


Figure 2. Structure of residential fuels use across regions in 2006: Based on IEA analysis in 2008. (Source: Pachauri & Brew-Hammond, 2012)

Figure 3 indicates how forest-based fuelwood, often used inefficiently, remains the dominant form of biomass resources globally. One example, in many countries, of inefficiency is the dominance of open fire pits in confined spaces. The challenge to double the improvement in efficiency will have to focus on measuring the efficiency of biomass use statistically, introducing more technologies, and concentrating on the regions with the greatest needs if renewables are to replace traditional non-renewable fuels.

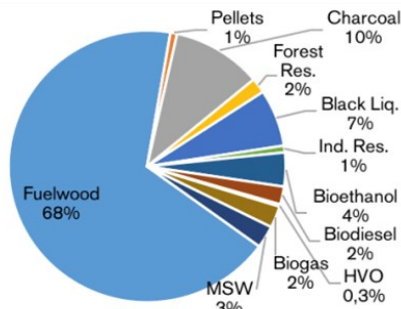


Figure 3. Primary energy supply of biomass resources globally, 2013 Source: World Energy Council 2016 based on data from World Bioenergy Association 2016

Forests still provide a dominant source of renewable energy in Asia and Africa. Meeting the energy efficiency target will require bolder financing, and policies will be needed to embrace new technologies on a much more ambitious scale (SDG 2017). The SDGs are broad by nature and comprise 17 goals that span the economic, social, and ecological "pillars" of sustainability. Unsurprisingly, such a high-level abstraction provides little guidance for operationalizing development programs. Forest research often focuses on understanding local system dynamics and not necessarily on the most effective means of implementing specific projects to achieve SDG goals. Of the 17 SDGs, the term "forests" is only explicitly mentioned in three of the SDGs' goals, which deal with clean water, sanitation, and life on land. As forests are not specifically mentioned in the SDGs, bioenergy is an important type of renewable energy.

Therefore, it is important to support the UN Sustainable Development Goals (SDGs) in the context of climate change and energy security. As summarized evaluation report, integrated evaluation modeling indicates a high risk of not achieving long-term climate targets without bioenergy. Global ratings show that bioenergy accounts for three-quarters of all renewable energy consumption today and half of the cheapest options to double renewable energy consumption by 2030. Bioenergy is part of a larger economy, including agriculture, forestry, and manufacturing. Bioenergy plays a role in every energy sector.

Bioenergy enhances regional energy access and reduces reliance on fossil fuels in general. It has the potential to rejuvenate the forest and agricultural sectors, as well as promote the use of renewable resources as raw materials in a variety of industrial operations. It has the potential to help us achieve our global climate protection goals, as well as other social and environmental objectives. Bioenergy can play an essential and constructive role in achieving the agreed UN Sustainable Development Goals (SDGs) and implementing the Paris Agreement on Climate Change, thereby driving climate goals, food security, better land use, and sustainable energy for all.

CONCLUSION

This review article examines people's behavior who live near conservation areas and use forests as a primary source of income to get by on their daily livelihood. The findings of this study demonstrate that, in addition to their capacity to defend themselves against protected areas, respondents' behavioral intentions are influenced by their positive views, supportive attitudes, and supportive social norms. Protected area is an important part of global effort to conserve the biodiversity, without scientific management it is not possible and insufficient. Forests have tremendous strength and capacity. Forests are essential to sustainable, safe, healthy, and just societies, both rural and urban, developed and less

developed. It is in the interests of conservation professionals to work together using a multidisciplinary approach to raise awareness of the interconnected of forests and the SDGs. This review examines the role of energy from forests in implementing the SDGs, focusing on four possibilities for providing energy services by forests: traditional wood fuels, modern wood fuels, liquid biofuels, and biofuels that combine heat and energy. The energy transition in low and middle-income countries should reduce traditional reliance on wood fuels for heating, cooking, and small industrial utilities, while countries currently looking to diversify their renewable energy portfolios may increase. The bioenergy records of the forests are competitive and remain inexpensive. The findings reflect need to make the benefit and risk in protected area through credible communication channel. The cost of other renewable energies will play an essential role in the importance of forest energy sources for electricity, heating, cooking, and transportation.

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