

**WORLD TRADE ORGNIZATION AND ITS IMPLICATION ON THE
TRADING OF MAJOR FOOD COMMODITIES IN NEPAL**

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ACRONYMS AND ABBREVIATIONS

WTO	World Trade Organization
AoA	Agreement on Agriculture
BLM	Binary Logit Model
MFN	Most Favored Nation
MAPs	Medicinal and Aromatic Plants
USA	United States of America
UAE	United Arab Emirates
VIF	Variance Inflation Factor
FDI	Foreign Direct Investment
NTFPs	Non Timber Forest Products
TBT	Technical Barriers to Trade
SPS	Sanitary and Phytosanitary Measure
NTIS	Nepal Trade Integration Strategy
SAFTA	South Asian Free Trade Area
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
SAARC	South Asian Association for Regional Cooperation
RTA	Regional Trade Agreement
TFA	Trade Facilitation Agreement
GDP	Gross Domestic Product
CBS	Central Bureau of Statistics
ARDL	Autoregressive Distributed Lag
NRB	Nepal Rastra Bank
CISE	Cash Incentive Scheme for Export
FTAs	Free Trade Agreements
LDC	Least Developed Country
KII	Key Informant Interview
PTA	Preferential Trade Agreement
TRIPS	Trade Related Intellectual Property Rights
TBT	Technical Barriers to Trade
AMS	Aggregate Measures of Support

ABSTRACT

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The study was conducted to investigate how food traders have perceived the impact of membership of WTO on trade of major food commodities of Nepal. To achieve this objective, primary data was collected from major food traders and key informants of Nepal which was then subjected to descriptive analysis, scaling technique, Garrett ranking method, Pearson chi square test and logit regression model. It was found majority of traders agreed on membership has improved overall trade of food commodities but improvement was only seen in import trade not in export trade of Nepal. Decreased or no effect of membership on productivity of major food crops was discovered. Majority of traders had experienced change in domestic trade policies after WTO but policies were not found compatible with WTO regulations and efforts of government were not sufficient. Majority of traders claimed Nepal is getting MFN treatment in import trade only not in export trade. Only majority of exporters were found to be familiar with AoA and majority of importers and traders doing both experienced increased market access except exporters. Dominance of informal trade was found in import trade than export trade of Nepal and only exporters were found to be mostly not affected by informal trade. Results showed higher probability of involving in informal trade for traders of Lumbini and Madesh province than of Bagmati province but the probability was found lower for traders with higher educational qualification. Nepal need to develop policies focused on increasing domestic production, promoting trade of product with comparative advantage, diversifying trade, searching for transit alternatives to trade with third world countries to enhance trade under WTO.

1. INTRODUCTION

1.1 Background Information

International trade occurs to harness comparative and competitive advantage in order to make domestic market more efficient by increasing total surplus (Lamsal & Dhakal, 2022). In the past, countries controlled trade through agreements between themselves, often using protectionist measures like high tariffs. Today, countries mostly adopt free trade with few taxes on goods, focusing on comparative advantage. The World Trade Organization (WTO) at present helps make sure everything is fair and multilateral trade is liberalized (S. Acharya, 2019).

WTO was established on January 1, 1995 by replacing General Agreement on Tariffs and Trade (GATT) 1947 with a motive to monitor and regulate trade among nations. WTO have 164 member countries till date. Main function of WTO is to regulate, facilitate and smoothen the trade between nations by liberalizing trade, improving market access and reducing tariff and non-tariff barriers. On April 23, 2004, Nepal joined the WTO as its 147th member (Ministry of Industry Commerce and Supplies, 2018a). Nepal was the first Least Developed Country to negotiate with the World Trade Organization about accession, and even though the process was tough, they managed to get a good deal for their accession (P. R. Pandey et al., 2014). Members of the WTO commit to abide by the multilateral rules and agreements, which have a direct impact on trade of the member countries (B. Pant, 2016). Every member country in the WTO gets the same treatment as each member of WTO grants each member Most Favored Nation (MFN) status, but developing nations get some extra benefits, and the least developed ones get even more special treatment.

Nepal's foreign trade has distinct characteristics: its composition of import and export of goods align with comparative advantage theory of international trade; most of its trade is with India; Nepal consistently faces trade deficits, with increasing gap; its global trade share is decreasing; and it relies on a limited range of exports and markets (S. B. Thapa, 2012). Nepal began adopting liberalization policies in the 1980s, which peaked in 1990 alongside the shift to a democratic political system. It is believed that the membership brings both opportunities and challenges. Joining the WTO brings advantages to Nepal like fair treatment, stable trade, more market access and participation in multilateral trade rule making and standard setting (TEPC, 2023). In this context a commonly asked question is the implications it has on the economy and agriculture trade of Nepal (R. P. Sharma & Karkee, 2004).

The purpose of this study is to assess the perception of traders on implication of WTO membership in trade of major food crops of Nepal. Among many agreements, Agreement on Agriculture (AoA) is most important one that have three main pillars market access, domestic support and export subsidy (*WTO Agriculture Website*, 2023) . WTO has significant implication in trade of agricultural commodities specifically AoA that commits to limit national agricultural policies that hinders international trade. These agreements should increase efficiency, decrease friction, remove domestic subsidies, remove tariff and non-tariff barriers , open up new markets, increase trade volume and eliminate risk of changing unbound tariff by making them bound (Buckingham, 2008). Study will analyze perception of traders on AoA and changes in its aspects after WTO across types of traders. Trade data of Nepal and many studies showed sharp increase in import of commodities and somewhat stagnant condition of export after Nepal's accession to WTO (Maharjan & Knerr, 2019), what may be the reasons for such increase in import? Also analysis of implication of membership on policies, strategies and legislation that Nepal adopted to meet the commitments during accession to WTO will be done. Implication of trade liberalization on informal trade between Nepal and India and factors affecting decision of traders to involve in informal trade will be analyzed. Similarly detailed study of bilateral trade of Nepal with major trading partner especially India and existing hurdles and barriers of Nepalese traders while trading with India and third world countries will be identified with the objective of providing policy suggestions to policymakers to remove the barriers and improve trade of Nepal.

1.2 Problem statement

Becoming a member of the WTO can be considered as just the start of Nepal's journey to become more deeply connected and involved in the global economy. It was anticipated membership will help Nepal to integrate with global trading system (B. Thapa, 2012). After so many years of membership question raised is what has been the actual implication of WTO on trade of Nepal. Analyzing the impact of WTO and trade agreements on trade is rather an empirical question (Mujahid & Kalkuhl, 2016). Many studies have been done to empirically analyze the implication of free trade rule of WTO on trade of member countries using quantitative data of import and export and some studies were found that has empirically analyzed impact of WTO membership on trade of Nepal. But there exist a gap in literatures about the actual implication of WTO on trade of food commodities of Nepal. Specifically, no studies were found on how food traders (importers and exporters) of Nepal has perceived the implication of WTO membership on trade of food commodities. Most of the studies often use a tool for empirical analysis called the gravity model, which is proven as one of the most successful tool to analyze trade patterns among nations (Beck, 2020). Studies done by Subramanian & Wei (2007), Baier & Bergstrand (2007), Liu (2009), Grant & Boy (2011), Chang & Lee (2011) and Gil-Pareja et al. (2016) has empirically proved WTO has improved trade of member countries but studies done Rose (2004), Esteve et al. (2019), and Mujahid & Kalkuhl (2016) has proved WTO has not led to favorable trade outcomes. Among a handful of studies done to access the impact of WTO on trade of Nepal studies done by Oh & Prasai (2012), Thapa (2012), GC (2019), Neopane et al. (2021), and P. Shrestha (2022) has discovered negative effects of WTO on Nepal. This revealed even though many empirical studies were conducted to analyze impact of WTO on trade of member countries and of Nepal, no literatures were found that revealed the implication of WTO membership on trade of food commodities of Nepal. To the best of my knowledge, there is not any study with latest data of up to 2024 in analyzing how membership of WTO has been perceived among the people who are being directly affected by it i.e. traders engaged in international trade of food commodities. So, there exist a research gap in context of perception of traders on how WTO has impacted the trade of food commodities of Nepal. This study will answer the question: What is the actual implication of WTO on trade of major food commodities of Nepal based on the perspective of traders? Has membership promoted trade or decreased it? Thus, the purpose of this study is to access the

perception of traders on implication of WTO membership in trade of major food crops of Nepal and provide insights for informed policy decisions.

1.3 Research questions

Specifically the research will answer the following questions:

1. How has Nepal's WTO membership impacted the trade of major food commodities based on the perspective of traders?
2. What are the improvements and challenges faced on trade of major food commodities due to the membership?
3. What is the perception of traders on AoA and its aspects across types of food traders of Nepal?
4. How have production and productivity of major food crops in Nepal been influenced by its WTO membership, and how do these changes relate to trade outcomes?
5. How have Nepal's trade policies evolved after WTO membership in relation to major food commodities?
6. What is the scenario and perception of traders on existing informal trade between Nepal and India?
7. What are the factors affecting the decision of traders to involve in informal trade?
8. What are the factors affecting familiarization of traders with trade liberalization after WTO?
9. What policy implications can be derived from the research findings to address trade barriers, enhance the trade of major food commodities, and improve Nepal's engagement in the global economy through its WTO membership?

1.4 Rationale of the study

The purpose of this study is to investigate the impact of WTO on the trading of major food commodities in Nepal. Despite expectations that entering the WTO would promote trade, there is still not strong evidence showing how traders of Nepal has perceived the impact of membership on trade of food commodities. While various empirical studies have explored the broader implications of WTO membership for trade patterns among member countries, there is a scarcity of research that specifically focuses on how Nepal's engagement in the global trade system has influenced its trade of essential food products. The existing literature has primarily centered on aggregate trade effects and general economic impacts of WTO membership, largely overlooking the complex dynamics of the food commodities trade based on the perspective of traders of Nepal. By focusing on the specific effects of WTO and its agreements on the trade of food commodities, this study is aimed at bridging the research gap discussed above. Also study will analyze the perception of traders on existing informal trade between Nepal and India and determine the factors that affect the decision of traders to involve in informal trade. It is important to conduct this research and fulfill the research gap for a number of reasons. First and foremost, food security is Nepal's top priority, and any modifications to the trade dynamics of food crops may have a big effect. Second, understanding how Nepal's trade in food commodities is performing will assist policymakers in developing successful trade policies that are beneficial to local farmers, traders, and consumers. Third, Nepal continues to participate in the global market through its membership in the WTO and it is necessary to exploit the benefits of membership which this study aims to explore. Fourth, study will identify the reasons, impacts and ways of checking the informal trade between Nepal and India that will provide insights to understand negative effects of informal trade and importance of checking such trade. By filling the gap in research, the study's findings have the potential to add to the body of existing knowledge. The findings can also be a useful tool for policymakers to formulate trade policies that improve trade prospects, address barriers, check informal trade and promote sustainable trade connections throughout the global economy. In conclusion the study hopes to advance knowledge of Nepal's position in the world trading system by providing insightful information for traders, consumers, researchers and policymakers.

1.5 Objectives

General objective

- To assess the implications of Nepal's membership in the World Trade Organization (WTO) on the trade of major food commodities and provide insights for informed policy decisions.

Specific objectives

- To identify the major improvements and challenges faced due to membership on trade of major food commodities of Nepal.
- To examine the perception on impact of WTO's membership on food trade dynamics and agriculture productivity across types of traders and reasons behind it.
- To access the perception on AoA and its aspects across types of traders of Nepal.
- To investigate implication of membership in domestic trade policies of Nepal.
- To examine the scenario and perception of traders about the existing informal trade between Nepal and India.
- To investigate the factors affecting the decision of traders to involve in informal trade.
- To identify the factors affecting familiarity of traders with trade liberalization after WTO.
- To provide policy recommendations for aligning domestic trade policies with WTO regulations and enhancing trade under WTO membership.

2. LITERATURE REVIEW

With increasing globalization in the world, role of WTO in the governing and smothering international trade is becoming more significant. Globalization simply means increasing economic integration of the world economy and growth of international trade. WTO is the successor and incorporates GATT and International Trade Organization (ITO) within it and perform every function as a result of negotiations (Barnor et al., 2015). In comparison of GATT, WTO has greater potential to intrude in international affairs and introduced Dispute Settlement Mechanism (DSM) (Deardorff & Stern, 2002). The role of the WTO is to encourage free and fair trade among its members with the goal of fostering economic development and advancing world peace. This was accomplished by administering trade agreements, serving as a venue for negotiations on trade, assisting in the resolution of trade disputes and collaboration with other global institutions like the IMF and the World Bank (Barnor et al., 2015).

Apart from fostering trade WTO has significant institutional role to restrain countries in using trade policies that would hamper each other and themselves and protect poor countries from rich countries. Although WTO was mostly established by developed nations, its greatest advantage may occur to developing and Least Developed Countries (LDC) (Deardorff & Stern, 2002). WTO is known as one of the most successful international multilateral institution. The WTO, despite being a multilateral organization, uses a bilateral approach for negotiations where pairs of countries or small groups negotiate trade tariffs between themselves and then apply those agreements to the entire membership while ensuring equal treatment through the most-favored nation principle (Bagwell & Staiger, 2010).

Nepal is a landlocked country located between two emerging powerhouses India and China. After years of negotiations Nepal became 147th member of WTO on 23 April 2004 (Ministry of Industry Commerce and Supplies, 2018a). Membership can be regarded as the source of opportunities and challenges for Nepal. International agriculture trade for Nepal is now more open due to the WTO, but unfair domestic support and export subsidy from rich countries makes it hard for poor countries like Nepal to benefit, unless Nepal diversifies its exports (B. Pant, 2016). Along with multilateral agreement with WTO Nepal has also become member of various Regional Trade Agreements (RTAs) which also have significant implication on trade of Nepal. Nepal has approved SAARC Agreement on a South Asian Free Trade Area (SAFTA) which aims to decrease tariff rates among the eight SAARC countries on more than 5000 products. Similarly Nepal ratified

the membership of Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) in February 2004 (*Nepal - Trade Agreements Website*, 2021). BIMSTEC helps to bridge the free trade between South and South East Asian countries. Along with multilateral and RTAs Nepal has made bilateral trade agreements with 17 countries in which treaty with India signed in 1996 and amended in 2009 is most significant in terms of trade volume. This treaty allows Nepal to trade freely with India, except for a few restricted items, and India makes up over 60% of Nepal's total trade as of the fiscal year 2019/20 (*Nepal - Trade Agreements Website*, 2021).

The WTO has two important principles, "Most Favored Nation (MFN)" and "national treatment," that will help Nepal's products and services sell better abroad. The MFN rule means Nepal's products and services can enter global markets with fair conditions, just like products and services from other WTO members. The national treatment rule ensures that Nepal's goods and services are treated the same as those of importing country (B. Thapa, 2012).

Rich countries might use strict food safety rules to protect their farms, creating barriers for poorer nations, but the WTO has an agreement to manage this issue and ensure fair trade which is called SPS. Nepalese exporters are bearing some kind of non-tariff barriers which can be more injurious than tariff barriers in the name of SPS due to institutional and political issues of Nepal (Shakya, 2016).

Being a member Nepal should abide by the rules and agreements of WTO which would have significant impact on agriculture sector and trade of food crops. Some agreements under WTO that directly affect the sector are Agreement on Agriculture (AoA), Sanitary and Phytosanitary Measures (SPS), Technical Barriers to Trade (TBT) and Trade Related Intellectual Property Rights (TRIPS) (R. P. Sharma & Karkee, 2004).

2.1 AoA and its implication for Nepal

Among many agreements AoA is the one that has most impact on the agriculture trade of Nepal. After concluding by all member countries AoA came into force in 1995 in order to address government policies that distort market and restrict trade (*WTO Agriculture Website*, 2023). The AoA aims to make international farm trade fairer and more predictable by encouraging countries to remove trade barriers, reduce tariffs, and decrease domestic support and export subsidies, leading to less distorted and more competitive agricultural trade (Shakya, 2016). Thus market access, domestic support and export subsidy are the three main pillars of AoA of WTO.

2.1.1 Market access

Market access is related to the rules and commitments regarding import of goods which purpose is to reduce tariff barriers and abolish non-tariff barriers. As a member of the WTO, Nepal is required to allow other member countries access to its markets, while also gaining the right to access their markets for its goods based on multilaterally agreed terms (K. P. Pant, 2000). Table 1 shows the provisions under market access of AoA.

Table 1. Main Provisions of AoA on market access

Provision	General Provisions	Nepal's Case
AoA Article 4.1 & Schedules	Binding and reducing of bound tariffs; other market access commitments in Schedules.	Nepal binds tariffs but no reduction post-transition as an LDC.
AoA Article 4.2	Prohibition of quantitative restrictions on imports; only ordinary tariffs allowed	Applied in Nepal.
AoA Article 5	Special safeguard provision against import surges (quantity and depressed prices).	Nepal didn't utilize due to non-tariffication.
Schedules	Implementation of current and minimum access commitments with tariff rate quotas (TRQs).	Nepal could have used TRQs but didn't open them.
Schedules	Tariff reduction schedule – reduction of bound rates over implementation period.	No reduction required for Nepal as an LDC after transition phase.

2.1.2 Domestic support

As per the AoA, domestic support means government help to agricultural producers, with the aim of limiting trade-distorting subsidies while allowing non-distorting agricultural policies. Domestic support measures are classified into two group's i.e. exempt and non-exempt measures. There is no limit on the outlays on exempt measures as they do not distort the pattern of global trade but there is limitation on the outlays for nonexempt measure as they distort the trade (Awasthi & Adhikary, 2004). Table 2 below shows exempt and nonexempt support measures.

Table 2. List of exempt and nonexempt support measures

Exempt measures	Non-exempt measures
<ul style="list-style-type: none"> • Green Box measures • Article 6.2 development measures • Blue Box support • <i>De minimis</i> level of support 	<ul style="list-style-type: none"> • All measures that are “not” exempt • The outlays on these measures are expressed in terms of Total Aggregate Measurement of Support (Total AMS), with two components: <ul style="list-style-type: none"> • Product-specific AMS • Non product-specific AMS

According to Awasthi and Adhikari (2004) the debate over the harmful effects of farm subsidies in developed nations on agriculture in developing countries is a significant topic within the AoA, and Nepal shares similar concerns about Indian agricultural subsidies affecting its own agriculture due to India's significant influence. When Nepal opened up for liberalization and joined the WTO, this happened at a time when the public expenditure on agriculture was not only low but declining. The AoA does not restrict all subsidies Nepal can provide AMS within *de minimis* level i.e 10% of value of agricultural product but focus of government should be on raising investment in agriculture to overcome supply side constraints (Awasthi & Adhikary, 2004).

2.1.3 Export subsidy

Export subsidies are known as most problematic in distorting trade because they increase the share of exporter in world market, depress the world price and make world market prices unstable. Nepal during its accession to WTO also committed no to subsidize export and also Nepal cannot afford to do it but Nepal is negatively affected by the export subsidy given by its trading partner (Tiwari et al., 2006). Study done by Tiwari et al. (2006) states 4 out of 5 AoA articles on export competition (Article 8-12) are on export subsidies and only one Article 12 is on export restriction which covers restriction for only foodstuffs with the consideration of food security. The study further adds Nepal neither did nor is able to provide subsidy however is taking incentive measures for export promotion like exemption of income taxes earned from export sales.

In 2012 a program called Cash Incentive Scheme for Exports (CISE) was introduced by Nepal to promote export of selected group of commodities to countries other than India. A study done to analyze the impact of this subsidy found subsidized firms increased their exports of

targeted product destinations compared to the firms in control groups (Defever et al., 2020). The study further added CISE scheme helped increase trade diversification but its overall impact on total exports was limited and has high fiscal cost, which makes the effectiveness of scheme doubtful. Government of Nepal made provision to provide minimum cash subsidy of 4 to 8 % to exporters by implementation of amended Export Subsidy Work Procedure, 2018. The export subsidy on agricultural products remains unchanged at 5% if the value addition of product is more than 50 %, if not subsidy remains at 3% (Prasain, 2022). Author added export subsidies should be granted on the goods that are produced domestically, have Nepali value addition and generate employment.

2.1.4 Concluding remarks for AoA

For Nepal, the benefits of the AoA would be ineffective unless it enhances its farm output and strengthens the sector to seize the market opportunities resulting from liberalization, as its limited agricultural exports and vulnerability to increased food imports could pose challenges to domestic farmers (Shakya, 2016).

2.2 Implication of WTO on trade among member countries

Some empirical studies done in this field have concluded that: membership has benefited the trade of member countries if we ignore the agriculture trade which can be viewed as one of the WTO's apparent failures (Grant & Boys, 2011). A study done by Rose in 2004 examines the impact of global trade agreements like the WTO, its predecessor GATT, and the GSP (GSP: Generalized System of Preferences i.e. zero or reduced tariff on import of certain products provided by wealthy nations to developing ones). Using a standard gravity model and data from many countries and years, it finds that joining the GATT/WTO doesn't notably change trade patterns, but the GSP has a significant influence on trade (Rose, 2004) .

The gravity model of international trade uses the idea from Newton's Law that: trade between countries is like gravity – it's bigger when their economies (product of GDP's of countries) are larger and closer together, just like how objects with more mass are attracted and closer objects have stronger gravitational pull (S. Acharya, 2013a). Similarly another study revealed that both the WTO and RTAs have boosted trade between participating countries, except for food. Only RTAs increased food trade among members. While the WTO doesn't seem to improve food trade, it does help developing countries trade more food than developed nations

(Mujahid & Kalkuhl, 2015). This study also used gravity model for empirical analysis and has tried to solve certain issues in analysis like multilateral trade resistances and cases where trade value is zero. Similar study conducted showed unexpected outcome because the WTO hasn't helped member countries trade food better; in fact, it seems to have caused a problem where food trade between WTO members dropped by around 16% compared to non-members (Mujahid & Kalkuhl, 2016).

According to theories about the WTO, how much a country benefits from being a member depends on how it uses its membership, who it makes deals with, and which goods those deals involve (Subramanian & Wei, 2007). Grant and Boys (2011) used the gravity model of trade to analyze the results and discovered that the WTO has large beneficial effects on members' agricultural trade despite the sensitive nature of trade and the members' unwillingness to make significant adjustments. Similarly another study after addressing the sample selection bias and standard gravity model specification problems showed that the WTO not only makes current trade partners trade more, but it also helps form new trade connections (Liu, 2009). By studying bilateral dataset of trade including cases with no trade and using a better analysis method, this research by Liu (2009) shows that the GATT/WTO has significantly boosted global trade, both by increasing trade with existing partners and by forming new trade relationships. By using a well-designed gravity model, Subramanian & Wei (2007) discover results that match the expectations: First, rich nations that took part more actively in reciprocal trade than developing countries got a big trade boost. Second, trade increased more when both countries agreed to liberalize trade, not just one. Lastly, sectors that weren't liberalized didn't experience more trade.

A study conducted to analyze impact of free trade agreements on trade using gravity equation empirically showed that free trade agreements (FTAs) have a big impact on trade i.e. trade becomes about five times larger than before due to FTAs. On average, after 10 years of having an FTA, the trade between two countries, almost doubled (Baier & Bergstrand, 2007). Another study findings using empirical gravity model indicate a widespread yet varying pattern of evidence suggesting that GATT/WTO membership has brought about economically substantial impacts on the bilateral trade of member countries (Gil-Pareja et al., 2016). A study by Javorcik & Narciso in 2017 by analyzing data of 15 countries that joined WTO between 1996 and 2008 highlights unintended effects of joining the WTO. It shows that when countries become WTO members, there's a change in how import prices are assessed. This limits customs officials from

helping with tariff evasion, but it also makes importers find new ways to evade tariffs. Even though some forms of evasion decrease, the overall level of evasion doesn't change much (Javorcik & Narciso, 2017).

Above mentioned studies that are heavily based on parametric gravity trade models, but a study raised misspecification of conventional gravity model may occur due to heterogeneous membership and membership selection bias. So non parametric model is used to access the impact of WTO in trade that revealed a significant trade promoting effects for bilateral trade of member countries (Chang & Lee, 2011). Consistent with Rose's significant study in 2004, our findings demonstrate that, in contrast to regional trade agreements and currency unions, the process of GATT/WTO accession has not led to favorable trade outcomes (Esteve et al., 2019).

These type of mixed implications of WTO are seen in trade effects by various studies but a gap in literature was found about the implication of WTO in trade of major food crops of Nepal and this gap will be fulfilled by this study.

2.3 Implication of WTO on Trade of Nepal

For a small, landlocked, least developed country like Nepal that, joining the WTO wasn't optional it was a necessity, regardless of whether the outcomes were good or bad. Nepal's only option is to minimize the challenges and utilize most of the opportunities from WTO membership (B. Thapa, 2012). Nepal is considered good in trade openness, estimated as: share of nominal GDP by the total export and imports of goods and services and ratio is 55%. But, if we only look at exports without imports, Nepal's position among developing countries gets much worse due to high import dependency (Neopane et al., 2021).

Trade liberalization in Nepal is relatively lower in agricultural sector than manufacturing and service sector and there exists negative relation between trade openness and per capita income growth (Chaudhary, 2011). Thus study implies that the benefits of trade are higher for Nepal's trading partners than for Nepal itself, suggesting that trade liberalization occurred without suitable internal policies and institutions. Therefore, effect of liberalization on trade pattern of Nepal i.e. before and after liberalization there was not much significant difference in trade expect few specific aspects (Oh & Prasai, 2012). The objective of becoming a member of WTO to Nepal was to diversify its trade and make its trade rules more open and free (GC, 2019). Study was done by GC in 2019 to analyze Nepal met its objective or not and study revealed trade diversification was not found statistically significant even after becoming member of WTO.

Nepal's imports of agricultural products are rising much more quickly than its exports. While agricultural exports had a yearly decrease of 2.3% in real terms (6.4% in nominal terms) from 2005 to 2015, agricultural imports grew rapidly at a real rate of 13.7% per year (22.4% in nominal terms), leading to a widening gap between the two (Pokharel, 2019).

As per the study done by Thapa in 2012, after accession to WTO Nepal experienced sharp increase in import but export was found almost stagnant that resulted in increase of trade deficit of Nepal at very fast rate after accession to WTO. The study added after Nepal joined the WTO, the portion of its total exports going to India grew from 51.8 percent to 67.0 percent but there seemed remarkable increase in Foreign Direct Investment (FDI) where number of FDI companies registered annually in Nepal was 79 before WTO that reached to 146 after WTO.

Nepal's exports have been poor, while imports have grown eight times from 1996 to 2018, partly due to increased remittances. A study by Bhatta (2013) used Vector Error Correction Model (VECM) to show that remittances lead to more imports and a worse trade balance over the long term. Other reasons for this scenario is supply side constraints like credit unavailability, unavailability of skilled labor and inadequate infrastructure (Bhatta, 2013).

Including the impact of the 2014/15 earthquake, there has been a drop of about 10% in export growth. This decline is expected to worsen in 2015/16 due to the ongoing fuel crisis in the country (Richter, 2017). The study adds Nepal faces challenges in its exports due to low production, not meeting global quality standards, high trade costs, regulatory hurdles, and other obstacles, leading to the conclusion that Nepal, as a landlocked least developed country, might struggle to compete in global trade.

These studies showed sharp increase in import of commodities after Nepal accession to WTO, what may be the reasons for such increase. One study argues increased remittances flow have increased demand of imported agricultural commodities in Nepal. Alternatively increased remittance inflow resulted in decrease in production of domestic agricultural tradable commodities (Maharjan & Knerr, 2019).

Even after WTO, Nepal's agricultural trade situation is concerning because various signs indicate problems: imports are rising quickly, export growth is slow and focused on less valuable items, trade deficits are increasing, and there's very little diversification in the products being traded and the countries they're being sold to (R. Sharma, 2019b). Around 66% of Nepal's exports are with India, about 3% are with China (another neighboring country), and the remaining portion

goes to other countries (Pokharel, 2019). Also study done by Oh & Prasai in 2012 using gravity model estimated Nepal's trade with China is very low and highly dependent to India and study suggested to increase trading activities with China.

Thapa (2012) studied the trade potentiality of Nepal which is ratio of predicted trade to actual trade using gravity model. The result showed Nepal has gone beyond its expected trade potentiality with 10 trading partners, which includes its big neighbors India and China. Additionally, there's still untapped trade potential with 9 other partners, including neighboring country Bangladesh (S. B. Thapa, 2012). After accession to WTO, contribution of trade in GDP of Nepal have found to be increased. Before WTO during the period 1984 to 2003 average contribution of trade in GDP was 11.25% but it reached 14.935 % during period 2004 to 2022 (CBS, 2023). This indicates increase in trade volume of country but increase seems to be more for import only. Similarly study done by Acharya (2019) using ARDL approach of estimation found 1 percent increase in foreign trade (total trade) has resulted in increase of 0.62 percent in GDP of Nepal. Although agriculture is a vital component of Nepal's economy in terms of GDP, jobs, and trade, its share in overall expenditure has consistently declined despite policy emphasis on its importance (Awasthi & Adhikary, 2004)

Another implication of WTO could be in agriculture production and productivity of Nepal which will then impact the agricultural trade of Nepal. Year by year, the agricultural sector's share in the GDP is declining, while the non-agricultural sector's contribution seems also stagnant (Dumre et al., 2020). Agriculture contribution to GDP in the year 2004 was 39.1% which decreased to 23.95% in year 2022 but growth of industry sector also seems stagnant which was 60.9% in year 2004 and only 61.76% in year 2022 (Nepal Rastra Bank, 2022). This study will also try to evaluate implication of WTO in domestic agriculture production of Nepal. Similarly implication of WTO may also arise in production productivity of major crops of Nepal which is a rather neglected topic and no literatures are found in this context. A study examines the changes in cereal production in Nepal between 1995 and 2014, finding that there was a consistent rise in the area cultivated, overall production, and productivity of major cereals during this time (Gairhe et al., 2018). Similarly another study done by Neupane et al. (2022) discovered increase in overall average production of major cereal crops by around 2,245 MT annually between 1990 and 2018. But among various reasons for this increase, liberalization and WTO are not included. This study will try to find out the implication of WTO in this increase of productivity,

Terms-of-trade hypothesis, suggests that countries utilize tariffs partly to enhance their terms of trade. A study done by Ludema and Mayda in 2013 examines whether the most-favored-nation (MFN) tariffs established by World Trade Organization (WTO) members during the Uruguay Round align with this hypothesis. The study proposes that the negotiated importer's tariff level should be inversely linked to the product of two factors: exporter concentration and importer market power. The analysis indicates that due to WTO negotiations, countries have reduced their average tariffs by 22% to 27% compared to the tariffs that would have prevailed without cooperation (Ludema & Mayda, 2013).

Accession of WTO has also impact on the average and bound tariff of Nepal which directly and indirectly impact the trade especially import of Nepal. Regarding Nepal's tariffs, the average MFN applied and effectively applied rates were 12.3% and 11.6%, respectively, in 2021. Additionally, the average MFN bound tariff rate stood at 28.3%. At present, nearly 99.7% of Nepal's tariff lines are bound, indicating a high degree of commitment to these rates (Nepal, 2023). Nepal has experienced a gradual reduction in its tariff liberalization process, with the average MFN tariff decreasing by 2.2 percentage from 2000 to 2019, resulting in a shift from 14.2% to 12%. More precisely, non-agribusiness products are subject to a standard tax rate of 11.90%, whereas agricultural items face an average rate of 12.60% (Neopane et al., 2021).

2.4 Implication of WTO on trade policies of Nepal

Nepal's capacity to adopt a relatively unrestricted trade policy has been severely restricted by its landlocked status and its open border with India (K. Sharma, 2015). Becoming a WTO member would require Nepal to align its domestic policies, strategies and legislation with the overall rules of the WTO and the specific commitments it agrees to during the accession process (R. P. Sharma & Karkee, 2004). So, Nepal is obligated to create new policies, enact essential laws, and revise current legislations to align with WTO benchmarks (S. Acharya, 2019).

Nepal has notably reduced tariff obstacles, eliminated quantitative restrictions (QRs), and opened up its investment policy to encourage foreign investment. It stands as one of the most open economies in South Asia, surpassed only by Sri Lanka (B. Pant & Panta, 2009a). The Trade Policy Review of Nepal (TPRN) 2012 represents Nepal's first Trade Policy Review by the WTO, fulfilling the Trade Policy Review Mechanism (TPRM) mandate of WTO. The main point of this review report is that Nepal has made significant advancements in opening up its trade policies. However, these efforts would have been more substantial if they encompassed a longer-

term outlook, including reforms implemented in the mid-1980s, instead of focusing solely on post-WTO reforms (K. Sharma, 2015).

Nepal's second review of its trade policy at the World Trade Organization (WTO) examines the years from 2012 to 2018. Nepal has undergone significant transformation during the review period with a promulgation of constitution in 2015 that followed new federal political system. Agriculture Development Strategy was also brought up during the period (Ministry of Industry Commerce and Supplies, 2018b).

After joining the WTO, Nepal introduced its first major trade policy called Trade Policy, 2009, which replaced the earlier Trade Policy from 1992. The 2009 policy aimed to create an open and transparent economy, with goals of boosting trade's role in the country's economy, reducing poverty, and fostering economic growth. The outcomes of this policy were mixed so, it was later substituted by Trade Policy, 2015. Trade Policy, 2015 aims to enhance Nepal's economy by promoting exports and strengthening its ability to offer competitive products and services in global markets (Ministry of Industry Commerce and Supplies, 2018b). Nepal has a new strategy called Nepal Trade Integration Strategy, 2016 (NTIS, 2016) to improve trade by focusing on product development, making trade agreements better, strengthening supply side and improving trade infrastructure. Nepal had made previous strategy called Diagnostics Trade Integration Study, 2004 (DTIS, 2004) that didn't work out and later it was revised as NTIS and implemented in 2010 to support Trade Policy, 2009. NTIS was further updated as NTIS, 2016 to support Trade Policy of 2015 (Ministry of Industry Commerce and Supplies, 2018b).

After being member of WTO, Nepal has key focus on transit and connections that includes signing of Transit Transport Agreement with China and Preferential Trade Agreement with India, new transit port Visakhapatnam in India. Also Nepal Trade Information Portal has become functional and parliament agreed Trade Facilitation Agreement (TFA) and Revised Kyoto Convention (RKC). Similarly Nepal has been making changes in its customs policies and institutions to make trade smoother. It have been following plans called Customs Reform and Modernization Strategies and Action Plan (CRMSAP) since 2003, with the latest one, the 5th CRMSAP, starting in 2017 and going until 2021 (Ministry of Industry Commerce and Supplies, 2018a). Nepal has made big improvements in its trade infrastructures, such as creating Integrated Check Posts (ICPs), Inland Container Depots (ICDs), and an Electronic Cargo Tracking System (ECTS). Nepal also made a significant deal with India to make waterways for easier and cheaper

transport of goods, giving Nepal more ways to reach the sea. They're already starting to study and plan for this on both sides (Ministry of Industry Commerce and Supplies, 2018a).

2.5 Bilateral Trade of Nepal

In 2021, Nepal's foremost merchandise trade partner was India, accounting for 80.1% of its exports and 60.7% of its imports. The second-largest trade partner was China, contributing to 0.5% of Nepal's exports and 15.1% of its imports by value. Other notable trade partners included Argentina, the United States, the United Arab Emirates, Indonesia, Australia, Ukraine, Malaysia, and the Republic of Korea (Nepal, 2023).

After accession to WTO, WTO compatibility of Nepal-India Trade Treaty is highly important for trade of Nepal. Study done in 2004 by R. P. Sharma & Karkee claimed that some provisions of treaty are not compatible with WTO rules as treaty is neither free trade agreement (FTA) nor Preferential Trade Agreement (PTA). The study explores ways to ensure the treaty complies with WTO regulations, such as potentially transforming it into a Free Trade Agreement (FTA) with mutual industrial goods trade freedom or justifying it as a Preferential Trade Agreement (PTA) by extending benefits to other Least Developed Countries (LDCs) too through the Enabling Clause (R. P. Sharma & Karkee, 2004). The Transit Treaty lets Nepal trade with other countries using ports like Kolkata/Haldia and, since 2016, Vishakhapatnam (Ministry of Industry Commerce and Supplies, 2018a).

India has made some trade rules easier for Nepal, giving them special treatment. Because of this, trade between India and Nepal has increased more than it was before 1990 (P. R. K. Shah, 2017). The study explained about how a trade policy that focuses on exports has helped improve trade between India and Nepal. Trade liberalization due to membership in WTO has positively impacted the import of Nepal from India (Budha, 2014).

Landlocked countries consider they should be able to use nearby countries to reach the sea without trouble, but the countries they pass through sometimes use this situation to their advantage. In regard of Nepal using nearest seaport through India, Nepal considers it had the right of free access of the sea but India used this to its benefit as a political move. Nepal didn't gain many benefits from selling products to third world countries because of the poor transit facilities in India (Nihar, 2016).

A study was done by Nepal Rastra Bank in 2014 to assess export barriers of Nepalese products, revealed nearly 50 % of respondents faced procedural barriers due to the bureaucratic mechanism and quarantine approval from India is major export hurdle for Nepalese traders. Similarly one third of respondents experienced institutional barriers and approximately 60% of respondents faced some form of policy barrier. Structural and procedural barriers together have led to bad impacts on volume, size, and number of products and competitive ability of Nepal's export. Study further claimed all of respondents perceived structural barriers due to poor trade infrastructure which they consider most critical barriers (Bank, 2014). The study further claims reduction in trade of commodities with comparative advantage over the years.

Although in this present era of globalization many research have proven that informal barriers to trade are still a problem, especially in developing countries. This is really important in South Asia, especially for trade between India and Nepal. Even though the countries don't put extra taxes or limits on each other's goods, Nepalese traders still have problems with informal barriers that keep the formal trade from growing and the informal trade from getting smaller (Pohit, 2018a).

Even though India and Nepal have been making trade easier through different types of agreements, the big and active informal trade between them is still going strong (Taneja & Pohit, 2007b). There exists informal trade between Nepal and India in both directions. What's interesting is that even official traders are using this informal way to solve problems and disputes. The study found that it's cheaper to use this informal way which is the main reason behind it and mostly because it's faster and has fewer steps. Other reasons for using the informal way could be that the businesses are small, the people involved have less education, and they might not know all the trade rules. Many of the goods going from Nepal to India through this informal trade actually come from other countries, probably because it's cheaper due to the taxes (Taneja & Pohit, 2007b).

The Study done by Nepal Rastra Bank in 2014 suggests to design policies that can address these issues and hurdles can be starting point to eliminate export barriers and promote trade of Nepal to India as well as third world countries.

Another study recommends to enhance transit infrastructure, explore other options of seaport other than Kolkata and Vishakhapatnam on India's eastern coast that is closer to border of Nepal in order to decrease transportation and transaction cost and save time (Nihar, 2016). Identifying and understanding barriers that Nepalese exporters face while exporting to India and third world countries can provide valuable insights to policymakers to develop and implement

suitable strategies for the promotion of export of Nepal. This study will explore the trade barriers of Nepal and reasons for large informal trade with India that has quite negative impacts on trade balance of Nepal in order to suggest policy implications to improve the multilateral trade of Nepal.

2.6 Informal trade between Nepal and India

Informal trade means commodities traded by firms that are not recorded on official records and fully or partially escape payment of duties and charges (Taneja & Bimal, 2020). Highest informal trading border checkpoint of Nepal is Birgunj border which accounts for 53 percent of total informal trade occurring from Nepal to India (Taneja et al., 2004). Despite of the bilateral free trade agreements (FTAs) between India and Nepal there exists huge two way informal trade between the nations. A study claims two way informal trade between Nepal and India is almost as large as formal trade which even increased after the implementation of FTA in 1996 (Taneja et al., 2004). Goods illegally traded from India to Nepal are generally goods originating locally from India but goods illegally traded from Nepal to India are mostly from third countries originating from China, Japan, Thailand, Hong Kong and Singapore (Taneja & Pohit, 2007a) and study done by Alam (2015) also states flow of illegal Chinese product to India via Nepal. Study done by Taneja and Pohit (2007a) claims risk of trading in formal channel is very low for both importers and exporters as they have developed mechanisms to mitigate risk.

Taneja et al. (2004) further claims a long and porous border of 1800 km between Nepal and India might be the cause of informal trade which mostly occurs via both motorized and non-motorized vehicles and air borne informal trade is almost negligible. Study done by Karmacharya (2006) claims open border between two countries as main reason for informal trade between the nations. Another study states factors like complex customs procedure, poor capacity and corruption at border cause more delay in overland trade between Nepal and India by 200 percent of ideal time that might provoke traders to go for informal trade (Pohit, 2018b). Also harassment by customs officials and complex and time consuming bureaucratic system for certificate of origin and other non-tariff barriers as other reason for going towards informal trade (Taneja et al., 2004). Another study done by Pulami (2023) also claims existing informal trade as one of the many effects of open border between Nepal and India and suggests strengthening border security and border governance to control them. Another reason for informal trade may be due to non-tariff barriers in the name of standardization of products when applied in trade distortive manner (Taneja & Bimal, 2020). Similarly significantly lower transaction cost in informal channel than formal channel,

weak institutional setup of the formal channel, no procedural delays, no paper work needed and lower educational level of informal traders could be the reasons for large and vibrant informal trade between Nepal and India (Taneja & Pohit, 2007a).

Existing informal trade in South Asia has resulted in low intra-regional trade in South Asia and made South Asia one of the least economically integrated regions of the world (Taneja & Bimal, 2020) . Open border between Nepal and India has increased the availability of cheaper Indian and Chinese goods in Nepal and illegal traders are getting advantage from it (S. Sharma, 2020). Under invoicing, misclassification and mis-declaration of country of origin by bribery of custom officials are done in informal trade that results in loss of government revenue(Taneja & Bimal, 2020). Although trade of MAP's in Nepal is regulated by Department of Forestry by issuing permits and collecting revenue but studies show officially recorded export value of MAP's of Nepal is many times lower than the amount actually exported which shows the existing large informal trade that is causing great loss of government revenue (Chapagain, 2020). Shifting such informal trade to formal channels can significantly increase regional trade in South Asia region (Taneja & Bimal, 2020). To manage the existing informal trade efforts should be made focusing on improving institutional setup in formal channel and decreasing the trade cost of formal traders (Taneja & Pohit, 2007a). Similarly, simplifying customs procedure, enhancing border security and combating corruption can help to minimize the informal trade between Nepal and India (Pohit, 2018a)

2.7 Conceptual framework

This section describes the conceptual framework of the study (Figure 1) which is developed through the literature review. Nepal's membership of WTO is the independent variable which affects the dependent variable which trade of major food commodities of Nepal. This cause effect relationship will be analyzed based on the perception of the food traders of Nepal. There are moderating and mediating variables in the relationship which is dictated by the arrows in Figure 1. The variables which are affected by the WTO's membership of Nepal and ultimately they affect the dependent variable trade of food commodities are the mediating variables which are trade liberalization, productivity of major food crops, domestic trade policies, AoA and its aspects. Similarly informal trade of Nepal with India is a moderator variable that is not affected by WTO membership of Nepal but it affects the dependent variable. The relationship between these variables is shown in the framework but the direction of relationship is not known which will be discovered after the study. Familiarity of traders with trade liberalization after WTO are affected by socio demographic factors of the traders like age, gender, education level, ethnicity, experience years, location, awareness on membership etc. Similarly decision of a trader to involve in informal trade are also affected by those sociodemographic factors as shown in Figure 1. Analyzing the effect of membership on trade liberalization, productivity of major food crops, domestic trade policies, AoA and change in its aspects will help to draw policy recommendations to improve the trade of food commodities of Nepal under WTO regime.

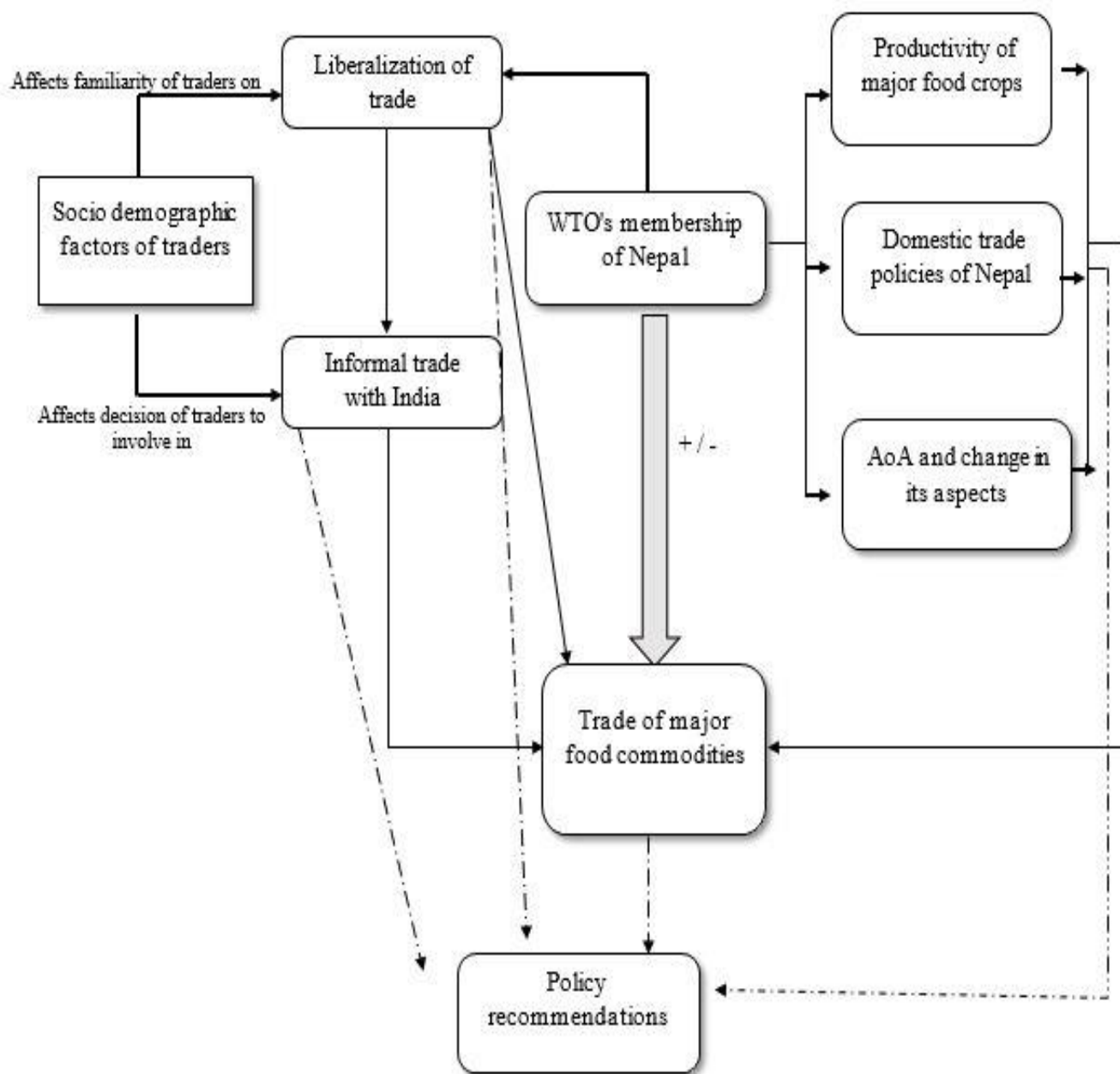


Figure 1. Conceptual framework

3. MATERIALS AND METHODS

3.1 Research design

This study employed mixed-methods research design, incorporating both qualitative and quantitative techniques. Two tools were used i.e. Semi structured survey and Key Informant Interview to gather quantitative insights and qualitative perspective respectively. This combination of methods helped to explore a holistic understanding on the perspective of major food traders on WTO's membership of Nepal. This mixed method also allowed for the triangulation that helped to confine the study within its objective.

3.2 Description of research site

The research was conducted on six major market hubs of Nepal in order to represent the exporters and importers of Nepal. Six districts were selected among the major market hubs especially border areas with India where international trade of Nepal is concentrated in order to represent the diversity in trade practices, geographical location and economic activities across Nepal. They are:

1. Banke District

- Located in Lumbini province representing the western part of Nepal.
- Major food industries multinational companies of Nepal are located.
- Relevant border checkpoints of the district are Nepalgunj (Rupaidiha) and Jamunaha.

2. Rupandehi District

- Also located in Lumbini province representing the western part of Nepal.
- Important trade hub with border checkpoint Bhairahawa (Sunauli).
- Have high industrial growth along with industry of food commodities.

3. Chitwan District

- Located in Bagmati province representing the central part of Nepal.
- A significant trade hub of Nepal with some food producing and processing industries involved in export and import of food commodities of Nepal.

4. Parsa District

- Also located in Bagmati province representing the central part of Nepal.
- Largest border checkpoint of Nepal Birgunj (Raxaul) also called Gateway of Nepal is located in the district.

5. Morang District

- Located in Koshi Province representing eastern part of Nepal.
- Fourth largest border called Jogbani border of Biratnagar is located in this district.
- Also good industrial growth.

6. Kathmandu District

- Located in Bagmati Province representing central part of country.
- Capital city of the country and essential hub for national and international trade.

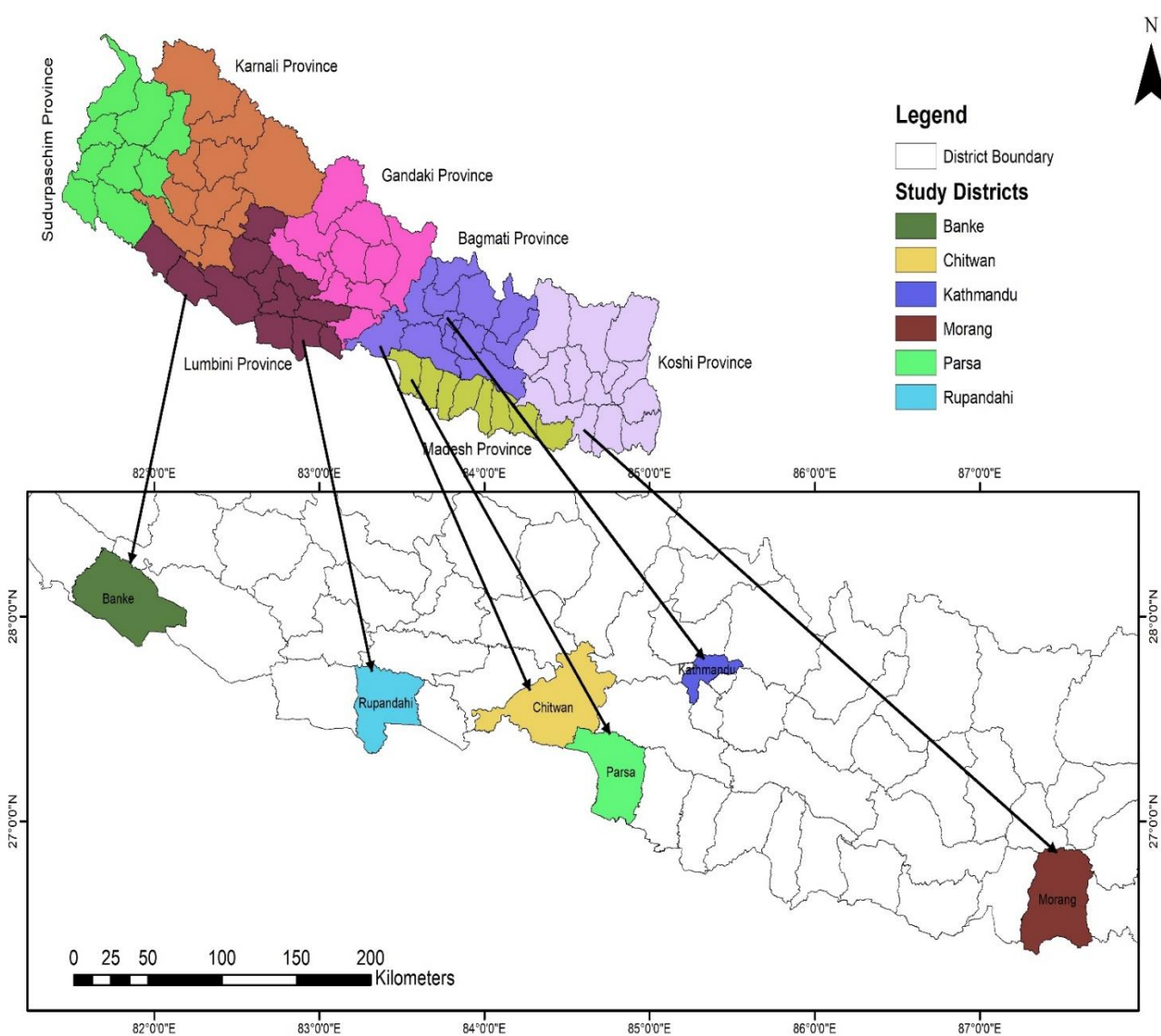


Figure 2. Map of study areas

3.3 Sampling procedure and technique

Selection of whole population for the study is constrained by time and funds. Therefore, appropriate sampling procedures and techniques were adopted to represent whole population in a scientific way. The quantity and quality of information obtained from the survey depends on the size of the sample and amount of variation (Oun & Bach, 2014). Both of these factors can be controlled by using appropriate sampling methods. The detail of such sampling procedures and methods adopted for the study is described on the subsequent chapters.

3.4 Sampling method

Sampling is the best method to collect information about target population given the limitation of time and fund. Sampling procedure helps to minimize the cost and provides the acceptable results (Oun & Bach, 2014). Sampling procedures involves the sequential steps including defining sampling population, sampling frame, sample size estimation and sample selection procedure. Purposive random sampling was used to collect information for the study to ensure a comprehensive representation of experiences, geography and perspectives.

3.5 Defining the population

Identification of the target population for the study is the first step of sampling procedure. For this study population is defined as all the traders of Nepal who are involved in export and import of food commodities. Exact population size of such traders was no possible to find so population size was considered to be unknown.

3.6 Sampling frame

Sampling frame was constructed based on the list of members provided by associations like Federation of Nepalese Chambers of Commerce and Industry (FNCCI), Confederation of Nepalese Industries (CNI), Chitwan Association of Industries (CAI) etc. Among the members, traders who are involved in export and import of food commodities were selected purposively which became the sampling frame. Now, from the sampling frame, respondents were selected randomly.

3.7 Sample size

A total of 95 traders from the six districts who are involved in export and import of food commodities were selected. From the sampling frame constructed random sampling was done and probability of selection of each respondent in the sampling frame was same. A diverse sample of

traders was selected for the survey. The sample encompassed traders from various sectors such as agriculture, food processing, and wholesale trade. Number of samples from each district is shown below.

Table 3. Number of samples from each district

Banke	Rupandehi	Chitwan	Parsa	Morang	Kathmandu
21	18	10	12	12	22

While for the Key Informant Interview, 15 Key Informants selected were high government officials from different ministry of Nepal, private associations like FNCCI, CNI etc., researchers and economic advisors.

3.8 Interview schedule design

The interview schedule (semi-structured) was prepared in simple English language. Various questions were set to meet the objectives of the study. Respondents were surveyed in Nepali language.

3.9 Pre-testing of interview schedule

Pre-testing was done to test the validity of the interview schedule and for the estimation of cost, travel and interview time. The interview schedule and checklists were pretested with 6 respondents. Necessary modifications were made as per the response obtained through pre-testing. Final interview schedule was administered for the survey.

3.10 Data collection

Both primary and secondary data were collected for the study.

3.10.1 Primary data

Survey with a semi structured questionnaire was conducted among 95 Nepalese traders actively engaged in the trade of major food commodities. Primary survey with close ended semi structured questionnaire was done with the traders. The survey questionnaire was designed to capture information on perspective of traders on WTO membership of Nepal, opportunities and challenges faced due to membership, perceived impacts of WTO membership, trade barriers, informal trade with India and suggestions for improvement. Sampling was purposive random, ensuring representation across different commodity sectors and geographic locations.

Similarly Key informant interview (KII) was conducted with the major stakeholders like high government officials, private institutions, researchers and economic advisors for the validation of the data and better understanding of the scenario. Key Informant Interview was carried out with the checklist containing all open ended questions.

3.10.2 Secondary data

Secondary data was collected from various sources, including trade statistics from government agencies, reports on trade policies, relevant academic studies, and publications from international organizations. These secondary data provided contextual background and supported the findings from primary data analysis. Trade data of Nepal on various commodities according to internationally accepted Harmonized System (HS) code was extracted using Trade Information Portal of Nepal that is maintained functional by official website of Trade and Export Promotion Center, Nepal. Similarly, secondary data regarding information of traders was gathered from FNCCI, Confederation of Nepalese Industries etc. for building up the sampling frame.

3.11 Data analysis

Data collected were tabulated, variables were properly defined and coded in the Microsoft Excel Spreadsheet 2010. For the analysis IBM Statistics SPSS package version 23 and STATA version 12 were be used. Data was analyzed using both qualitative and quantitative approaches. Work of data analysis is not completed and still going on. Some of techniques that are used and will be used are discussed below.

3.11.1 Quantitative analysis

Variables created were analyzed quantitatively using descriptive statistics to determine frequency distributions, means, and standard deviations. Bar diagrams and pie-charts are used for diagrammatic representation of the data. Some of the techniques used are:

3.11.2 Frequency analysis

Frequency analysis was done to organize and summarize categorical data in order to understand the distribution and frequencies of responses for categorical variables. Frequency tables were created for the variables, percentages were calculated and visual representation of data was done using bar charts and pie charts.

3.11.3 Multiple response analysis

This analysis technique examines the frequencies of multiple response of a single question in order to identify the most common combinations of responses and gain insights into the relationship between different choices. Percentage of each option of the total number of responses was calculated, diagrams were made and interpreted properly.

3.11.4 Likert scale data analysis

This analysis was done to obtain respondents' position on certain issues or conclusions which is related with the degree of agreement or disagreement. Descriptive analysis, frequency analysis and diagrammatic representation was done for each level of agreement or disagreement. After getting frequencies, Index of agreement was calculated using the formula:

$$\text{Index of Agreement (I}_a\text{)} = \frac{F_a - F_d}{N}$$

Where, F_a is frequency of agreement, F_d is frequency of disagreement, N is total number of responses.

Also comparative analysis using t test or ANOVA can be further conducted by classifying data into groups in order to test there is significant difference between means or not.

3.11.5 Forced ranking data analysis

Henry Garrett's Ranking technique was used to analyze the forced ranking data of the study. Various studies conducted in various fields of study using this technique of analysis were reviewed for analyzing the data (Balasubramaniam et al., 2022; Basu, 2016; Esteve et al., 2019; Eswari, 2011; Joghee et al., 2019; B. Pant, 2016; Shanthini, 2020).

Analysis was done by following steps (Eswari, 2011) :

Step 1: All the options collected from each individual respondent were ranked from 1 to 5 based on relative importance.

Step 2: Number of respondents who respond to each rank for each option was computed by calculating frequency using MS Excel.

Step 3: Henry Garrett formula was used to calculate the percent position.

$$\text{Percent Position} = \frac{100 (Rji - 0.5)}{Nj}$$

Where, R_{ji} is the rank given for the j th respondent, and N_j is the number of variables ranked by the j th respondent.

Step 4: Garrett table (appendix) was used to find the equivalent value of percent position by which percent position was converted into scores using the table (Dhanavandan, 2016). Now the score is calculated by multiplying the number of respondents in that particular rank by the Garrett value.

Step 5: Total value for each option was calculated by summing the scores obtained in step 4.

Step 6: Now the total value was divided by the total number of sampled respondents to get the averages.

Step 7: Rank of each option was calculated and average values were ordered in descending order which prioritized each option. High valued options were considered as most important and so on.

3.11.6 Pearson chi square test for independence of two factors

The chi-square test was used to determine if there is a significant association or independence between two categorical variables. Hypothesis should be set at first i.e.

Null Hypothesis (H_0): Variables A and B are associated or dependent.

Alternate Hypothesis (H_1): Variables A and B are not associated or are independent.

Now test statistics was run in SPSS and output generated was interpreted based on the p value. P value less than or equal to 0.05 indicated association between variables as statistically significant at 5% level of significance. In this case null hypothesis was rejected and alternate hypothesis was accepted.

Up to now, I am vigorously doing my analysis portion. If using above Chi square test association came to be significant between the variables, further tools will be used like regression model. If suitable multiple regression model and Probit model will be used to study cause and effect relationship between variables.

3.11.7 Econometric analysis

Logit regression model was used for estimation of factors affecting familiarity of major traders with trade liberalization after WTO. Similarly the model was also used to estimate factors affecting agreement of traders on WTO has improved trade. The logit model was used to analyze the binary or dichotomous response of respondents which allowed to examine how a change in

any independent variable changes all the outcome possibilities of dependent variable (Subedi, 2015). The logit model which is based on cumulative logistic probability functions is computationally easier to use than other types of models and it also has the advantage to predict the probability of outcome of dependent variable (Adeogun et al., 2008).

Logit regression can be used to study and predict relation of binary dependent variable and independent variables measured at any scale in which independent and residuals may not be normally distributed (Burinskiene & Rudzkiene, 2007).

The characteristics feature of logit model is that the effect of independent variables on dependent variable is non-linear (S. Acharya, 2013b). The model is called logit because we can easily make it linear by using logit transformation on dependent variable. Logistic regression relies on probabilities and shape of the log curve. Only assumption of logistic regression is that the resulting logit transformation is linear, the dependent variable is binary and the resultant logarithmic curve is free from outliers (Healy, 2006).

When the dependent variable, y , can be either 0 or 1, we can interpret it as representing a probability (P) which can range from 0 to 1. We transform this probability as follows:

$$P' = \ln \left(\frac{P}{1-P} \right)$$

This transformation is called the logit transformation. When we apply it, the transformed probability, denoted as P' , can theoretically take any value from negative to positive infinity (Burinskiene & Rudzkiene, 2007). Therefore, we can use these transformed values in a standard linear regression model i.e.

$$P' = b_0 + b_1 x_1 + b_2 x_2 + \dots + b_n x_n + \varepsilon$$

3.11.7.1 Factors affecting familiarization with trade liberalization after WTO

In this study dependent variable familiarization with trade liberalization after WTO is discrete, dichotomous and mutually exclusive in nature following the Binary Logit Model (BLM). Among the different types of trades involved in international trade, familiarization with trade liberalization after WTO was different which was affected by various factors.

In the logit model, suppose Y_i be the binary response of the traders and take only two possible values; $Y = 1$, if the trader is familiar with the trade liberalization after WTO and $Y = 0$, if the

trader is not familiar with liberalization. Suppose x was the vector of explanatory variable affecting the familiarization and β , a vector of slope parameters, which measures the changes in x on the probability of the traders on familiarization with liberalization after WTO. The probability of binary response was defined as follows:

$$\begin{aligned} \text{If, } Y_i = 1; P(Y_i = 1) &= P_i \\ Y_i = 0; P(Y_i = 0) &= 1 - P_i \end{aligned}$$

Where, $P_i = E(Y = 1/x)$ represents the conditional mean of Y given the certain value of X . The logit transformation of the probability of familiarization with liberalization was represented as follows (Laduber et al., 2016).

$$L_i = \ln \left[\frac{P_i}{1 - P_i} \right] = Z_i = \beta_0 + \sum_{i=1}^n \beta_i x_i + \varepsilon_i$$

Where, Y_i = a binary dependent variable (1, if traders are familiar with trade liberalization after WTO, 0 otherwise), x_i includes the vector of explanatory variables used in the model, β_i = parameters to be estimated, ε_i = error terms of the model, $\exp(e)$ = base of natural logarithms,

L_i = Logit and $\left[\frac{P_i}{1 - P_i} \right]$ = odd ratios.

The regression model used was:

$$Y_i = f(\beta_i x_i) = f(\text{AGE, GENDER, EXPERIENCE, EDUCATION, D_MADHESI, D_DALIT, D_JANAJATI, D_LUMBINI, D_MADHES, D_KOSHI, D_IMPORTER, D_BOTH, D_RAW, D_PROCESSED, KNOW_MEMBER, INFORMAL_HAMPERED})$$

Dummies were created for the categorical variables as per requirement and the description of variables is given below in Table 4.

Table 4. Description of the variables used in logit model

Variable	Description	Expected sign
Dependent variable		
FAM_LIB	Familiarity with trade liberalization (1= Familiar, 0= Otherwise)	
Independent variables		
AGE	Age of trader (Years)	+
GENDER	Gender of the trader (1=Male, 0=Otherwise)	+/-
EXPERIENCE	Years of experience of the trader (Years)	+
EDUCATION	Education level of trader (1 = Above Bachelors, 0 = Otherwise)	+
ETHNICITY	Ethnicity of respondents	
D_MADHESI	1 = Madhesi, 0 = Otherwise	+/-
D_DALIT	1 = Dalit, 0 = Otherwise	+/-
D_JANAJATI	1 = Janajati, 0 = Otherwise	+/-
LOCATION	Province of the traders	
D_LUMBINI	1 = Lumbini, 0 = Otherwise	+/-
D_MADHESH	1 = Madhesh, 0 = Otherwise	+/-
D_KOSHI	1 = Koshi, 0 = Otherwise	+/-
TRADER_TYPE	Type of trader	
D_IMPORTER	1 = Importer, 0 = Otherwise	-
D_BOTH	1 = Both, 0 = Otherwise	+
FORM_COMMODITIES	Form of commodities traded	
D_RAW	1 = Raw, 0 = Otherwise	-
D_PROCESSED	1 = Processed, 0 = Otherwise	+
KNOW_MEMBER	Know Nepal is member of WTO 1 = Yes, 0 = Otherwise	+
INFORMAL_HAMPERED	Hampered by existing informal trade 1 = Yes, 0 = Otherwise	+

3.11.7.2 Factors affecting decision to involve in informal trade

The factors affecting decision to involve in informal trade was analyzed using logit regression model. The decision to involve in informal trade was taken as dependent variable for the logit model in the study. The selected dependent variable was discrete, dichotomous and mutually exclusive in nature as it has two categorical outcomes- traders' involvement in informal trade or not. The prediction of the decision whether to involve in informal trade was examined using eleven explanatory variables. The following form of Logit model was used in the study.

In the logit model, suppose Y_i be the binary response of the traders and take only two possible values; $Y = 1$, if the trader is involved in informal trade and $Y = 0$, if the trader is not involved in informal trade. Suppose x was the vector of explanatory variable affecting the involvement and β , a vector of slope parameters, which measures the changes in x on the probability of the traders on involvement with informal trade. The probability of binary response was defined as follows:

$$\begin{aligned} \text{If, } Y_i = 1; P(Y_i = 1) &= P_i \\ Y_i = 0; P(Y_i = 0) &= 1 - P_i \end{aligned}$$

Where, $P_i = E(Y = 1/x)$ represents the conditional mean of Y given the certain value of X . The logit transformation of the probability of involvement with informal trade was represented as follows (Laduber et al., 2016).

$$L_i = \ln \left[\frac{P_i}{1 - P_i} \right] = Z_i = \beta_0 + \sum_{i=1}^n \beta_i x_i + \varepsilon_i$$

Where, Y_i is a binary dependent variable (1, if traders are involved in informal trade, 0 otherwise), x_i includes the vector of explanatory variables used in the model, β_i = parameters to be estimated, ε_i = error terms of the model, $\exp(e)$ = base of natural logarithms, L_i = Logit and

$\left[\frac{P_i}{1 - P_i} \right]$ = odd ratios.

The regression model used was $Y_i = f(\beta_i x_i) = f(\text{AGE, GENDER, POSITION, EDUCATION, D_EXPORTER, D_BOTH, D_MADHESH, D_KOSHI, D_LUMBINI, INFORMAL HAMPERED, FAMILIARITY_LIB})$

Dummies were created for the categorical variables as per requirement and the description of variables is given below in Table

Table 5. Description of the variables used in logit regression model

Variable	Description	Expected sign
Dependent variable		
INVOLVED_INFORMAL	Involved in informal trade (1= Yes, 0= Otherwise)	
Independent variables		
AGE	Age of trader (Years)	+/-
GENDER	Gender of the trader (1=Male, 0=Otherwise)	+
POSITION	Position of trader in business (1=Owner, 0=Otherwise)	+
EDUCATION	Education level of trader (1 = Above Bachelors, 0 = Otherwise)	-
TRADER_TYPE	Type of trader	
D_EXPORTER	1 = Exporter, 0 = Otherwise	-
D_BOTH	1 = Both, 0 = Otherwise	-
LOCATION	Province of traders	
D_MADHESH	1 = Madhesh, 0 = Otherwise	+
D_KOSHI	1 = Koshi, 0 = Otherwise	+
D_LUMBINI	1 = Lumbini, 0 = Otherwise	+
INFORMAL_HAMPERED	Hampered by existing informal trade 1 = Yes, 0 = Otherwise	+/-
FAM_LIB	Familiarity with trade liberalization (1= Familiar, 0= Otherwise)	-

3.11.8 Qualitative Analysis

Open-ended responses from the KII will undergo thematic analysis. Responses will be coded and grouped into themes to identify common patterns, challenges, and opportunities related to WTO membership and its effects on trade in major food commodities. After grouping and coding the data obtained from Key Informant Interview frequency analysis was done using descriptive statistics.

4. RESULTS

This section presents the results after the analysis of data obtained from the primary survey conducted among the major traders of food commodities of Nepal along with appropriate discussions. Also there is separate section of results for the data obtained from Key Informant Interviews which was conducted among high government officials, researchers on the relevant field and private associations.

4.1 Result of survey with major traders of food commodities

4.1.1 Sociodemographic characteristics

4.1.1.1 Types of traders

Three types of traders i.e. importers, exporters and both were identified by the study which is shown in Figure 2. Among the 95 traders surveyed, majority of them were importers (35 percent) followed by exporters (34 percent) and both (31 percent).

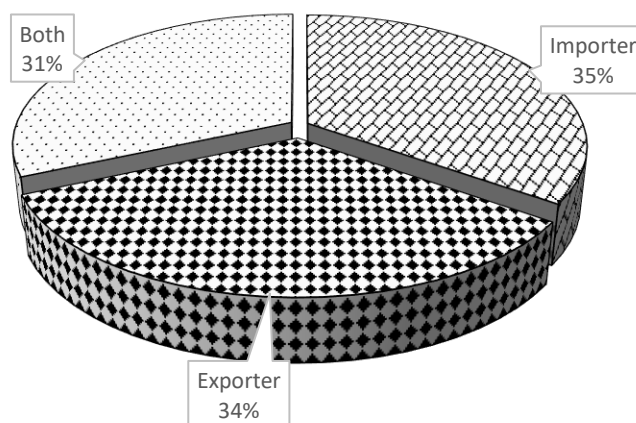


Figure 3. Types of traders

4.1.1.2 Sociodemographic characteristics of respondents by types of traders

This section describes the variables, both continuous and categorical, that help to paint a picture of the socio-demographic characteristics of the respondents of the study site (Table 6). The sociodemographic characteristics of the target group i.e. major traders of Nepal was analyzed to understand the distribution of key information among different types of traders which are importers, exporters and those involved in both.

The age of the respondents on an average was found to be 35.26 years old. Among the 95 traders surveyed, majority of them 80 percent were male across all types of trader, only 20 percent

were female. Among type of traders involvement of female was higher in both category (30 percent) followed by exporter (21.9 percent) while least involvement was in case of importers (9.1 percent). Majority of the respondents 23.2 percent (i.e., 22) were from Kathmandu followed by Banke which was 22.1 percent, 18.9 percent from Rupandehi, 12.6 percent each from Morang and Parsa and 10.5 percent were from Chitwan. Exporters were found to be concentrated in Kathmandu (46.9 percent) and very few importers only 3 percent were in Kathmandu. Importers were concentrated in districts which have border checkpoints with India, among which majority 45.2 percent were in Banke district followed by 24.2 percent in Rupandehi. Education which is a fundamental human right and, is an effective tool for personal development plays a significant role in the welfare of people, as well as socioeconomic development of nation. Good educational status of the respondents was found in which majority of them 48.4 percent (i.e., 46) had educational qualification between 12th grade and bachelor followed by 29.5 percent above bachelors and remaining 22.1 percent were up to 12th grade. Traders with diverse levels of experience in the field of export and import of food commodities participated in the study. The study revealed traders on an average had experience of 11.66 years. Among types of traders, importers have experience of 13.64 years on average followed by exporters (11.28 years) and both (10.07 years). Among the respondents majority i.e. 45.3 percent were owner of the business followed by managers in the business who were 38.9 percent and rest were directors. Among the sampled importers and exporters majority were owners of their business which was 57.6 percent and 53.1 percent respectively but in case of both importer and exporter majority of respondents (56.7 percent) were managers. Diversity was seen in the ethnic group of the respondents among which majority of them were found to be Madhesi i.e. 45.3 percent followed by 38.9 percent who were Brahmin/Chhetri, 11.6 percent were Janajati and only 4.2 percent were Dalits. Majority of the importers were Madhesi (51.5 percent) followed by Brahmin/ Chhetri (36.4 percent) and Dalits and Janajati 6.1 percent each. But majority of exporters were Brahmin/Chhetri (43.8 percent) followed by Madhesi (34.4 percent), Janajati (15.6 percent) and Dalits (6.3 percent). Similarly majority of traders doing both export and import were Madhesi (50 percent) followed by Brahmin/Chhetri (40 percent), Janajati (13.3 percent) and no Dalits were both importer and exporter.

Table 6. Sociodemographic characteristics of the respondents

Characteristics	Type of Traders			
	Importers	Exporters	Both	Total
Age of respondents(years)	33.94	35.19	36.67	35.26
Experience of respondents(years)	13.64	11.28	10.07	11.66
Gender				
Male	30(90.9)	25(78.1)	21(70)	76(80)
Female	3(9.1)	7(21.9)	9(30)	19(20)
Location				
Banke	15(45.5)	3(9.4)	3(10)	21(22.1)
Rupandehi	8(24.2)	3(9.4)	7(23.3)	18(18.9)
Chitwan	4(12.1)	2(6.3)	4(13.3)	10(10.5)
Parsa	3(9.1)	5(15.6)	4(13.3)	12(12.6)
Morang	2(6.1)	4(12.5)	6(20)	12(12.6)
Kathmandu	1(3)	15(46.9)	6(20)	22(23.2)
Educational Qualification				
Up to 12	8(24.2)	9(28.1)	4(13.3)	21(22.1)
12 to Bachelors	14(42.4)	15(46.9)	17(56.7)	46(48.4)
Above Bachelors	11(33.3)	8(25)	9(30)	28(29.5)
Business Position				
Director	3(9.1)	6(18.8)	6(20)	15(15.8)
Owner	19(57.6)	17(53.1)	7(23.3)	43(45.3)
Manager	11(33.3)	9(28.1)	17(56.7)	37(38.9)
Ethnicity				
Brahmin/Chhetri	12(36.4)	14(43.8)	11(36.7)	37(38.9)
Madhesi	17(51.5)	11(34.4)	15(50)	43(45.3)
Dalits	2(6.1)	2(6.3)	0(0)	4(4.2)
Janajati	2(6.1)	5(15.6)	4(13.3)	11(11.6)

Notes: Figure in the parentheses represent percent.

4.1.1.3 Form, class of commodities traded and trading countries

Commodities traded by respondents were classified into raw, processed and both and chi-square test was done to test the significance of association between form of commodities and types of traders and result obtained are in Table 7. Majority 49.5 percent of the respondents were involved in the trade of both type of commodities followed by 27.4 percent involved in trade of processed commodities and rest 23.2 percent were involved in trade of raw commodities only. Pearson Chi-square value obtained was 89.139 which was significant at 1 percent level which

revealed significant association between form of commodities traded and types of trader. Majority of importers 60.6 percent were involved in trade of raw commodities while majority of exporters 71.9 percent traded processed commodities. But all of the traders 100 percent involved in both export and import traded both raw and processed commodities.

Eight major trading countries were identified and multiple response was taken from the traders about with which countries they traded and the result obtained based on percent of cases is presented in Table 8. Multiple response analysis was done using crosstab with types of traders for estimating the frequencies and percentages of cases. In case of total trade, majority of the trade was found to be with India which is 74.7 percent followed by Australia (32.6 percent) and USA (30.5 percent). In case import trade only, all of importers 100 percent traded with India followed by 33.3 percent with China and then 21.2 percent with Bangladesh. Very few of importers traded with countries like USA (6.1 percent), Europe (3 percent), Australia (3 percent) and no trade was with Japan and UAE. Similarly in case of export trade only, majority of exporters 68.8 percent were involved in trade with USA followed by Australia (56.3 percent), Japan (43.8 percent), UAE (37.5 percent), Europe (37.5 percent), India (31.3 percent) and at last only 15.6 percent each with China and Bangladesh. In case of both import and export trade, majority of traders doing both 93.3 percent traded with India followed by Australia (40 percent), Japan (36.7 percent) UAE (33.3 percent), Europe (30 percent), Bangladesh (26.7 percent), China (20 percent) and USA (16.7 percent).

Commodities traded by the respondents were classified into 7 classes as shown in Table 9 and multiple response was taken from traders. Major commodity traded was cereals which was traded by 47.54 percent of the respondents and after that MAPs and spices (34.7 percent), others (28.4 percent), pulses (25.3 percent), vegetables (22.1 percent), beverages (6.3 percent) and fruits (5.3 percent). In case of import trade major commodity traded was cereals (63.6 percent) followed by vegetables (30.3 percent), pulses (27.3 percent), others (24.2 percent), fruits (6.1 percent) and no import of MAPs and spices and beverages was found. Similarly, in case of export trade majority of trade 43.8 percent was of MAPs and spices followed by vegetables (28.1 percent), others (25 percent), cereals (21.9 percent), pulses (18.8 percent), beverages (12.5 percent) and fruits (6.3 percent). Lastly in both export and import trade, major commodity traded was MAPs and spices

(63.3 percent), cereals (56.7 percent), others (36.7 percent), pulses (30 percent), vegetables 96.7 percent), beverages (6.7 percent) and fruits (3.3 percent).

Table 7. Form of Commodities Traded by types of trader

Form of Commodities	Type of Trader			Total	Chi square	p value
	Importer	Exporter	Both			
Raw	20(60.6)	2(6.3)	0(0)	22(23.2)	89.139***	0.000
Processed	3(9.1)	23(71.9)	0(0)	26(27.4)		
Both	10(30.3)	7(21.9)	30(100)	47(49.5)		

Note: Figure in the parenthesis represent percentage. *** indicates significant at 1 percent level of significance.

Table 8. Countries traded by types of trader

Trading Countries	Types of traders			Total
	Importer	Exporter	Both	
India	33(100)	10(31.3)	28(93.3)	71(74.7)
China	11(33.3)	5(15.6)	6(20)	22(23.2)
Bangladesh	7(21.2)	5(15.6)	8(26.7)	20(21.1)
USA	2(6.1)	22(68.8)	5(16.7)	29(30.5)
Europe	1(3)	12(37.5)	9(30)	22(23.2)
Japan	0(0)	14(43.8)	11(36.7)	25(26.3)
Australia	1(3)	18(56.3)	12(40)	31(32.6)
UAE	0(0)	12(37.5)	10(33.3)	22(23.2)
Total	33	32	30	95

Note: Figure in the parenthesis represent percentage which are based on multiple response.

Table 9. Class of commodities traded by respondents

Class of commodities	Type of trader			Total
	Importer	Exporter	Both	
Cereals	21(63.6)	7(21.9)	17(56.7)	45(47.4)
Pulses	9(27.3)	6(18.8)	9(30)	24(23.3)
MAP and spices	0(0)	14(43.8)	19(63.3)	33(34.7)
Vegetables	10(30.3)	9(28.1)	2(6.7)	21(22.1)
Beverages	0(0)	4(12.5)	2(6.7)	6(6.3)
Fruits	2(6.1)	2(6.3)	1(3.3)	5(5.3)
Others	8(24.2)	8(25)	11(36.7)	27(28.4)
Total	32	30	30	95

Note: Figure in the parenthesis represent percentage which are based on multiple response.

4.1.2. Improvements and challenges for Nepal after membership of WTO

Garett ranking method was used to investigate major improvements and challenges brought to Nepal due to the membership of WTO and results obtained are shown in Table 10. Among the five given improvements increase in trade volume was found to be the most important improvement followed by integration with global trading system as second most important improvement while decrease in tariff and non-tariff barriers is least important improvement due to membership of WTO.

Along with improvements WTO membership also brought challenges for Nepal and the major challenges faced were ranked as shown in Table 10. Most severe challenge faced was increased dependency with India, followed by sharp increase in import than export, increased competitiveness, and decreased domestic support and least severe was decreased export subsidy.

Table 10. Improvements and challenges for Nepal after membership of WTO

Improvements after membership	Garett Average Value	Rank
Integration with global trading system	58.02	II
Increase in trade volume	59.38	I
Made trade fairer	47.47	IV
Decreased tariff and non-tariff barriers	37.1	V
Diversified trade	49.38	III
Challenges due to membership		
Increased Competitiveness	49.57	III
Sharp Increase in Import than export	60	I
Increased dependency with India	59.4	II
Decreased domestic support	46.04938	IV
Decreased export subsidy	38.15	V

4.1.3 Knowledge and perception on WTO's membership of Nepal across types of traders

To investigate the implication of WTO's membership, at first opinion of major traders was taken on their awareness and familiarity on membership and the results are presented in Table 11. Also Pearson chi square test was conducted to analyze the familiarity of membership among types of traders. Respondents were asked, whether they knew or not that Nepal is a member of WTO since 2004 A.D. In response to this question majority of the respondents 86.3 percent response showed they knew about membership i.e. 82 of them were aware about the membership. The Pearson Chi-square value ($X^2 = 2.431$) revealed association with type of trader was insignificant. Also majority of respondents who did not know about membership (21.2 percent) were importers and majority who knew about membership were exporters (90.6 percent).

In regards to the familiarity with trade liberalization of Nepal after WTO, respondents revealed majority of them 61.1 percent i.e., 58 were familiar whereas 38.9 percent i.e., 37 were not. Association of familiarity with liberalization was significant across types of traders at 5 percent level with chi-square value of 7.032. Majority of importers (51.5 percent) were not familiar with trade liberalization but majority of exporters and both, were familiar with 56.3 and 80 percent respectively.

82 respondents who knew about the Nepal's membership of WTO were asked whether they agree or not that WTO has improved trade of Nepal. This showed majority of them (47.6 percent) agreed on membership have improved trade followed by 28 percent who showed disagreement, 14.6 percent were neutral, 6.7 percent strongly disagreed and only 3.7 percent strongly agreed. Index of agreement (Ia) was calculated and was 0.02 which revealed respondents showed very low degree of agreement on the statement. The Pearson Chi-square value 14.515 showed significant association between perceived improvement in trade due to membership and types of trader at ($P < 0.05$). Majority of the importers (65.4 percent) believed that membership has improved the trade whereas, majority of exporters (41.4 percent) disagreed on this opinion. Similarly, majority of importer and exporter both (55.6 percent) agreed on the opinion.

Table 11. Knowledge and perception on WTO's membership of Nepal across types of traders

Particulars	Category	Type of Traders				Chi Square	P Value
		Importer	Exporter	Both	Total		
Know Nepal is member of WTO	Yes	26(78.8)	29(90.6)	27(90)	82(86.3)	2.431	0.297
	No	7(21.2)	3(9.4)	3(10)	13(13.7)		
Familiarity with liberalization after WTO	Familiar	16(48.5)	18(56.3)	24(80)	58(61.1)	7.032**	0.030
	Not familiar	17(51.5)	14(43.8)	6(20)	37(38.9)		
Agree membership improved trade	Strongly Agree	1(3.8)	2(6.9)	0(0)	3(3.7)	14.515*	0.069
	Agree	17(65.4)	7(24.1)	15(55.6)	39(47.6)		
	Neutral	2(7.7)	5(17.2)	5(18.5)	12(14.6)		
	Disagree	4(15.4)	12(41.4)	7(25.9)	23(28)		
	Strongly Disagree	2(7.7)	3(10.3)	0(0)	5(6.1)		

Note: Figure in the parenthesis represent percentage. ** and * indicate significant at 5% and 10% levels, respectively.

4.1.4 Implication of WTO's membership on trade, productivity and trade policies

To access the implication of WTO on trade, productivity and trade policies of food commodities, those traders who were aware about Nepal's membership of WTO (i.e. 82 traders) were asked about their perspective on effect of membership on changes in trade, productivity and trade policies of Nepal and the results obtained are shown in Table 12.

Membership of WTO has brought various changes in the trade dynamics of Nepal. Respondents who were aware about the membership were asked about the changes in trade dynamics of food commodities after the membership. Regarding the changes in import, majority of respondents, 96.3 percent revealed import has increased after the membership yet association of change in import was found insignificant with types of traders.

Similarly, majority of the respondents i.e. 69.5 percent perceived export of food commodities has either decreased or stagnant whereas only 30.5 percent perceived increased in export after WTO. Pearson Chi-square value 11.368 was found significant at ($P < 0.05$) which revealed significant association between change in export after membership and types of traders. Majority of importers 69.2 percent believed export has decreased and also majority of exporters 89.7 percent

believed export has decreased but majority of traders involved in both import and export 51.9 percent believed export has increased.

Membership may also have impacted productivity of major food crops of Nepal and to investigate this respondents were asked about how they have perceived changes in productivity after membership. Majority of respondents, 57.3 percent of them perceived productivity was decreased/no effect after membership whereas 42.7 percent believed productivity has increased. Chi-square test resulted in no significant association of change in productivity with types of traders. Among types of traders, majority of only those involved in both (55.5 percent) have perceived productivity has increased but majority of importer (69.2 percent) and exporter (58.6 percent) believed decrease or no effect in productivity after membership.

The respondents who were aware about the membership of WTO were asked either membership affected domestic trade policies or not. Majority of the respondents 74.1 percent perceived that membership has affected domestic trade policies of Nepal and only 25.9 percent revealed it has not been affected. By Chi-square test, perception of respondents on effect on trade policies was not found significant with types of traders.

Same respondents' perception on compatibility of domestic trade policies of Nepal with WTO revealed majority of them 79 percent has perceived current domestic trade policies as not compatible yet association with types of traders was found not significant from Chi square test.

Again, those respondents were asked about the sufficiency of efforts of Nepal to align domestic trade policies with WTO, which showed majority of them 91.4 percent revealed efforts are not sufficient and the association of sufficiency of efforts of Nepal with types of traders was found to be not significant.

Perception of respondents on Nepal's treatment as Most Favored Nation (MFN) in regards to tariff rate was asked and the results showed majority of respondents 60.5 percent perceived Nepal is getting the MFN treatment while 39.5 percent do not think Nepal is getting MFN treatment. Association between Nepal's MFN treatment and types of traders was found significant at ($P < 0.1$) with chi-square value of 5.744. Only majority of importers (53.8) believed Nepal is not getting MFN treatment but majority of exporters (57.1 percent) and both (77.8 percent) believed Nepal is getting the MFN treatment after WTO.

Table 12. Implication of WTO's membership on trade, productivity and trade policies

Particulars	Category	Type of Traders				Chi Square	P Value
		Importer	Exporter	Both	Total		
Change in import	Increase	24(92.3)	28(96.6)	27(100)	79(96.3)	2.229	0.328
	Otherwise (Decrease/no effect)	2(7.7)	1(3.4)	0(0)	3(3.7)		
Change in export	Increase	8(30.8)	3(10.3)	14(51.9)	25(30.5)	11.368**	0.003
	Otherwise	18(69.2)	26(89.7)	13(48.1)	57(69.5)		
Change in productivity	Increase	8(30.8)	12(41.1)	15(55.5)	35(42.7)	3.357	0.187
	Otherwise	18(69.2)	17(58.6)	12(44.4)	47(57.3)		
Affected trade policies	Yes	19(73.1)	18(64.3)	23(85.2)	60(74.1)	3.146	0.207
	No	7(26.9)	10(35.7)	4(14.8)	21(25.9)		
Compatibility of policies	Yes	5(19.2)	8(28.6)	4(14.8)	17(21)	1.640	0.440
	No	21(80.8)	20(71.4)	23(85.2)	64(79)		
Efforts sufficient?	Yes	2(7.7)	1(3.6)	4(14.8)	7(8.6)	2.245	0.326
	No	24(92.3)	27(96.4)	23(85.2)	74(91.4)		
Nepal getting MFN?	Yes	12(46.2)	16(57.1)	21(77.8)	49(60.5)	5.744*	0.057
	No	14(53.8)	12(42.9)	6(22.2)	32(39.5)		

Note: Figure in the parenthesis represent percentage. ** and * indicate significant at 5% and 10% levels, respectively.

4.1.4.1 Reasons for change in trade (import and export) after WTO

Garett ranking method of analysis was used to investigate the reasons for changes in trade dynamics of Nepal after WTO. Earlier Table 12 clearly revealed after WTO, import has increased sharply but export has been stagnant or decreased. This section here presents the reasons behind it. Respondents aware of membership were asked about the reasons for sharp increase in import and decrease in export after WTO and the results obtained are presented in Table 13 and 14.

Among the five reasons shown in Table 13 low domestic productivity was ranked I which revealed it as the most important reason for increasing import followed by lack of import

substitution policies (Rank II), market liberalization (Rank III), increase in remittances (Rank IV) and least important reason was tariff reduction and removal of quotas which was ranked last.

Regarding reasons for stagnant or decrease in export, Table 14 clearly showed problem in transit for third world countries as the most important reason (Rank I) followed by ineffective export promoting policies (Rank II), high trade cost (Rank III), not meeting global quality standards (Rank IV) and least important reason was poor trade diversification (Rank V).

Table 13. Reasons for increase in import after membership.

Reasons for sharp increase in import	Average Garrett Value	Rank
Increase in remittances	45.83	IV
Low domestic productivity	62.63	I
Market liberalization	48.78	III
Tariff reduction and removal of quotas	33.27	V
Lack of import substitution policies	60.45	II

Table 14. Reasons for stagnant or decrease in export after membership

Reasons for stagnant or decrease in export	Average Garrett Value	Rank
High trade cost	52.71	III
Not meeting global quality standards	42.71	IV
Problem in transit for third world countries	56.53	I
Ineffective export promoting policies	56.36	II
Poor trade diversification	41.7	V

4.1.4.2 Reasons for change in productivity after membership

Multiple response analysis was conducted to investigate the reasons for change in productivity after WTO and the results obtained are shown in Table 15 and Table 16. Earlier it was found majority of trader revealed productivity was decreased or no effect and respondents who revealed this were asked what may be the reasons. As of percent of cases in Table 15, among five reasons given, majority of them (70.2 percent) felt high consumption of imported products followed by unfavorable production policies (68.1 percent), decreased domestic support (31.9 percent), decreased export subsidy (21.3 percent) and only 14.9 percent felt increased global competition as the reasons for decrease or stagnant productivity after WTO. Similarly,

respondents who revealed productivity was increased after WTO, reasons for increase were asked to them and results obtained are in Table 16. Among the reasons majority of cases 68.6 percent revealed availability of new hybrid seeds whereas only 40 percent of them felt membership of WTO and favorable production policies as the reasons for increasing productivity after WTO.

Table 15. Reasons for decrease in productivity after membership of WTO

Reasons	Responses		Percent of cases
	Frequency	Percent	
High consumption of imported products	33	34.0%	70.2%
Increased global competition	7	7.2%	14.9%
Decreased domestic support	15	15.5%	31.9%
Decreased export subsidy	10	10.3%	21.3%
Unfavorable production policies	32	33.0%	68.1%
Total	97	100.0%	206.4%

Table 16. Reasons for increase in productivity after membership of WTO

Reasons	Responses		Percent of cases
	Frequency	Percent	
Membership increased productivity	14	15.9%	40.0%
Availability of new hybrid seeds	24	27.3%	68.6%
Adoption of new technology	21	23.9%	60.0%
Increased export market potential	15	17.0%	42.9%
Favorable production policies	14	15.9%	40.0%
Total	88	100.0%	251.4%

4.1.4.3 Efforts of Nepal and recommendations to make policies compatible with WTO

Multiple response analysis and Garrett ranking method were used to analyze the efforts of Nepal and importance of recommendations respectively to make internal trade policies compatible with WTO. Earlier Table 12 revealed majority of respondents felt efforts of Nepal were not sufficient, in this context traders were asked what efforts Nepal has made for alignment of internal policies with WTO and multiple response was taken which results are shown in Table 17. Majority of respondents revealed Nepal has focused on encouraging FDI (24.3 percent) followed by strengthening supply side (23.4 percent), reducing tariff obstacles (20.7 percent), improving trade

infrastructure (20.7 percent) and only 10.8 percent felt Nepal has focused on eliminating quantitative restrictions.

Table 17. Efforts of Nepal to align internal trade policies with WTO

Efforts of Nepal	Responses		Percent of cases
	Frequency	Percent	
Strengthen supply side	26	23.4%	41.9%
Reduced tariff obstacles	23	20.7%	37.1%
Eliminated quantitative restrictions	12	10.8%	19.4%
Encouraged FDI	27	24.3%	43.5%
Improved trade infrastructure	23	20.7%	37.1%
Total	111	100.0%	179.0%

Earlier in Table 12 it was found majority of traders perceived internal trade policies of Nepal not compatible with WTO. Respondents were asked to rank the recommendations to make policies compatible with WTO and ranks obtained are given in Table 18 below. It was found promoting products with comparative advantage as the most important recommendation as it got the rank I, improving transit with third world countries as second, developing policies focused on import substitution as third, developing policies to decrease bureaucratic hurdles and least important recommendation was found to be decreasing tariff and non-tariff barriers which was ranked last.

Table 18. Recommendations to make trade policies compatible with WTO

Policy recommendations	Garett Average Value	Rank
Improving transit with third world countries	50	II
Policies should decrease bureaucratic hurdles	49.26	IV
Promote products with comparative advantage	55.86	I
Decrease tariff and non-tariff barriers	45	V
Develop policies focused on import substitution	49.88	III

4.1.5 Implication of Agreement on Agriculture (AoA) on trade across types of traders

Pearson Chi-square test was used to examine how types of traders perceive the implication of AoA and its aspects on trade of food commodities and results obtained are summarized in the Table 19. For this, respondents who were aware about WTO's membership were asked about their familiarity with AoA and their opinion on changes in aspects of AoA which are market access, domestic support and export subsidy. Majority of the respondents (65.9 percent) were not familiar about the AoA and remaining 34.1 percent were familiar about the agreement. Association between familiarity with AoA and types of traders was found significant at 5 percent level by Pearson chi-square test. Only majority of exporters (51.7 percent) were familiar about the AoA but majority of importers (65.4 percent) and both (85.2 percent) were not familiar about AoA.

Regarding change in market access majority of the respondents 65.9 percent felt market access has increased after membership while remaining 23.5 percent of respondents perceived decreased or no effect of membership in market access. Chi-square value of 15.612 was significant at ($p < 0.01$) which revealed the interdependence between change in market access after membership and types of traders. Across type of traders those involved in both export and import were the majority ones i.e. 92.6 percent of them felt increased market access after WTO followed by importers (65.4 percent) and exporters (42.9 percent).

Another aspect of AoA, change in tariff rate was not significantly associated with types of traders. In this case majority of traders 63.4 percent felt increase in tariff rate after membership whereas 36.6 percent felt tariff rate has decreased or no effect in it. Across types of traders majority of all three traders i.e. exporters (69 percent), importers (65.4 percent) and both (55.6 percent) perceived increase in tariff rate.

In regards to change in domestic support majority of respondents 65.9 percent felt decrease or no effect in domestic support after membership of WTO while 34.1 percent felt increased domestic support. After Pearson chi square test, change in domestic support after membership was found not significant with types of traders. Across types of trader majority of all three traders i.e. importers (76.9 percent), exporters (69 percent) and both (51.9 percent) perceived decrease or no effect in domestic support after membership.

Lastly, in case of export subsidy, majority of traders 68.3 felt decreased or no effect of membership on change in export subsidy whereas 31.7 percent perceived increase in export

subsidy after membership. But association between change in export subsidy after membership and types of traders was found not significant. Across types of trader majority of all three traders i.e. importers (76.9 percent), exporters (69 percent) and both (59.3 percent) perceived decrease or no effect in export subsidy after membership.

Table 19. Familiarity with AoA and change in its aspects after membership of WTO

Variables	Category	Types of Traders				Chi square	P Value
		Importers	Exporters	Both	Total		
Familiarity with AoA	Familiar	9(34.6)	15(51.7)	4(14.8)	28(34.1)	8.474**	0.014
	Not familiar	17(65.4)	14(48.3)	23(85.2)	54(65.9)		
Change in market access	Increase	17(65.4)	12(41.4)	25(92.6)	54(65.9)	16.312***	0.000
	Decrease/ no effect	9(34.6)	17(58.6)	2(7.4)	28(34.1)		
Change in tariff	Increase	17(65.4)	20(69)	15(55.6)	52(63.4)	1.147	0.563
	Decrease / no effect	9(34.6)	9(31.0)	12(44.4)	30(36.6)		
Change in domestic support	Increase	6(23.1)	9(31)	13(48.1)	28(34.1)	3.896	0.143
	Decrease / no effect	20(76.9)	20(69)	14(51.9)	54(65.9)		
Change in export subsidy	Increase	6(23.1)	9(31.0)	11(40.7)	26(31.7)	1.918	0.383
	Decrease / no effect	20(76.9)	20(69)	16(59.3)	56(68.3)		

Note: Figure in the parenthesis represent percentage. *** and ** indicate significant at 1% and 5% levels respectively.

4.1.6 Perception of traders on existing informal trade between Nepal and India

Descriptive analysis along with chi-square test was used to examine the perception of traders on existing informal trade of Nepal. Very high proportion of respondents which was 87.4 percent revealed they are not involved in informal trade with India. Chi-square test resulted in significant association of involvement in informal trade with types of traders at 5 percent level. Across types of traders maximum involvement in informal trade was of importers (21.2 percent) followed by both (10 percent) and exporters (3.1 percent).

Respondents were asked whether informal trade has hampered their business or not in which majority of them, 72.6 percent agreed on it has hampered whereas 27.4 percent revealed no any effect of informal trade on their business. Chi-square test resulted in significant association of this with types of traders at ($p < 0.05$). Across types of traders, majority of all three types i.e. both (86.7 percent), importers (78.8 percent) and exporters (53.1 percent) stated informal trade has hampered their business. Among traders, exporters (46.9 percent) were the traders who were found mostly not affected by informal trade.

Regarding checking informal trade all of the respondents agreed on this. Within them, majority of them (77.9 percent) strongly agreed and 17.9 percent agreed. None of the respondents disagreed on checking existing informal trade. Result of chi-square test revealed significant association of agreement of checking informal trade with types of traders at 5 percent level.

Table 20. Perception of traders on informal trade of Nepal

Particulars	Types of Traders				Chi square	P Value
	Importer	Exporter	Both	Total		
Involved in informal trade						
Yes	8(24.2)	1(3.1)	3(10)	12(12.6)	6.840**	0.033
No	25(75.8)	31(96.9)	27(90)	83(87.4)		
Informal trade hampered						
Yes	26(78.8)	17(53.1)	26(86.7)	69(72.6)	9.727**	0.008
No	7(21.2)	15(46.9)	4(13.3)	26(27.4)		
Agreement on checking informal trade						
Strongly Agree	27(81.8)	18(56.3)	29(96.7)	74(77.9)	15.297**	0.004
Agree	5(15.2)	11(34.4)	1(3.3)	17(17.9)		

Note: Figure in the parenthesis represent percentage. ** indicate significant at 5% levels.

4.1.6.1 Reasons, negative effects and suggestions of informal trade

Multiple response analysis was done to investigate the reasons, negative effects and suggestions of informal trade and result obtained are summarized in Table 21. Respondents were asked about what may be the possible reasons of engaging in informal trade, negative effects of informal trade and suggestions for checking informal trade and multiple response was taken.

Among the reasons given in Table 21, majority of respondents (37.4 percent) said informal trade is cheaper followed by 23.1 percent poor institutional setup in formal trade, 19 percent it is

faster as have fewer steps, 11.8 percent lack of resources for formal trading and only 8.7 percent said due to ignorance of trade rules.

Regarding negative effects of informal trade, majority of respondents perceived unfair competition among traders (40.8 percent) followed by loss of government revenue (34 percent), growth of informal sector (14.1 percent) and increased inequality and rural poverty (11.2 percent) as the negative effects of informal trade.

Suggestions were also taken from traders to check the existing informal trade of Nepal in the form of multiple response. Majority of them, 31.1 percent suggested on strengthening border security followed by 28.3 percent suggested on making policies to make formal trade more attractive, then 21.5 percent suggested on improving institutional setup of formal channel and only 19.2 percent of respondents suggested on making formal trade more attractive.

Table 21. Reasons, negative effects and suggestions on informal trade

Reasons, negative effects and suggestions	Responses		Percent of cases
	Frequency	Percent	
Reasons for engaging in informal trade			
It is cheaper	73	37.4%	76.8%
It is faster as have few steps	37	19.0%	38.9%
Ignorance or trade rules	17	8.7%	17.9%
Poor institutional setup in formal channel	45	23.1%	47.4%
Lack of resources for formal trading	23	11.8%	24.2%
Total	195	100.0%	205.3%
Negative effects of informal trade			
Increased inequality and rural poverty	23	11.2%	24.2%
Loss of government revenue	70	34.0%	73.7%
Growth of informal sector	29	14.1%	30.5%
Unfair competition among traders	84	40.8%	88.4%
Total	206	100.0%	216.8%
Suggestions to check informal trade			
Decrease transaction cost of formal traders	42	19.2%	44.2%
Improve Institutional setup of formal channel	47	21.5%	49.5%
Strengthen border security	68	31.1%	71.6%
Make policies to make formal trade more attractive	62	28.3%	65.3%
Total	219	100.0%	230.5%

4.1.7 Trade barriers and recommendations to solve the barriers

Garett ranking method was used to examine the existing trade barriers faced by food traders of Nepal and same method was used to rank the recommendations for removing the barriers and result obtained are presented in Table 22 below.

From the analysis it was found high trade cost was the most severe barrier faced by the traders, poor transit facilities with third world countries as second, bureaucratic hurdles for formal trade as third, high tariff and non-tariff barriers as fourth and finally lack of standardization and quality control as the least severe barrier.

Regarding recommendations to overcome the barriers it was found strengthening transit alternative as the most important one, decreasing trade cost as second, facilitating smooth institutional channel as third, decreasing tariff and non-tariff barriers as fourth and focusing on standardization and quality control as the least important recommendation.

Table 22. Trade barriers faced by traders of Nepal and their recommendations

Existing major trade barriers faced	Garett Average Value	Rank
High Trade cost	54.95	I
Poor transit facilities with third world countries	52.84	II
Bureaucratic hurdles for formal trade	49.63	III
High tariff and non-tariff barriers	47.21	IV
lack of standardization and quality control	45.37	V
Recommendations for Removing Trade Barriers	Garett Average Value	Rank
Strengthen transit alternatives	53.16	I
Decrease trade cost	52	II
Facilitate smooth institutional channel	51.32	III
Decrease tariff and non-tariff barriers	48.42	IV
Standardization and quality control enhance	45.11	V

Respondents were also asked have above mentioned barriers affected your trade flows and response obtained was analyzed using Pearson Chi square to examine the effect across types of traders. Result obtained is in Table 23 which revealed trade flow of majority of the traders i.e. 80 percent has decreased whereas 20 percent of them felt no significant impact on trade flow.

Association between effect of barriers on trade flow and types of traders was significant at 10 percent level.

Table 23. Effect of barriers on trade flow across trader types

Particulars	Category	Type of Traders				Chi Square	P Value
		Importer	Exporter	Both	Total		
Effect of Barriers on Trade Flow	No Impact	8(24.2)	9(28.1)	2(6.7)	19(20)	5.025*	0.081
	Decreased trade flow	25(75.8)	23(71.9)	28(93.3)	76(80)		

Note: Figure in the parenthesis represent percentage. * indicate significant at 10 percent level.

4.1.8 Factors affecting familiarization with trade liberalization after WTO

Logit regression model was used to determine the variables that affect familiarization of respondents with trade liberalization after WTO and the result obtained is presented in Table 24. The independent variables used in the logit regression model were free from the problem of multicollinearity as indicated by mean VIF of 2.02 (Table 24). The Likelihood ratio chi square value of 97.80 ($P < 0.01$) suggests that the predictors of the model make highly significant contribution in explaining dependent variable and predictors of model significantly improves its fit compared to a null model. Similarly, a non-significant Pearson chi--square of 30.40 in the model indicates the model adequately fits the data, supporting the reliability of the model. The Pseudo R-square value was learned to be 0.77 indicates approximately 77 percent of the variability in the dependent variable is explained by the predictors included in the model which revealed explanatory variables of the model has substantial explanatory power.

Concerning the independent variables, age of the traders, education level of traders, dummy variable of types of trader (importer), dummy variable of type of trader (both), dummy variable of form of commodities traded (raw), dummy variable of form of commodities traded (both), know Nepal is member of WTO and business hampered by informal trade were found to have some positive influence on familiarity with trade liberalization after WTO whereas the gender of traders, years of experience of traders, dummy variable of ethnicity (Madhesi), dummy variable of ethnicity (dalit), dummy variable of ethnicity (Janajati), dummy variable of location of traders (Lumbini), dummy variable of location of traders (Madesh) and dummy variable of location of traders (Koshi) had a negative influence (Table 24). However dummy variable of location of

traders (Lumbini), dummy variable of types of trader (importer), dummy variable of form of commodities traded (raw), dummy variable of form of commodities traded (both) and know Nepal is member of WTO were not statistically significant.

The interpretation of the predictors is best explained by their marginal effect dy/dx which is shown adjacent to the coefficients of each predictor. It is evident from the results that probability of traders to be familiar with trade liberalization increased by 0.1 percent with the increase on one year of age of traders ($p < 0.05$). As of gender, probability of male traders being familiar with trade liberalization was 1.6 percent less than that of female traders ($p < 0.10$). Likewise, a unit decrease in years of experience of traders decreased the probability of traders being familiar with trade liberalization by 0.1 percent ($p < 0.10$). Coming to the effect of educational qualification of traders, traders who have qualification above bachelors had 1.7 percent more probability of being familiar with trade liberalization than those who have qualification below bachelors ($p < 0.05$). In case of ethnicity of traders, Brahmin/Chhetri were taken as base category for interpretation. Probability of being familiar with trade liberalization of Madhesi traders was 29.9 percent less than that of Brahmin/Chhetri ($p < 0.05$), meanwhile that of dalit was 99.9 percent less ($p < 0.05$) and that of Janajati was 88.9 percent less ($p < 0.10$) than Brahmin/Chhetri. Regarding effect of location, traders of Madesh province had 40.3 percent lower probability ($p < 0.10$) and traders of Koshi province had 37.6 percent lower probability ($p < 0.10$) of being familiar with trade liberalization than that of Bagmati province. Although traders of Lumbini province also had lower probability of being familiar than that of Bagmati province but the coefficient was not statistically significant. As of type of trader, traders involved in both import and export had 2.1 percent greater probability of being familiar with trade liberalization than those involved in export only ($p < 0.10$). Likewise, traders whose business was hampered by informal trade were 20.5 percent more likely to be familiar with trade liberalization than of those whose business was not hampered ($p < 0.10$).

Table 24. Factors affecting familiarization with trade liberalization after WTO

Variables	Coef.	dy/dx	SE	z-value	p-value
AGE	0.457**	0.001**	0.205	2.23	0.026
GENDER	-9.386*	-0.016*	5.597	-1.68	0.094
EXPERIENCE	-0.358*	-0.001*	0.203	-1.76	0.078
EDUCATION	5.653**	0.017**	2.688	2.10	0.035
ETHNICITY					
D_MADHESI	-10.237**	-0.299**	0.205	-2.48	0.013
D_DALIT	-19.597**	-0.999**	8.344	-2.35	0.019
D_JANAJATI	-9.179*	-0.889*	5.169	-1.78	0.076
LOCATION					
D_LUMBINI	-3.843	-0.022	3.587	-1.07	0.284
D_MADHESH	-6.453*	-0.403*	3.316	-1.95	0.052
D_KOSHI	-6.322*	-0.376*	3.816	-1.66	0.098
TRADER_TYPE					
D_IMPORTER	2.435	0.005	3.068	0.79	0.427
D_BOTH	6.976*	0.021*	4.189	1.67	0.096
FORM_COMMODITIES					
D_RAW	2.299	0.004	3.531	0.65	0.515
D_PROCESSED	4.66	0.009	3.324	1.40	0.161
KNOW_MEMBER	0.321	0.001	1.753	0.18	0.855
INFORMAL_HAMPERED	6.431*	0.205*	3.338	1.93	0.054
CONSTANT	1.514		4.88	0.31	0.756
Number of observations	95				
LR $\chi^2(17)$	97.80				
Pseudo R-squared	0.77				
Pearson $\chi^2(77)$	30.40 ^{NS}				
Mean VIF	2.02				

Note: ** and * represent significant at 5 percent and 10 percent level respectively.

4.1.9 Factors affecting decision to involve in informal trade

Logit regression model was used to examine the variables that affected the decision of traders to involve in informal trade and the result obtained is given in Table 25 below. The independent variables used in the model were free from multicollinearity as indicated by mean VIF of 1.47. The Likelihood ratio chi square value of 67.16 ($P < 0.01$) suggests overall model is statistically significant and predictors of model significantly improves its fit compared to a null model. Similarly, a non-significant Pearson chi-square of 79.06 in the model indicates the model adequately fits the data, that indicates a good fit between observed and expected frequencies. The Pseudo R-square value was learned to be 0.639 that indicates approximately 63.9 percent of the variability in the dependent variable is explained by the predictors included in the model which revealed explanatory variables of the model has substantial explanatory power.

Among the independent variables position of trader in the business, dummy variable of location of the trader (Madesh), dummy variable of location of the trader (Koshi), dummy variable of location of the trader (Lumbini) and familiarity of traders on trade liberalization were found to have some positive influence on the decision of traders to involve in informal trade whereas age of traders, gender of traders, educational qualification of traders, dummy variable of type of trader (exporter), dummy variable of type of trader (both) and business hampered by informal trade had negative influence on the decision to involve in informal trade. However, age of traders, gender of traders, dummy variable of trader type (both), dummy variable of location (Koshi) and familiarity of traders with trade liberalization were not statistically significant.

Marginal effects after logit (dy/dx) was used to interpret the results which is given in the Table 25 adjacent to the coefficients. From the results in the table it was clear that probability of traders to involve in informal trade is 5.3 percent greater if trader was owner of the business than those who were not owner of the business ($p < 0.01$). Concerning educational qualification, the trader having qualification of above bachelors had 6.2 percent less probability ($p < 0.05$) of involving in informal trade than those having qualification of less than bachelors. Likewise in case of type of trader, probability of exporter to involve in informal trade was 8.8 percent lower than that of importer, trader doing both also had less probability than importer but coefficient was found not significant. Regarding location of traders, traders of Madesh province had 73.3 percent greater probability ($P < 0.05$) of involving in informal trade than traders of Bagmati province and traders of Lumbini province had 9.1 percent more probability ($p < 0.10$) of involving in informal trade than

traders of Bagmati province, while traders of Koshi province also had greater probability than Bagmati province but coefficient was found not significant. The results revealed that those traders whose business was hampered by existing informal trade had 3.7 percent lower probability of involving in informal trade than that of those whose business was not hampered by informal trade ($p < 0.10$).

Table 25. Factors affecting decision to involve in informal trade

Variables	Coef.	dy/dx	SE	z-value	p-value
AGE	-0.057	-0.001	0.068	-0.84	0.400
GENDER	-0.741	-0.009	1.506	-0.49	0.623
POSITION	3.287***	0.053***	1.238	2.66	0.008
EDUCATION	-5.315**	-0.062**	2.164	-2.46	0.015
TRADER_TYPE					
D_EXPORTER	-6.593***	-0.088***	2.433	-2.71	0.007
D_BOTH	-0.613	-0.006	1.24	-0.49	0.621
LOCATION					
D_MADHESH	6.396**	0.733**	2.826	2.26	0.024
D_KOSHI	0.874	0.013	2.495	0.35	0.726
D_LUMBINI	3.861*	0.091*	2.318	1.67	0.096
INFORMAL_HAMPERED	-2.101*	-0.037*	1.141	-1.84	0.066
FAM_LIB	1.531	0.015	1.386	1.10	0.269
CONSTANT	-1.248		3.469	-0.36	0.719
Number of observations	95				
LR χ^2 (11)	67.16***				
Pseudo R-squared	0.639				
Pearson χ^2 (80)	79.06 ^{NS}				
Mean VIF	1.47				

Note: ***, ** and * represent significant at 1 percent, 5 percent and 10 percent level respectively

4.2 Result of key informant interview

4.2.1 Implication of WTO on trade and trade policies of Nepal

- 9 informants out of 15 (60 percent) revealed accession to WTO had improved trade of Nepal in and made it systematic but 2 informant (13.33 percent) there was no significant benefit from WTO for Nepal.
- Integration with global trading system with increased global market access due to trade liberalization for Nepal (53.33percent)
- Increase in import after membership of WTO was felt by majority of informants (66.67 percent) while only 3 of them said export of NTFPs, tea and coffee has increased.
- 4 informants (26.67 percent) said after WTO favorable scenario was found for consumers but not for traders.
- 5 informants (33.33 percent) revealed quality control and standardizations had been more systematic after WTO.
- 26.67 percent of responses revealed some level of diversification on trade of Nepal was seen in terms of countries and commodities after WTO.
- More fluctuation in market prices of commodities was seen after membership of WTO.

Along with changes in trade regime informants have given very thoughtful insights regarding changes in trade policies of Nepal after WTO but 2 of them (13.33 percent) felt no significant changes in trade policies of food commodities. Perceptions of informants on changes in trade policies of Nepal after WTO are:

- Tariff rates were bound within certain limits for agricultural and food commodities (40 percent of informants)
- 7 of them (46.67 percent) revealed policies made after WTO's membership were found to be more focused on making import easy but not exports.
- 6 of the responses showed policies in some way or other facilitated trade of agricultural products but 1 respondent argued on no trade gain in agriculture because of not being able of producing tradable volume.

- In majority of response (53.33 percent) it was found after WTO Nepal had made efforts on decreasing tariff and non-tariff barriers but 2 informants argued on this saying not sufficient efforts were made to decrease non-tariff barriers e.g. TBT was still hurdle for Nepal.
- Although, policy level commitments were made by Nepal after membership which were removing charges and duties from primary agriculture commodities, setting export subsidy to zero and domestic subsidy within limit but charges were continued and export subsidies were also given. In case of domestic support informant added, Nepal still had ample room to provide such subsidies.
- After membership system based approach of trade had been realized in terms of quality.
- Earlier trade policies which were primarily focused on bilateral agreements, after membership they were found to become more multilateral.

4.2.2 Compatibility of bilateral and regional trade policies of Nepal with WTO

Informants were asked to put forward their opinion on the compatibility of bilateral (India, China, Bangladesh etc.) and regional (SAFTA and BIMSTEC) trade agreements that Nepal has made with the WTO and their responses are summarized below.

- 80 percent of the informants revealed that the agreements made were compatible with WTO but 20 percent of them denied agreements were not compatible.
- 46.67 percent of informants said that Nepal's trade is mostly based on bilateral and regional trade agreements rather than multilateral trade agreements.
- 40 percent of responses showed among bilateral trade agreements Nepal has signed, preferential treatment were with neighboring countries India and China in many commodities.
- According to 26.67 percent of informants regarding bilateral treaty with India, India seemed to be on dominating position due to our high dependency with India and low negotiation capacity.
- According to one informant, although for Nepal considerable room existed for raising tariffs from existing level without violating WTO rules, Nepal India Treaty had prevented us from utilizing this policy space.
- However India sometimes had put some form of non-tariff barriers in our export.

4.2.3 Efforts of Nepal for alignment of trade policies with WTO

15 informants were asked about the efforts done by Nepal to align domestic trade policies of Nepal with WTO in order to utilize maximum opportunity from it and the responses obtained are summarized below after thematic analysis:

- 9 out of 15 informants (60 percent) said Trade Policy Review mechanisms were going on timely and necessary revisions were made.
- 40 percent of informants expressed policies were focusing on capacity development of institutions, ministries and departments.
- 3 informants (20 percent) revealed government has ratified agreement on trade facilitation.
- 46.67 percent of informants said policies were made to promote export of Nepal and 3 informants (20 percent) revealed NTIS has identified commodities with comparative advantage.
- Notifying agriculture subsidies to WTO, harmonizing products in codex system, establishment of SPS notification and inquiry authority, single window system for trade, certificate of origin and digital signature were some of the initiatives carried out by Nepal.
- Similarly risk management selectivity system, post clearance audit and after customs clearance are some of the efforts.
- One of the informants said Finance Ministry of Nepal was studying the possibility of transit alternatives which could be the seven different port access given by China to Nepal.
- Nepal was taking part in negotiations and dispute settlement mechanisms.

4.2.4 Factors affecting trade policies of Nepal

Informants were asked about their perspective of what could be the key factors (both positive and negative) affecting trade policies of Nepal and the responses obtained are given below after analysis.

- Majority of informants 66.67 percent believed political instability of Nepal as the key factor affecting making and implementation of trade policies while one of the informant revealed frequent turnover of staff in ministries hinders development of expertise.
- 53.33 percent said landlocked nature of Nepal had made logistics difficult and costly and thereby affected policies.

- 7 out of 15 informants (46.67 percent) revealed our high dependency with India has also affected policies.
- 40 percent believed low negotiation capacity of Nepal and 33.33 percent said poor interagency coordination as potential factors affecting trade policies of Nepal.
- 4 of the informants (33.33 percent) identified geopolitical position between India and China, bilateral and regional agreements and abundance of natural resources as positive factors.
- Only 20 percent of them said trade policy making not being underpinned by solid research as a factor affecting trade policies.
- Similarly some potential factors identified were: Nepal not being able to fully utilize policy space given by WTO, Nepal's upcoming graduation from LDC country, lack of industrialization, trade policy of other countries, interest of international agencies and INGOs in policies of Nepal and open border with India.

4.2.5 Suggestions to grab opportunities of WTO and policy recommendations to align Nepal's trade policies with WTO

Informants were asked to provide their suggestions and policy recommendations in order to overcome the identified negative factors affecting trade policies and enhance alignment of Nepal's trade policies with WTO so that opportunities from trade liberalization can be grabbed. Responses obtained were analyzed and are summarized below.

- Majority of them (60 percent) suggested on increasing volume of domestic production and promote policies to use domestic products.
- Another major suggestion obtained from 53.33 percent of informants was to develop policies that can utilize comparative and competitive advantage and ease the export of products having comparative advantage.
- Similarly, promoting interagency coordination (46.67 percent), building up negotiation capacity (26.67 percent), promoting diversification of products (33.33 percent) and increasing institutional capacity (40 percent) were identified as major suggestions.
- One of them suggested on replacing export subsidies by domestic subsidies that ultimately aid exports.

- 3 of the informants (20 percent) suggested that agriculture subsidies must be rationalized and streamlined.
- 20 percent recommended on developing policies that focus on transit alternatives for third world countries using ports provided by China.
- Develop policies aiming preparation for graduation from LDC after 2026.
- Policies should focus on regulating informal trade of Nepal.
- Strategic planning should be done to cope up with fast transition of trade occurring in global economy.
- Policies should focus on total trade than trade balance.
- Policies should be focused on decreasing non-tariff barriers.

5. DISCUSSIONS

5.1 Discussion for results of survey with traders

5.1.1 Sociodemographic characteristics

Age of the traders on an average was found to be 35.26 years in the study area and average experience years of them was 11.66 years. Regarding gender perspective, majority of traders were found to be male (80 percent) and import trade was highly dominated by males whereas somewhat involvement of females was seen in export and both trade. This might be due to involvement of females in small enterprises based on processing of local products like pickles, processed meat for export which are being demanded at recent times by Nepalese living in foreign. A study based on gender analysis of trade also has revealed in developing countries trade liberalization has increased involvement of women in export oriented industries due to lower wage rate than male (Jansen et al., 2011). In case of location and types of trader majority of importers were concentrated in Banke (45.5 percent) and Rupandehi (24.2 percent) district whereas majority of exporters were at Kathmandu (46.9 percent). This discrepancy might be due to proximity of Indian border checkpoint to Banke and Rupandehi districts where importers were more than exporters. Educational qualification of majority of traders i.e. 45.3 percent was 12 to bachelors. In case of ethnicity, majority of traders were Madhesi which was 45.3 percent in which majority of importers were Madhesi (51.5 percent) but majority of exporters were Brahmin/Chhetri (43.8 percent) and majority of both were also Madhesi (50 percent). This might be due to dominance of residency of Madhesi people in southern plains of Nepal adjoined with Indian border where majority of importers were found which was also stated in the study of Pandey (2022).

Form of food commodities traded was found to be significantly associated with trader types in which majority of importers (60.6 percent) traded raw commodities while majority of exporters (71.9 percent) traded processed. Regarding overall trade, this result was found inconsistent with the study done by Inst et al. (2020) which stated majority of exported commodities of Nepal were raw materials which had larger volume but less value and majority of imported commodities of Nepal were processed ones with lower volume but high value. Largest bilateral trade of Nepal was found to be with India with which 74.7 percent of traders traded. Regarding only import trade majority of the importers i.e. 100 percent traded with India but in case of only export trade, majority of exporters i.e. 68.8 percent traded with USA while in case of both trade majority of both traders i.e. 93.3 percent traded with India. Similar findings of India as largest trading partner

was reported by Neopane & Acharya (2021), Alam (2020), Taneja & Roy (2020) and Shrestha & Paudel (2021). But result of only export trade was found inconsistent with study of Taneja & Roy (2020), Richter (2017), Thapa (2012) and Bhagat (2020) which reported India as largest export market of Nepal. The study found in total cereals as the major class of food commodity traded by all traders i.e. by 47.4 percent of them followed by MAP and spices (34.7 percent) while major commodity of import trade was also cereals (traded by 63.6 percent of importers) and that of export trade was MAP and spices (traded by 43.8 percent of exporters). Study done by Neopane & Acharya (2021) has stated rice as top imported food commodity of Nepal that falls under class cereals and nutmeg followed by cardamom as top exported commodity of Nepal that falls in class MAP and spices which was found consistent with our study. Contrary to this, report on Nepal foreign trade statistics 2022/23 stated crude soya bean oil as top imported food commodity and refined palm oil as top exported food commodity (DoC, 2023).

5.1.2 Improvements and challenges for Nepal due to WTO

Based on the importance, five most common improvements were ranked and result found was increase in trade volume as the most important improvement due to membership (rank I) followed by integration with global trading system (rank II), diversification of trade (rank III), made trade fairer (rank IV) and least important improvement was decreased tariff and non-tariff barriers (rank V). Study done by KC (2019) has also showed continuous increase of trade volume after trade liberalization and studies done by B. Thapa (2012) and Dahal & Bhaskar (2004) has stated increased global market access for Nepal after WTO. Similarly trade was made fairer and tariff and non-tariff barriers were decreased (B. Thapa, 2012). Contrary to our finding trade diversification was not fulfilled and insufficiency of Nepal to diversify its exports were stated by GC (2019) and KC (2019) respectively.

Regarding challenges Nepal faced after membership, our study found sharp increase in import than export was ranked as most important challenge followed by increased dependency with India, increased competitiveness, decreased domestic support and least important challenge faced was decreased export subsidy. Finding on sharp increase in import than export was supported by studies of S. S. Shrestha (2016), Simkhada (2019), KC (2019), M. Shrestha & Paudel (2021), Thapa (2012) and Richter (2017). High dependency of Nepal with India is supported by the study of Prasai (2014), KC (2019), Alam (2020) and Shrestha (2016) which states more than two third of trade on Nepal occurs with India in terms of both import and export.

5.1.3 Implication of WTO on trade and trade policies of Nepal

Regarding implication of WTO on trade of food commodities of Nepal majority of traders (47.6 percent) agreed on membership has improved trade and index of agreement was found to be 0.02 that revealed low degree of agreement. This finding was supported by work of Gil-Pareja et al. (2016) which had estimated WTO have increased trade of member countries by 36 percent. Chang & Lee (2011) also revealed significant trade promoting effects of WTO, Liu (2009) stated WTO not only makes trade partners trade more but also helps to form new connections, Subramanian & Wei (2007) discovered increased trade when both countries agreed to liberalize trade and Grant & Boys (2011) discovered WTO has large beneficial effects on members' agricultural trade. Contrary to these, some studies has also discovered opposite i.e. food trade between WTO members dropped by around 16% compared to non-members (Mujahid & Kalkuhl, 2016) and process of GATT/WTO accession has not led to favorable trade outcomes (Esteve et al., 2019). Contrary to our finding, studies done by Neopane et al. (2021), GC (2019), Pokharel (2019), Thapa (2012), Bhatta (2013), P. Shrestha (2022) and Sharma (2019) stated negative effects of WTO's membership on trade of Nepal which were sharp increase in import than export inability to diversify trade and increased dependency with India. Very few evidences of WTO improving trade of Nepal were found which were: contribution of trade on GDP has found to be increased after WTO period (CBS, 2023). Although trade volume has increased after WTO, imports has always dominated export (R. Acharya, 2019). Across types of traders although majority of the importers (65.4 percent) believed that membership has improved the trade but majority of exporters (41.4 percent) disagreed on this opinion. It might be because import trade of Nepal being easier than export trade.

Regarding trade dynamics of Nepal after membership, majority of food traders (96.3 percent) perceived sharp increase in import after WTO and this finding is supported by studies of P. Shrestha (2022), Pokharel (2019), S. S. Shrestha (2016), KC (2019) Simkhada (2019), M. Shrestha & Paudel (2021), and Thapa (2012). Regarding reasons for sharp increase in import, low domestic productivity was ranked to be the most important reason which was consistent with the findings of Simkhada (2019), Maharjan & Knerr (2019) and Adhikari et al. (2021) and increased remittances was found to be fourth important reason and this finding is supported by the study of Bhatta (2013) and Maharjan & Knerr (2019). Majority of food traders (69.5 percent) perceived

either decrease or stagnant export except majority of traders doing both import and export (51.9 percent) who perceived increase in export. Richter (2017) stated decreasing export of Nepal, KC (2019) claimed no significant increase in export of Nepal and study done by Sharma (2019) and Shrestha (2016) stated growth in export but at a very slow rate. Problem in transit for third world countries (rank I), high trade cost (rank II), products not meeting global quality standards (rank IV) were found as the reasons for decreasing or stagnant export and this finding is supported by Richter (2017), Thapa (2012) and (Bhagat, 2020) and K. R. Acharya (2019). Study done by Nihar (2016) claims Nepal did not benefit much from exporting to third world countries due to poor transit facilities in India. It was discovered majority of traders (57.3 percent) experienced decrease or no effect in productivity of major food crops of Nepal after membership. This finding is supported by the findings of Dumre et.al. (2020) and Nepal Rastra Bank (2022) which shows decreasing trend of contribution of agriculture in GDP.

Majority of the food traders i.e. 74.1 percent revealed WTO's membership has affected domestic trade policies of Nepal and this finding is supported by study of Acharya (2019). Efforts like strengthening supply side, reducing tariff obstacles, eliminating quantitative restrictions, encouraging FDI and improving trade infrastructure were made by Nepal to align domestic trade policies with WTO among which, majority of traders believed encouraging FDI as the major effort being made. Encouraging FDI is consistent with the finding Thapa (2012) which discovered doubling of FDI in Nepal during post accession period of WTO. Studies done by Büthe & Milner (2008) and Kharel & Kharel (2019) also supports increase in FDI after trade liberalization and membership of WTO. Despite of the efforts, yet 91 percent of traders revealed efforts were not sufficient and 79 percent of trades thought current domestic trade policies were not compatible with WTO. This was consistent with the finding of Sharma (2015) which states the incompatibility of policies due to sole focus on post WTO reforms and lack of long term outlook. Regarding policy recommendations promoting product with comparative advantage was found as most important one which is also claimed in the study done by B. Pant & Panta (2009b). Improving transit facilities with third world countries was found as second most important recommendation which also stated in the study done by Kharel & Dahal (2021).

Majority of respondents 60.5 percent perceived Nepal is getting the MFN treatment among which only majority of importers (53.8) believed Nepal is not getting MFN treatment but majority of exporters (57.1 percent) and both (77.8 percent) believed Nepal is getting the MFN treatment after

WTO. This finding is supported by the study of L. D. Adhikari (2023) that claims LDCs get special and differential treatment in the agreements of WTO to be benefited from the trade liberalization.

5.1.4 Implication of AoA on trade of Nepal

Implication of AoA on trade was analyzed through its aspects and results found were: majority of traders perceived increased market access (65.9 percent), increase in tariff rate (63.4 percent), decrease or no effect in domestic support (65.9 percent) and decrease or no effect in export subsidy (68.3 percent). In case of increased market access, traders involved in export only was the only group of traders whose majority did not felt increased market access but majority of importers only and both experienced increase in market access after WTO. This might be due to export trade of Nepal being comparatively more difficult and has more obstacles than that of import trade. Study done by Bista & Adhikari (2021) and Joshi et al. (2023) also claims export trade of Nepal is more challenging than import trade. The finding of increased market access after membership of WTO is supported by the studies done by B. Thapa (2012) and Dahal & Bhaskar (2004). Contrary to the finding of increase in tariff after WTO, studies claim decreasing tariff rate i.e. Neopane et al. (2021) claims Nepal is gradually decreasing its tariff and Rena (2009) claims member countries has converted their non tariff barriers to normal tariff and subjected them to reduction. Although WTO member countries committed to reduce trade distorting subsidies in agriculture as claimed by the studies of Brink & Orden (2023) and S. K. Sharma et al. (2022) but in case of Nepal study done by P. Kharel & Dahal (2021) suggests Nepal still has considerable room for providing subsidies donnot need to decrease it. Regarding export subsidy, similar to our finding Nepal committed no to sudside exports and make it zero (P. Kharel & Dahal, 2021). However, Nepal provides subsidies to exports of selected agricultural goods under cash incentive schme for export (CISE) to promote export to countries other than India and studies of Defever et al. (2020) and P. Shrestha (2022) discovered no significant growth of export in terms of volume and value even after the scheme.

5.1.5 Informal trade between Nepal and India

Majority of traders (87.4 percent) said they were not involved in informal trade which might be due to the sensitive nature of question and traders were scared about sharing the reality. Across the types of traders majority of importers were found to be involved in informal trade and very few exporters only 3.1 percent were involved. This shows dominance of informal trade in import trade of Nepal than export trade which might be due to open border with India. Also only exporters group of trader were the traders who were found least affected by the informal trade. This finding is consistent with the finding of the study done by Taneja et al. (2004) which states informal import trade between Nepal and India is 44 percent of formal trade which is greater than informal export trade i.e. is 34 percent of formal trade. Regarding reasons, informal trade being cheaper than formal trade was found as the major reason (37.4 percent) which was also stated in the study done by Taneja & Pohit (2007a). Similarly 19 percent of traders felt informal trade being faster because of fewer steps as a reason for informal trade which is also claimed by the study of (Pohit, 2018a). Among the negative effects major effect felt by traders was unfair competition with traders (40.8 percent) followed by loss of government revenue (34 percent) which were claimed by the studies of S. Sharma (2020) and Chapagain (2020) respectively. Suggestion of majority (31.1 percent) of traders on checking informal trade was to strengthen border security followed by 28.3 percent suggested on making policies to make formal trade more attractive, then 21.5 percent suggested on improving institutional setup of formal channel and only 19.2 percent of respondents suggested on decreasing transaction cost of formal traders. Similar suggestions were also found on the study done by Taneja & Bimal (2020) Taneja & Pohit (2007) and Pohit (2018a).

5.1.6 Factors affecting familiarity of traders with trade liberalization

Educational qualification positively affected the familiarity of traders with trade liberalization which means educated traders were found more familiar with trade liberalization. This finding was supported by study of Stiller et al (2022) which claimed highly educated ones supports trade liberalization because they knew the importance of liberal trade. Another study by Petrachkova (2022) also supports this claiming individuals having higher knowledge on finance and economics favors policies related to liberalization of trade. It was found disadvantaged ethnic groups were less familiar with trade liberalization in which Brahmins were found to be most familiar followed by Madhesi, Janajati and Dalits. Similar study done in India by Gaikwad &

Suryanarayan (2023) discovered opposite to the finding which claimed disadvantaged ethnic group are more likely to support trade liberalization because of potentiality of getting lower skill jobs for them. Regarding type of trader, traders doing both import and export were more familiar with trade liberalization than traders doing export only which might be because of need of greater experience and innovativeness for two way trading in global market. This finding was supported by the study of Seker (2011) which claimed two way traders (doing both import and export) are the fastest growing and most innovative group of traders than doing only export and only import.

5.1.7 Factors affecting decision to involve in informal trade

Probability of owner to engage in informal trade was 5.3 percent greater than that of others and this might be due to sensitive nature of question in which other employees hesitated to answer the truth but owners did not. Age and gender of traders were found to have not a significant effect on decision of traders to involve in informal trade but their effect was negative. This implied probability of females being involved in informal trade greater than males. Similar findings were made in the study conducted in Ecuador by Fernandez et al. (2020). Educational qualification of traders significantly affected their decision to involve in informal trade and traders with higher educational qualification (above bachelors) had 6.2 percent less probability of engaging in informal trade. This finding was in line with the study done by Taneja & Pohit (2007b) which claimed lower education level of informal traders might be the reason to their involvement in informal trade also in line with study done in Ecuador by Fernandez et al. (2020). Regarding types of trader, exporters had 8.8 percent lower probability of being involved in informal trade than importers. This finding was consistent with the studies of Taneja et al. (2004) and Abid (2019). Probability of traders of Madhesh and Lumbini province to involve in informal trade was greater than Bagmati province by 73.3 percent and 9.1 percent respectively and traders of Koshi province also had greater probability than Bagmati but coefficient was not significant. This might be due to presence of many important Indian border checkpoints in these province than Bagmati province which are Rupaidiha, Jamunaha, Sunauli and Jogbani. This was found consistent with the studies done by D. Pandey et al. (2014) and Patel (2013) and states most of informal trade of Nepal occurs in southern plains of Nepal which are border areas with India due to proximity and ease of trade activities. Those traders whose business was hampered by informal trade had 3.7 percent lower probability of involving in informal trade which might be due to those who are involved has faced

less loss because of higher profit from informal trade than formal. This finding was supported by the studies of Chapagain (2020) and Taneja & Bimal (2020).

5.2 Discussion for results of KII

5.2.1 Implication of WTO on trade and trade policies of Nepal

Regarding implication of WTO on trade regime of Nepal, some positive implications stated were that trade of Nepal had improved and became systematic, market access has increased, quality control and standardization had become systematic, increase in export of some high value crops and some level of diversification in trade in terms of countries and commodities. Finding of improvement in trade after WTO is supported by studies of Gil-Pareja et al. (2016), Chang & Lee (2011), Liu (2009), Subramanian & Wei (2007) Felbermayr et al.(2024) and Grant & Boys (2011) but contrary to the finding, studies done by Mujahid & Kalkuhl (2016) and Esteve et al. (2019) has discovered trade has been deteriorated after WTO. Increased market access in global market was in line with the studies done by B. Thapa (2012) and Dahal & Bhaskar (2004). Quality control and standardization became systematic and increase in export of some high value crops was supported by the study of Dharni & Sharma (2008). Contrary to the finding of increased diversification studies done by GC (2019) and Thapa (2012) claimed Nepal's failure to diversify its trade. WTO membership has created favorable scenario for consumers not for traders contrary to this finding study done by Felbermayr et al. (2024) claims WTO has created favorable scenario for both traders and consumers. Similarly negative implications identified were sharp increase in import than export which is consistent with the studies of P. Shrestha (2022), Pokharel (2019), S. S. Shrestha (2016), KC (2019) Simkhada (2019), M. Shrestha & Paudel (2021), and Thapa (2012) and more fluctuation in market prices which is supported by study of R. Sharma (2019a).

Identified implications of WTO on domestic trade policies were; tariff rates were bound within limit, tariff and non-tariff barriers decreased, policies focused on making import easier than export and trade policies which were earlier focused on bilateral agreements found to become more multilateral after WTO. Bounding tariff in agricultural and nonagricultural goods was stated in the study done by L. D. Adhikari (2023) and decreasing tariff and non-tariff barriers was also stated in the study done by B. Thapa (2012). After WTO policies focused on easing imports more than exports as trade openness increased purchasing power of people (Khadka, 2019). Similarly study

done by S. Sharma (2020) claimed post WTO policies of Nepal led to easier imports which is evident by significant increase in imports compared to stagnant imports. Shiferaw & Hagiwara (2018) also claims post WTO trade facilitation policies of Nepal focus on easing imports than exports in order to reduce customs clearance time and boost GDP. Contrary to these, R. K. Shah (2017) claimed before 1990 trade policy was import intensive but after 1990 (post liberalization) trade policy became export extensive. Nepal's focus has shifted towards multilateral agreements after WTO to benefit from global trade rules and enhance market access (B. Thapa, 2012). Although commitments were made to remove charges and duties from agricultural commodities, setting export subsidy to zero and domestic subsidy within limit but the commitments were not continued and Nepal still has ample room to provide domestic subsidies and this finding was supported by the study of P. Kharel & Dahal (2021).

5.2.2 Compatibility of bilateral and regional trade agreements of Nepal with WTO

Regarding compatibility perception of majority of informants were: bilateral and regional agreements of Nepal were compatible with WTO, Nepal's trade is mostly based on bilateral and regional agreements than multilateral and preferential bilateral trade agreement of Nepal is with India and China. In case of bilateral treaty with India, dominating position of India was realized due to our high dependency with India and sometimes non-tariff barriers are exerted by India to our exports. Finding of bilateral and regional agreements are compatible with WTO is supported by the study of Choi (2005) which states such agreements must align with WTO rules in order to avoid violating MFN treatment obligations and also supported by B. Thapa (2012) which states compatibility is needed to ensure adherence to global trade regulations. Similar finding was claimed by the study of Snyder (2009) which claimed RTAs of China are compatible with WTO since they are drafted in the shadow of WTO law. Finding of Nepal's trade is mostly based on bilateral and regional agreements than multilateral is supported by the studies of (N. B. Bista & Adhikari, 2021), (N. B. Bista & Adhikari, 2021) as they suggest Nepal's trade is highly influenced by such agreements but these studies do not claim that Nepal's trade is more based on bilateral and regional agreements than multilateral. However, study of Agrawal & Gupta (2018) claims there is a shift towards bilateral and regional agreements for trading from multilateral ones. Dominating position of India in bilateral treaty of Nepal and India was also claimed by study of Nihar (2016) which reveals India used the transit issue as political leverage but claimed it as right to access the sea. K. R. Kharel & Chalise (2020) also states India has been creating problems in trade and transit

contrary to the international norms and trade and transit treaties. Although for Nepal considerable room existed for raising tariffs from existing level without violating WTO rules, Nepal India Treaty had prevented us from utilizing this policy space (P. Kharel & Dahal, 2021).

5.2.3 Efforts of Nepal for alignment of trade policies with WTO

Main efforts of Nepal identified were timely trade policy review mechanism and developing policies focused on capacity development of institutions and promoting export of products with comparative advantage. Along with this Nepal taking part in negotiations and dispute settlement mechanisms, notifying agriculture subsidies to WTO, harmonizing products in codex system, establishment of SPS notification and inquiry authority, single window system for trade, certificate of origin, digital signature, study of possibility of transit alternatives through China and implementation of risk management selectivity system, post clearance audit and after customs clearance were some of the efforts identified. Finding of timely trade policy review is supported by the study of K. Sharma (2015 and 2020) that states first trade policy review done by WTO was on 2012 and second review covers time of 2012 to 2018 and both reviews were timely. In contrary to the finding of promoting export of product with comparative advantage studies done by P. Shrestha (2022) and Magar (2019) claims no focus of policies in promoting products with comparative advantage. Nepal is taking part in negotiations and dispute settlements is also stated by S. Acharya (2020) and L. D. Adhikari (2023). In case of possibility of transit through China study done by S. Acharya (2018) reveals although Nepal has transit right with both India and China to trade freely with third world countries but Nepal is using only transit via India due to geographical proximity but there could be potential of using transit via China too. According to study done by Regmi & Timalina (2018) as clearly stated by WTO to implement effective risk management system Nepal has tested deep learning model by Nepal customs in order to segregate high risk and low risk consignments which was found better than current rule based risk management system. Study done by Clark (2017) states FTA of WTO requires members to implement risk based post clearance audit functions in customs organizations and another study Shekofea & Sameti (2015) reveals audit after customs positively influences performance indicators such as revenues, registration time and labor productivity.

5.2.4 Factors affecting trade policies of Nepal

Major factors negatively affecting trade policies of Nepal were found to be political instability, landlocked nature of Nepal, high dependency with India, low negotiation capacity, policy making not underpinned by solid research and frequent turnover of staff in ministries. Some positive factors identified were geopolitical position between two large economies India and China, bilateral and regional agreements and abundance of natural resources. According to study of S. Bista & Webb (2006) political instability has decreased the sales of NTFPs of Nepal, study by Mishra & Paudel (2023) also revealed political instability has affected trade policies and study done by B. Pant (2005) investigated political instability in Nepal has hindered the execution of trade policies. According to study of K. R. Kharel & Chalise (2020) high dependency with India has led to imbalance in trade policies i.e. policies favoring import than export. Landlocked nature of Nepal has restricted sale of large cardamom beyond India (S. Acharya et al., 2021) and another study of Nihar (2016) reveals India used the transit issue as political leverage thus affecting the trade policies of Nepal. Another study done by K. Sharma (2015) suggests Nepal's autonomy in trade policy making is hindered by landlocked nature that arises due to transit related problems. Poor negotiation capacity of Nepal in multilateral and regional agreements directly affect the domestic trade policies L. D. Adhikari (2023). According to study of P. Kharel & Dahal (2021) policy making not being based on solid research is another factor affecting domestic trade policies. Nepal's position between India and China impacts trade policies because as per study of Khanal (2022) policies should maintain delicate balance between two large economies and according to Baniya (2023) neighboring countries compete for economic and security interests over the country. Abundance of natural resources in Nepal particularly NTFPs also affect trade policies because study done by Poudel (2007) states trade policies should promote export of abundantly present NTFPs in Nepal along with their sustainable use.

5.2.5 Suggestions and policy recommendations

Major suggestions identified were: developing policies that focus on increasing volume of domestic production, utilize competitive and comparative advantage, ease the export of products having comparative advantage, promoting interagency coordination, building up negotiation capacity, promote diversification of trade, increasing institutional capacity, rationalizing and streamlining agriculture subsidy, studying for transit alternatives for trading with third world countries and decreasing non-tariff barriers. Also replacing export subsidies by domestic subsidies

that ultimately aid exports and regulating informal trade. Study done by Bastola & Sapkota (2015) also suggests to focus on products having comparative and competitive advantage, increasing domestic productivity and promoting export. Similarly study of B. Pant & Panta (2009a) suggests to promote products having comparative advantage and diversify export trade to grab opportunities of WTO. Study of L. D. Adhikari (2023) claims Nepal should improve its negotiation strategy in WTO agreements to attract more trade and investment and develop interagency coordination. Similarly, Kafle (2007) suggests to improve institutional capacity of financial institutes to align with WTO standards. Nepal should focus on trade diversification and increasing FDI (Lohani, 2023). According to P. Kharel & Dahal (2021) Nepal should analyze possibility of transit alternatives to trade with third world countries. Studies done by Taneja & Bimal (2020), Taneja & Pohit (2007a) and Pohit (2018b) has suggested to check existing informal trade with India in order to grow formal trade under WTO.

6. CONCLUSION

The study was conducted to analyze the implication of WTO on trade of major food commodities of Nepal and to fulfill this board objective, improvements and challenges faced due to membership, effect of membership on trade dynamics, productivity and domestic trade policies of Nepal, changes in aspects of AoA after WTO, scenario of informal trade between Nepal and India, factors affecting decision of traders to involve in informal trade, factors affecting familiarity of traders with trade liberalization and policy recommendations to improve trade under WTO were examined by analyzing perception of major traders and key informants on above areas.

It was concluded most important improvement due to membership was increase in trade volume of Nepal followed by integration with global trading system, diversification of trade, trade being fairer and least important improvement was decreased tariff and non-tariff barriers. Similarly most important challenge faced due to membership was sharp increase in import than export followed by increased dependency with India, increased competitiveness, decreased domestic support and least important challenge faced was decreased export subsidy. Although majority of traders agreed on membership has improved trade of Nepal with very low degree of agreement (index of agreement = 0.02) but improvement in trade was only found in import trade not in export trade. Regarding trade dynamics after membership, sharp increase in import of food commodities was perceived by traders and most important reason for this increase was low domestic productivity followed by lack of import substitution policies. Similarly traders perceived stagnant or decreased export of food commodities after WTO and most important reason for this was found to be problem in transit for trading with third world countries followed by high trade cost. Majority of traders (87.3 percent) perceived agricultural productivity was stagnant or decreased after membership and major reason for this was high consumption of imported products followed by unfavorable production policies. Regarding effect of membership on domestic trade policies majority of traders (74.1 percent) claimed membership has affected domestic trade policies of Nepal but majority traders (79 percent) revealed domestic policies were not compatible with WTO. Although major efforts done by Nepal to make domestic policies compatible were encouraging FDI followed by strengthening supply side but majority of traders (91.4 percent) revealed efforts of Nepal were not sufficient. Most important recommendation to make policy compatible was found to be developing policies that promote products with comparative advantage followed by

improving transit facilities. Majority of traders (60.5 percent) believed Nepal is getting MFN treatment except majority of importers (53.8 percent) who believed Nepal is not getting such treatment in regards to tariff rate. Majority of traders of Nepal (65.9 percent) were not familiar about AoA of WTO except only exporters whose majority (51.7 percent) was familiar about it. Traders doing both import and export was major group (92.6 percent) experiencing increased market access after WTO followed by only importers (65.4 percent) and only exporters (42.9 percent). Majority of traders (63.4 percent) experienced increase in tariff, majority (65.9 percent) experienced decrease or no effect in domestic support, and majority (68.3 percent) experienced decrease or no effect in export subsidy.

Majority of traders were not involved in informal trade and among involved traders, maximum involvement was of importers. Across trader types, exporters were found to be mostly not affected by informal trade. Major reason for involving in informal trade was informal trade being cheaper followed by poor institutional channel in formal trade, lack of resources for formal trading and ignorance of trade rules. Major negative effect identified due to informal trade was unfair competition among traders followed by loss of government revenue, growth of informal sector and increased inequality. However all of the traders agreed on checking informal trade. Major suggestion to check informal trade was strengthening border security followed by making policies to make formal trade more attractive, improving institutional setup of formal channel and making formal trade more attractive.

Regarding factors affecting familiarity with trade liberalization age, education level, dummy variable of type of trader for both (with base category exporter) and business hampered by informal trade were found to have positive influence whereas the gender, years of experience, dummy variables of ethnicity for Madhesi, dalit and Janajati (with base category Brahmin/Chhetri) and dummy variables of location for Madesh and Koshi (with base category Bagmati) had a negative influence on familiarity with trade liberalization after WTO.

Similarly, among the variables affecting decision to involve in informal trade position of trader in the business, dummy variables of location for Madesh and Lumbini (with base category Bagmati) and familiarity of traders with trade liberalization had positive influence whereas educational qualification, dummy variable of type of trader for exporter (with base category importer) and business hampered by informal trade had negative influence on the decision of a trader to involve in informal trade.

7. RECOMMENDATIONS FOR FURTHER RESEARCH

This study finds out the following policy implications and research areas for promotion of trade of food commodities of Nepal under WTO regime.

7.1 Suggestions for concerned authority

- Development of policies that focus on increasing volume of domestic production.
- Ease the export of products having comparative advantage and produce them in tradable volume.
- Promotion of interagency coordination of institutions working in international trade and increase their institutional capacity.
- Build up negotiation capacity of Nepal for doing treaties and agreements.
- Promotion of diversification of trade in terms of product and trading partners.
- Rationalizing and streamlining agriculture subsidy.
- Studying for potentiality of transit alternatives for trading with third world countries.
- Replacement of export subsidies by domestic subsidies that ultimately aid exports.
- Regulation of informal trade between Nepal and India.

7.2 Suggestion for further research

- Perception of producers and consumers of Nepal on implication of WTO's membership of Nepal on their welfare.
- Value chain analysis of exported food commodities of Nepal in international market.
- Impact assessment of informal trade between Nepal and India.
- Factors affecting utilization of policy space provided to Nepal by WTO.
- Impact of Regional Trade Agreements on trade of food commodities of Nepal.
- Efficacy of export subsidy in promoting export of Nepal.
- Preparation of Nepal for LDC graduation in 2026 and its probable effects in trade of Nepal.

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APPENDICES

Appendix 1. Estimates from econometric models and test of data problems

1 a) Factors affecting familiarity of traders with trade liberalization after WTO

Logistic regression	Number of obs	=	95
	LR chi2(17)	=	97.80
	Prob > chi2	=	0.0000
Log likelihood = -14.608169	Pseudo R2	=	0.7700

familiarityLiberalization	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Age	.4573478	.2052993	2.23	0.026	.0549686	.8597269
dumMadhesi	-10.23709	4.130047	-2.48	0.013	-18.33184	-2.142351
dumDalits	-19.59717	8.344272	-2.35	0.019	-35.95164	-3.242699
dumJanajati	-9.17933	5.168853	-1.78	0.076	-19.3101	.9514357
dumLumbini	-3.842766	3.58737	-1.07	0.284	-10.87388	3.188349
dumMadhesh	-6.452881	3.315838	-1.95	0.052	-12.9518	.0460424
dumKoshi	-6.321681	3.816078	-1.66	0.098	-13.80106	1.157694
dumOwner	-2.708093	1.78922	-1.51	0.130	-6.2149	.798714
ExperienceConinuous	-.3581294	.2033623	-1.76	0.078	-.7567123	.0404534
Gender	-9.385763	5.597148	-1.68	0.094	-20.35597	1.584446
onlyAboveBach	5.653214	2.687682	2.10	0.035	.3854538	10.92098
dumImporter	2.435466	3.067533	0.79	0.427	-3.576789	8.44772
dumBoth	6.975722	4.189312	1.67	0.096	-1.235179	15.18662
dumProcessed	4.660408	3.323941	1.40	0.161	-1.854396	11.17521
dumRaw	2.299487	3.531419	0.65	0.515	-4.621967	9.220941
KnowMember	.3206244	1.75258	0.18	0.855	-3.114369	3.755618
InformalHampered	6.431099	3.338498	1.93	0.054	-.1122366	12.97443
_cons	1.514082	4.879873	0.31	0.756	-8.050293	11.07846

```
. mfx
```

Marginal effects after logit

```
y = Pr(familiarityLiberalization) (predict)
= .99758802
```

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	X
Age	.0011005	.00238	0.46	0.643	-.003556 .005757	35.2211
dumMad~i*	-.2989003	.21687	-1.38	0.168	-.723967 .126166	.494737
dumDal~s*	-.9991352	.00251	-397.57	0.000	-1.00406 -.99421	.052632
dumJan~i*	-.8892462	.27554	-3.23	0.001	-1.4293 -.349196	.115789
dumLum~i*	-.022262	.05684	-0.39	0.695	-.133674 .08915	.410526
dumMad~h*	-.4033433	.36655	-1.10	0.271	-1.12177 .315082	.126316
dumKoshi*	-.3760447	.45933	-0.82	0.413	-1.27631 .524217	.126316
dumOwner*	-.0090277	.01785	-0.51	0.613	-.044004 .025949	.484211
Exper~us	-.0008617	.00195	-0.44	0.659	-.004687 .002964	11.7158
Gender*	-.015553	.02601	-0.60	0.550	-.066523 .035417	.8
onlyAb~h*	.016877	.03721	0.45	0.650	-.056047 .089801	.347368
dumImp~r*	.0051096	.01153	0.44	0.658	-.01748 .027699	.347368
dumBoth*	.0213942	.03737	0.57	0.567	-.051856 .094644	.315789
dumPro~d*	.0085006	.01678	0.51	0.612	-.024381 .041383	.273684
dumRaw*	.0036882	.00987	0.37	0.709	-.015657 .023034	.231579
KnowMe~r*	.0008699	.00616	0.14	0.888	-.011209 .012949	.863158
Info~red*	.2048201	.21336	0.96	0.337	-.213356 .622996	.726316

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Goodness of fit of the model

```
number of observations =      95
number of covariate patterns =    95
Pearson chi2(77) =    30.40
Prob > chi2 =    1.0000
```

Test of multicollinearity among the independent variables

. vif

Variable	VIF	1/VIF
dumBoth	3.40	0.293807
dumImporter	3.35	0.298391
dumRaw	2.88	0.346774
dumProcessed	2.71	0.369588
Age	2.33	0.429723
Experienc~us	2.30	0.434712
dumLumbini	2.09	0.479354
dumMadhesi	1.78	0.562414
onlyAboveB~h	1.69	0.592013
dumMadhesh	1.67	0.600482
dumKoshi	1.59	0.629435
InformalHa~d	1.51	0.664411
dumOwner	1.50	0.666612
KnowMember	1.42	0.703976
dumJanajati	1.42	0.704470
dumDalits	1.33	0.750542
Gender	1.33	0.753158
Mean VIF	2.02	

1 b) Factors affecting decision of trader to involve in informal trade

```

Logistic regression
Number of obs      =      95
LR chi2(11)        =     67.16
Prob > chi2         =     0.0000
Pseudo R2          =     0.6386
Log likelihood = -19.003477

```

InformalInvolved	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
dumExpoert	-6.593155	2.433396	-2.71	0.007	-11.36252	-1.823787
dumBoth	-.6132027	1.240473	-0.49	0.621	-3.044485	1.81808
dumOwner	3.286705	1.237601	2.66	0.008	.8610522	5.712358
onlyAboveBach	-5.315275	2.163822	-2.46	0.014	-9.556289	-1.074261
InformalHampered	-2.10103	1.141391	-1.84	0.066	-4.338116	.1360564
dumMadhesh	6.396492	2.826022	2.26	0.024	.8575907	11.93539
dumKoshi	.8740577	2.495476	0.35	0.726	-4.016986	5.765101
dumLumbini	3.860863	2.318492	1.67	0.096	-.6832971	8.405023
familiarityLiberalization	1.531281	1.386264	1.10	0.269	-1.185746	4.248307
Age	-.0570851	.0677874	-0.84	0.400	-.1899459	.0757757
Gender	-.7400445	1.506111	-0.49	0.623	-3.691967	2.211878
_cons	-1.248286	3.469591	-0.36	0.719	-8.048558	5.551987

```
. mfx
```

```

Marginal effects after logit
y = Pr(InformalInvolved) (predict)
= .01041333

```

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]		X
dumExp~t*	-.0882656	.08295	-1.06	0.287	-.250851	.07432	.336842
dumBoth*	-.0057406	.0128	-0.45	0.654	-.030831	.01935	.315789
dumOwner*	.0538088	.05982	0.90	0.368	-.063437	.171055	.473684
onlyAb~h*	-.0621845	.0637	-0.98	0.329	-.187036	.062667	.347368
Info~red*	-.0370348	.04786	-0.77	0.439	-.130832	.056762	.684211
dumMad~h*	.7330824	.29933	2.45	0.014	.146411	1.31975	.126316
dumKoshi*	.0127495	.04592	0.28	0.781	-.077255	.102754	.126316
dumLum~i*	.0907821	.09922	0.91	0.360	-.103692	.285256	.410526
famili~n*	.0146322	.01888	0.77	0.438	-.022375	.051639	.610526
Age	-.0005883	.00105	-0.56	0.575	-.002643	.001466	35.2211
Gender*	-.0096732	.02822	-0.34	0.732	-.064982	.045635	.8

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Goodness of fit of the model

```

number of observations =      95
number of covariate patterns =    92
Pearson chi2(80) =    79.06
Prob > chi2 =    0.5086

```

Test of multicollinearity among independent variables

. vif

Variable	VIF	1/VIF
dumLumbini	1.82	0.550467
dumExpoert	1.71	0.584161
dumBoth	1.71	0.586328
familiarit~n	1.63	0.612780
onlyAboveB~h	1.61	0.622696
dumMadhesh	1.50	0.666598
dumKoshi	1.39	0.721188
Gender	1.28	0.780614
InformalHa~d	1.25	0.801300
dumOwner	1.19	0.838689
Age	1.12	0.890964
Mean VIF	1.47	

Appendix 2. Questionnaire for major traders of Nepal

WTO and its Implication in Trade of Major Food Commodities of Nepal**Introduction and Consent:**

Dear sir / madam,

Namaskar, I amand pleased to meet you with a noble objective of collecting real data and information on trade required for my research entitled WTO and its Implication in Trade of Major Food Commodities of Nepal. Your support will be highly appreciated and whatever data and information you provide will be kept confidential.

Name of the Trader:

Date:

Address:

Gender:

Ethnicity:

Age:

Contact Cell Phone Number:

Name of business/ organization:

Position/title in the business:

Years of experience in trade:

Educational Qualification:

1. What are the major food commodities that you export annually?

S.N	Commodities
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

2. What are the major food commodities you import annually?

S.N	Commodities
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

3. Do you know Nepal is a member of World Trade Organization (WTO)?

- a. Yes (GO TO QUESTION 4) b. No (GO TO QUESTION 20)

4. If yes, how familiar are you with the trade liberalization and agreements of the WTO?

- a. Very familiar b. Somewhat familiar c. Not familiar at all

5. How much do you agree with this statement "WTO membership has improved the trade of food commodities of Nepal"?

- a. Strongly agree b. Agree c. Neutral
d. Disagree e. Strongly disagree

6. What improvements have you perceived due to the membership?(Forced Ranking)

Rank	Improvements
	Integration with global trading system
	Increase in trade volume
	Made trade fairer
	Decreased tariff and non-tariff barriers
	Diversified trade

7. What negative impacts have you perceived due to the membership? (Forced Ranking)

Rank	Negative Impacts
	Increased competitiveness
	Sharp increase in import than export
	Increased dependency with India
	Decreased domestic support
	Decreased export subsidy

8. What are the changes in trade volume after accession to WTO? (Tick the response)

Import		Export	
Increase		Increase	
Decrease		Decrease	
Stagnant		Stagnant	

9. What may be reasons for sharp increase in agricultural imports after membership? (Forced Ranking)

Rank	Reasons for increase in import
	Increased remittances
	Low domestic productivity
	Market liberalization
	Tariff reduction and removal of quotas
	Lack of policies of import substitution

10. What may be the reasons for stagnant/decrease in agricultural exports after membership? (Forced Ranking)

Rank	Reasons for stagnant export
	High trade costs
	Not meeting global quality standards
	Problem in transit for third world countries
	Ineffective export promoting policies
	Poor trade diversification

11. How familiar are you with the Agreement on Agriculture (AoA) of the WTO?

- a. Very familiar b. somewhat familiar c. Not familiar at all

12. How have you experienced the impacts of membership on following aspects?

Aspects under AoA	Impacts		
	Increase	Neutral	Decrease
Market access			
Tariff			
Domestic support			
Export Subsidy			

13. Have you observed any changes in the production and productivity of major food crops in Nepal following its WTO membership?

- a. Increased b. Decreased c. No effect

If increased , reasons for increase	If decreased , reasons for decrease
Membership of WTO	High consumption of imported product
Availability of new hybrid seeds	Increased competition
Adoption of new technology	Decreased domestic support
Increased export market for products	Decreased export subsidy
Favorable policies for production	Unfavorable policies for production

21. Are you involved in informal trade with India?

a. Yes

b. No

22. If yes, what are your reasons to get involved in informal trade? (Multiple Choice)

a. It is cheaper

b. It is faster as have fewer steps

c. Ignorance of trade rules

d. Poor institutional setup in formal channel

e. Lack of resources for formal trading

23. If no, does informal trade with India has hampered your business?

a. Yes

b. No

24. What are the effects due to informal trade with India? (Multiple Choice)

Positive effects	Negative effects
Lower transaction cost	Increased inequality and rural poverty
Access to goods that otherwise would be difficult	Loss of government revenue
Increased employment	Growth of informal sector
	Unfair competition among traders

25. How much do you agree with the statement "Informal trade should be checked"?

a. Strongly agree

b. Agree

c. Neutral

d. Disagree

e. Strongly disagree

26. What can be done to check the existing informal trade? (Multiple Choice)

a. Decrease transaction cost of formal traders

b. Improve institutional setup of formal channel

c. Strengthen border security

d. Make policies to make formal trade more attractive

e. Others

27. In your experience what are the existing major trade barriers faced by large scale food commodity traders in Nepal? (Forced Ranking)

Rank	Barriers
	Poor transit facilities with third world countries through India
	Bureaucratic hurdles of Nepal for formal trade
	High trade cost
	High tariff and non-tariff barriers
	Lack of standardization and quality control

28. How have these trade barriers affected your trade flows and patterns?

- a. No significant impact
- b. slightly decreased trade flows
- c. moderately decreased trade flows
- d. significantly decreased trade flows

29. What recommendations do you suggest for removing trade barriers and enhancing food trade under WTO membership? (Forced Ranking)

Rank	Recommendations
	Strengthen transit alternatives
	Facilitate smooth institutional channel for formal trade
	Decrease tariff and non-tariff barriers
	Enhance standardization and quality control
	Decrease trade cost

Appendix 3. Checklist of Key Informant Interview

Checklist of Key Informant Interview

WTO and its Implication in Trade of Major Food Commodities of Nepal

Section I. Preliminary Information		
Name of Key Informant		Position in organization
Date:		Years of experience
Location		Contact Number
Respondent's organization		Educational Qualification

1. How do you perceive the impact of WTO membership (before and after) on the country's trade regime in regards to food commodities?
2. Can you provide insights on how trade policies of Nepal have changed before and after accession to WTO (How are current trade policies)?
3. What do you think about the compatibility of bilateral (Nepal, India, China etc) and multilateral trade policies of Nepal after accession to WTO?
4. Could you discuss any efforts or initiatives that Nepal has taken to align its trade policies with the rules and regulations of the WTO?

5. What, in your opinion, are the key factors (both positive and negative) that have affected the trade policies of Nepal?

6. Lastly, what suggestions do you have for overcoming the identified factors affecting trade policies and what policy recommendations do you have to enhance the alignment of Nepal's trade policies with the principles of the WTO?

Appendix 4. Garrett Table

GARRETT RANKING CONVERSION TABLE					
The conversion of orders of merits into units of amount of "soces"					
Percent	Score	Percent	Score	Percent	Score
0.09	99	22.32	65	83.31	31
0.20	98	23.88	64	84.56	30
0.32	97	25.48	63	85.75	29
0.45	96	27.15	62	86.89	28
0.61	95	28.86	61	87.96	27
0.78	94	30.61	60	88.97	26
0.97	93	32.42	59	89.94	25
1.18	92	34.25	58	90.83	24
1.42	91	36.15	57	91.67	23
1.68	90	38.06	56	92.45	22
1.96	89	40.01	55	93.19	21
2.28	88	41.97	54	93.86	20
2.69	87	43.97	53	94.49	19
3.01	86	45.97	52	95.08	18
3.43	85	47.98	51	95.62	17
3.89	84	50.00	50	96.11	16
4.38	83	52.02	49	96.57	15
4.92	82	54.03	48	96.99	14
5.51	81	56.03	47	97.37	13
6.14	80	58.03	46	97.72	12
6.81	79	59.99	45	98.04	11
7.55	78	61.94	44	98.32	10
8.33	77	63.85	43	98.58	9
9.17	76	65.75	42	98.82	8
10.06	75	67.48	41	99.03	7
11.03	74	69.39	40	99.22	6
12.04	73	71.14	39	99.39	5
13.11	72	72.85	38	99.55	4
14.25	71	74.52	37	99.68	3
15.44	70	76.12	36	99.80	2
16.69	69	77.68	35	99.91	1
18.01	68	79.17	34	100.00	0
19.39	67	80.61	33		
20.93	66	81.99	32		

Appendix 5. Some glimpses of survey and KII









