How Tariff Reduction Impact Global Economy- A CGE Analysis of Wood Economy of Pakistan

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Demand for wood is increasing with the rapid population growth in Pakistan. To cater for this rise in demand, Pakistan Government has decreased import duty on wood and products of wood in the country from 16 to 11 percent in finance bill of 2017.With this backdrop, this research quantifies the impact of reduced tariff duty of wood at household level and economy wide by applying Commutable General Equilibrium model. MyGTAP model is standardized by applying GTAP Data base and latest available Social Accounting Matrix of Pakistan. This updated economic trade model is tailor made model for these types of analysis. The result shows an increase in wood imports by US$ 41million. There is a positive impact on Real GDP, household income, but Pakistan government income will decrease by 0.08 percent due to reduction in tariff. Household analysis revealed that rural small farmers and non-farm workers' timber demand in Pakistan will escalate by 10 percent in relations to other communities. Policy makers and planners can best utilize these results in planning and implementation process for improving effectiveness of policies .

Keywords: wood, GTAP, Pakistan, import duty, Policy
GEL classification: F11, Q23, Q17, Q28

Forest cover of Pakistan is 5.01 percent (GoP, 2019) restraining the supply of wood as per global average of 30percent (Ahmed & Mahmood, 1998). Sustainable and environmentally stable economic growth depends upon forest cover of 25 percent. Forest contribute 0.45 percent in GDP of Pakistan. Consumer demand of wood is estimated as 44 million cubic meters while our forest supply

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Contribution of Authors
1. Conceived and designed the work further working on interpreting the results and drafting as an article
2. Data management, and critical evaluation of the work
3. Data interpreted, further critically evaluated the article as well as final approval to be published

is 14.4 million cubic meter per annum in the country, GoP (2019) indicating the gap in supply and demand. Geometric population growth is indicating rising demand of wood in housing and household level. (Ahmed & Mahmood, 1998; Chapagain, Pyakuryal, & Pokharel, 1998).Wood tariff in Pakistan is linked with Integrated Tariff of United Kingdom (UK).Harmonized System code for wood products (four digit) is 4401 to 4421 under chapter 44 of UK tariff classification (GOV.UK, 2018).

Deforestation and climate change are interlinked instigating about one fifth of human emissions and are mainly linked with farming and logging (Plumer, 2012). In Tropical region, major wood producing countries have 50-90 percent of illegal lodging against total volume of forest in the country (Nellemann, 2012). Afghan-Pakistan Transit Trade Agreement (APTTA) is also causing illicit dumping of wood and adversely affecting domestic market of Pakistan. A huge volume of imported wood supply is available in the country(Zaman & Ahmad, 2011).

On 24th April, 2017, US president Trump announced surge in duty on Canadian Lumber which intensify trade fight between Canada and US (Epstein & Light, 2017). As a next move in June 2017, an additional tariff was announced by US on Canadian Lumber (Skerritt, 2017).

Pakistan has publicly declared decrease in import duty of lumber wood for encouraging wood retailer and importers organization to promote import of wood in Pakistan for increasing competitiveness of imported wood in local market (GoP, 2017a). This decrease in tariff was announced by the Federal Minister during his budget speech in National Assembly of Pakistan on May, 26 2017which can affect the domestic market and local consumers generally. There is evidence that tariff liberalization is a panacea for higher economic growth especially in developing countries (Winters, McCulloch and Mckay, 2004). However, literature is not clear about the impact analysis of liberalization of trade on distribution of income and poverty. Pakistan actively participates in many regional trade agreements, but it still follows somewhat restrictive trade policies compared to its regional counterpart economies like China, India, Sri Lanka and Bangladesh (Khan et al., 2018). Khan et al., (2018) concluded that Pakistan Malaysia Free Trade Agreement can improve the outcome for Pakistan if Pakistan renegotiates the current FTA and gets the similar concession as presented to its competitor. This study is planned to explore the impact of government policies specifically on microeconomic and macroeconomic variables of Pakistan and generally on world. CGE modeling approach is used in this paper by incorporating the latest SAM available of Pakistan 2010-11 and disaggregating the regional household into 16 different households to identify the effect of policy changes on different households.

Paper is organized by discussing wood economy of Pakistan after this brief introduction, which encompasses production, trade, policies, tariff and taxes. Methodology part covers CGE modeling, data base, variables and solution methods. Results are presented in part 4 along with discussion on results. Conclusion and recommendations are presented at the end.

Wood Economy and Pakistan
Fuel wood and other products of wood are utilized for material support and fuel substitution globally (Sikkema, Junginger, McFarlane, & Faaij, 2013). Forest and forest-based industries are source of employment for five lacs people alongside a forage source for ninety million livestock of Pakistan (GoP 2019).

Production of forest products

Primary uses of forest products are provision of fire/fuel wood for rural community, timber for construction industry and vegetation cover for livestock and covering for fragile mountains of the country. Forests in Pakistan are comprised of state owned, communal and privately owned(Zaman & Ahmad, 2011).On demand side, wholesale indices of fire wood increased from 272.97 to 282.43 during 2017-18(GoP, 2019). Fuel wood of non-coniferous trees is dominating local market having domestic market share of 75.54 percent. On supply side, wood production of non-coniferous trees in Pakistan is estimated as 28 million cubic meters (Table 1).

Table 1

Products of forest in Pakistan 2016

Sr #	Item	Unit	Production	%age
1	Production of fuel wood of coniferous	m3	1,133,349	3.01
2	Production of fuel wood of non-coniferous	m3	28,400,000	75.54
3	Sawlogs and veneer logs of coniferous	m3	390,000	1.04
4	Sawlogs and veneer logs of non-coniferous	m3	1,633,000	4.34
5	Production of industry related round wood of non-coniferous	m3	826,000	2.20
6	Production of sawn wood of coniferous	m3	462,000	1.23
7	Production of sawn wood of all non-coniferous	m3	919,000	2.44
8	Production of other paper and paperboard products	Ton	662,000	1.76
9	Packaging and wrapping paper and paperboard	Ton	463,000	1.23

Source: FAOSTAT 2016

Wood trade of Pakistan (Import/export)

A foremost contribution of production of wood in Pakistan is its use as fuel in rural communities of local adaptive forest species. Industrial wood of coniferous species is imported from different global destinations as per price and demand. Industrial wood import of species of coniferous is 57.73000m^{3}in 2015-16worth US $ 3.52million. During 2018-19, Pakistan imported wood worth of US$ 216 million (Table 2), so wood import increase significantly after decrease in wood tariff in 2017-18.

Table 2*Different types wood traded in Pakistan (2018-19) million US$*

Items	HS code	Import	Export
Wood sawn or wood chipped	4407	104.814	0
Wood fiberboard	4411	41.850	31.168
Rough wood	4403	39.301	0
Plywood, veneered panel and laminated wood	4412	6.815	2.023
Other wood types		23.614	3.003
Total		216.394	36.94

Source: TradeMap

China is major exporter of wood to Pakistan and constitutes about 25 percent of total value of Pakistan's wood import (Fig.1) following Malaysia, US, EU, Thailand and Canada 14.9percent,14.17percent,13.54percent, 8.26percent and 7.96percent, respectively.

Fig 1: List of countries Sourcing wood to Pakistan
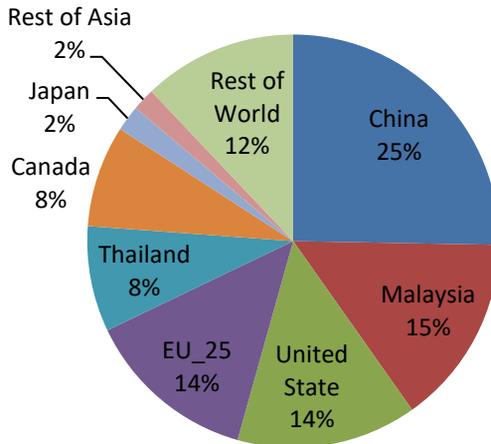
Source: Trade Map

Forest and Trade Policies of Pakistan

Forestry is the provincial subject according to constitution of Pakistan 1973. National Climate Change policy 2012 was framed to conserve national resources and their long-term sustainability. It also emphasis on forest mitigation and adaptation measures(GoP, 2012b). Policy objective of 1[st]approved National Forest Policy 2015 were promoting sustainable management and use of forest produce, mass afforestation through horizontal expansion and its maintenance, facilitating and harmonizing inter-provincial trade, import and export of wood and non-wood products, interlinking and decreasing fragmentation, reducing carbon emissions and fulfilling international obligations (GoP, 2015a). The article 151 of the constitution and Federal Legislative list (Part-I (27)) allows Federal Government to control trade of wood(GoP, 2012a). National Forest Policy 2015, emphasis while curbing deforestation and promoting conservation discuss partly (policy measure iii) import and export of wood as responsibility of Federal Forestry Board (GoP, 2015a).

Trade policy of Pakistan focused on global trade responsibilities of WTO to enhance competitiveness in the global markets. FTAs, trade agreements and regional integration is reforming domestic trade policies of less developed countries. Strategic Trade policy Framework 2015-18 mainly focus on promoting exports of the country through competitiveness, compliance of standards and creating policy environment(GoP, 2015b). Domestic trade policy is focused on exploring strength and weaknesses of emerging markets for conventional and advanced products. These market-based policy interventions will support in promotion of Pakistan's products in global markets.

Pakistan's tariff on wood products

Wood and wood products are imported from various global market in Pakistan. The tariff structure of Pakistan for import of wood depends upon its regional and bilateral trade agreements with different countries. The highest tariff on wood was observed on Japan comprising of 31.49 percent, followed Saudi Arabia and south Korea (Annex-1). Lowest tariff countries include Brunei, Iran Peru and Egypt.

Global tax collection and wood share

Contribution of wood products in global tax collection is also envisaged alongside its ecological and environmental support. Share of wood products in international tax collection is assessed as US$ 9.6 billion. EU is sharing dominant portion of taxes around US$ 5.38 billion (56percent) followed by US$ 1.7 billion (17percent) from United States.

Method

Changes in tariff in any sector has the economy wide impact due to its forward and backward linkages across different sectors. These cross sectoral linkages in any economy due to tariff liberalization can be studied in general equilibrium framework. The CGE model applied in present study is a tailor-made tool for these types of Trade policy analysis.

CGE Model

CGE models are part of economic models which apply actual economic data for estimation of response of any economy to changes in policy issues and macro-economic factors. CGE models are multiple sectors and regions framework of modeling which are modified with a recently developed MyGTAP model (Walmsley & Minor, 2013), as an improved part of standard GTAP model (Hertel, 1997). This standard model apprehend the internal relations of various sectors, factors, prices and related markets (Minor & Mureverwi, 2013). The database is calibrated on individual country input-output tables and other International data sources like Agricultural Data (FAO, OECD), macroeconomic data (WDI,IMF), Merchandise trade (COMTRADE), Tariffs (ITC), Agri Support subsidies (WTO) and services trade data (IMF). GTAP integrate all these data sets in a globally consistent framework which is ready to be used for international policy issues. The standard GTAP model represent a single country as regional representative household, while in MyGTAP model, we incorporate numerous households and factors which support to describe comprehensive links among different households and their earning and spending in the economy (Khan, 2015; Shutes & Kuiper, 2015; Iqbal, Anwar, Khan, & Husnain, 2018;Khan, Zada & Mukhopadhyay 2018; Malik et al., 2018; Khan, 2018;Khan et al., 2019; Khan et al., 2020).

The segregated household's number with different level of earnings and factor input enhances the model's capability to estimate effect of a change in policy of the country on the household's welfare. The household spending in the model is segmented into three classes; the personal spending, public spending and saving. In GTAP model, regional household having factors of production involved in production process i.e. land, labor, capital and entrepreneurship, earn his income through supplying these factor endowments to the firms/ farms, to harvest intermediate goods for satisfaction of demand of households and government. Investment is derived from regional savings aggregated from private households and government savings. This model has additional

components of regional transfers which are derived from remittances, foreign earning, grants and aids.

Many research studies used this model for analysis of policy changes in relation to trade policy analysis, climate change and mitigation strategies, migration and immigration, poverty and income distribution and recently in energy policy analysis. MyGTAP model is used by Khan (2019) in Nepal, Malik (2019); Khan et al.,(2018), Malik et al.,(2018)and Khan et al.,(2018)for Pakistan, etc. This model delivers the suitable framework and database to analyze trade policy of country.

Database and Aggregations

This study is based on two inclusive data sets, GTAP Database version 9a(Aguiar, Narayanan, & McDougall, 2016) and supplementary data set from Social Accounting Matrix (SAM) of Pakistan for 2010-11, developed by IFPRI(International Food Policy Research Institute). The data set of SAM of Pakistan for the year 2010-11 is merged in the standard GTAP model to expand the model data. GTAP database 9a used different reference years like 2004, 2007 and 2011 while in MyGTAP 2011 is used as base year. The GTAP model comprised of 140 regions/countries which are either individual country or combined region. These regions were aggregated into 30 regions. Individual regions were 26 remaining are aggregated regions. In GTAP model, 57 sectors of economy are aggregated into 40 sectors to simplify computations and derivation of cross sectoral linkages.

The SAM 2010-11 of Pakistan includes 16 classes of household (Annex 2) and are segregated into rural and urban classes (IFPRI 2016). Rural households in the MyGTAP model are comprised of 12categories of household classes; based on land holding and non-farm business activities, ownership of land. These are, six from farming communities, two farm workers and four non-farm workers(Iqbal et al., 2018). The subsistence holding in Pakistan is 12.5 acres. Small farmers farm holding is below 12.5 acre and medium farmer have holding size between 12.5-25acre of agriculture land. The remaining rural classes are engaged in farming activities as tenant or casual labor without land ownership. The urban households covered under four categories(Debowicz et al., 2012).Pakistani Households were divided into four quartiles in MyGTAP model, Quartile 1 cover Punjab and 2,3 and 4 encompassed Sind, KPK and Baluchistan province respectively. The rural and urban household types were segregated on the basis of their population and respective income (Anex-2).

Factor Aggregation

Factors of production in economics are of four major types. These factors of production (FP)in the SAM 2010-11 have been segregated into 12 classes; from which three belongs to labor working on farm, two from labor involved in non-farm activities, three from agricultural land, one to livestock and three from capital involved in agriculture activities(Anex-3).

Regional Aggregation

In GTAP database version 9a, whole world is divided into 140 regions. In this study, these regions were aggregated into thirty keeping in view Pakistan's wood import from different destinations. Regional aggregation list include Islamic Republic of Pakistan, India, Peoples Republic of China, Turkey, Thailand, Malaysia, Sri Lanka, UAE, Saudi Arab, Indonesia, Australia, Bangladesh, Iran, Canada, Korea, New Zealand, United States, Vietnam, Brazil, Peru, Singapore, Brunei, Japan, Chile, Mexico, Egypt and regions of EU-25, Rest of South Asian, Asia and globe.

Sectoral aggregation

An economy is comprised of different sectors. These sectors were segregated into 57 commodities in GTAP database 9 for ease of analysis. In this study, these commodities were aggregated into 40 (forty) sectors.

Variables of the study

Government policy change of reduction in tariff of wood may change economic variables. Study of effect of this policy change on different sectors will help analyst to illustrate logical inferences and policy implications. Various sectors affected by policy change were government earnings, GDP quantity index, terms of trade, cumulative export and import of wood, wood merchandise export and import volume, productivity of capital assets, market price of composite import of wood and demand of household.

MyGTAP Model Closure:

The GTAP standard model closures are worked out as basic point in GTAP model by assuming zero economic profit i.e. presence of perfect competition in various sectors of economy. Mobile factors in an economy were capital and labour among all sectors except for Land and natural resources. Government expenditure is considered as a constant contribution of public earnings with no additional tax. Therefore, expansion in government tariff will occur due to reduction in tariff. Foreign income movements are supposed to alter with change in prices of factors where they are placed. Also, the investment is determined by predictable rate of return, the sum of local savings of household and public budget deficit.

Results and Discussion

Decrease in tariff of wood might have impacts on Pakistan's economy. Some of the variables of the economy displays positive growths while other specify negative developments. These variables are examined for cumulative effect of change in duty.

Policy change and Macroeconomic variables`

When government policy changes, it impacts are directly observed on macroeconomic variables of that economy. The macroeconomic variables are GDP, tot, Pakistan's aggregates wood export and import, volume of merchandise exports and imports of wood and productivity of capital assets. The public priority is focused on improving revenue of the economy. So, decrease in import duty means lowering revenue of the regional household. The public earnings, tot and productivity of capital assets has shown negative trend while remaining variables revealed improvement. Total import of wood in Pakistan has improved by 15.62 percent due to this policy change. The merchandise imports also showed positive trend and improved by 0.04 percent on the basis of volume(Table 3).

Table 3

Policy change and macroeconomic variables

Variable description	Unit	Value
Public earnings	%	-0.08
Pakistan's aggregates wood export	%	0.61
Pakistan's aggregates wood import	%	15.62
Vol. of merchandise wood exports	%	0.12
Vol. of merchandise wood imports	%	0.04
Domestic market price of composite wood import	%	-5.00
Terms of trade	%	-0.02

Source: Authors own simulations

Aggregate export of wood also improved due to improving supply of wood in Pakistan. The improvement in export quantity of wood is 0.61 percent and wood merchandise export volume improved by 0.12 percent. This little improvement in export of wood is due to five percent decrease in price of commodities of Pakistan in global market (Table 3).

Market price of wood is estimated by demand and supply of wood in the domestic market (Ndoye, Pérez, & Eyebe, 1997). When supply improved, price show downward trend. The market price of wood has declined by five percent (Table 3) thus impacting consumer welfare. This decrease in duty resulted in increased import of wood products and in return improved supply of wood and lower the domestic market price in Pakistan.

GDP Quantity Index

The GDP is monetary value of all final goods and an indicator of production of goods and services, surplus or deficit of which may result in trade of different commodities in a country. The GDP of the country has also an effect on trade of wood in an economy(Limaei, Heybatian, Vaezin, & Torkman, 2011) and increase in domestic production (Malik et. al., 2018). A tiny change in GDP quantity index was noticed due to alteration of tariff of wood in Pakistan (Table 4). The GDP of Pakistan was US$ 213,686.2million (base year 2011) in pre-simulation time period which improved to US$ 213,691.8 million due to decrease in wood tariff. The results of GDP quantity index due to policy shift are modest because we unilaterally decreased the tariff of wood i.e. only Pakistan decreased the tariff of wood on rest of the world. Due to small share in trade of wood in global market, this policy shift would not impact significantly on international demand and supply of wood and allied industries. This small change in wood tariff would impact global supply chain as envisaged by the results of exports and imports changes.

Table 4

Global GDP Quantity Index

	Countries	% variation	Pre-simulation period	Post-simulation period	Absolute change
1	Pakistan	0.00262	213,686.2	213,691.8	5.5937
2	China	-0.000005	7,321,874.0	7,321,873.0	-0.5000
3	India	-0.000009	1,880,101.0	1,880,100.0	-0.1250
4	Turkey	0.000005	774,754.4	774,754.4	0.0625
5	UAE	0.000007	348,595.4	348,595.5	0.0312
6	Bangladesh	0.000067	111,905.7	111,905.8	0.0781
7	Thailand	0.000019	345,669.8	345,669.8	0.0625
8	Malaysia	0.000037	289,259.5	289,259.6	0.0937
9	Sri Lanka	-0.000045	59,178.04	59,178.01	-0.0273

Source: Authors own simulations

As discussed above, there is modest but a positive increase in real GDP of Pakistan. This positive increase revealed was worth US$ 5.59 million in Pakistan's real GDP. This might be caused by compensation of local demand of wood through import.

Policy change and aggregate import of wood in Pakistan

The policy change was implemented for the promotion of import of wood in the country. The total import bill of wood has increased up to 17 percent due to lowering the import tariff by Government of Pakistan during2017. In US economy, it was found that tariff has small but significant effect in both exports and imports (Zhang & Nguyen, 2018).The imports were US$ 271 million in the base year 2011, which enhanced to US$ 316 million. The absolute addition was US$ 45 million. This increased load on current account deficit which is already uncontrollable for the developing economy of Pakistan.

Policy Change and Household Income

The income of household earned from wood, net of depreciation, declined up to 0.02 percent in Pakistan. Main decline of 0.02 percent was observed in rural non farming communities in Punjab, KPK, Baluchistan and Sindh province. Likewise, urban household earnings will also be declined. The earnings of rural small farmer's household in Punjab, Sindh, KPK and Baluchistan improved by 0.01 percent. The main improvement in wages was observed in rural managers in Punjab up to 0.02 percent tailed by Sind, Baluchistan and KPK by 0.01 percent.

The cumulative earnings of different households have increasing trend. Main improvement was observed in Punjab in rural medium farmers by 0.04 percent. This trend was continued by 0.03 percent in rural small farming communities and in rural landless farming communities by 0.02 percent in Punjab.

Pattern of per capita income of household revealed that per-capita earning of medium class rural household showed better improvement (0.04 percent) in relation to remaining households.

Policy change and Consumer Welfare (Equivalent Variation changes)

Equivalent Variation (EV) is the mostly used instrument for analysis of welfare effect of trade liberalization. EV can be decomposed into different types including 'allocative efficiency', 'tot' and 'changes in capital assets'. Allocative efficiency' indicates an optimum local production which characterizes the consumer preferences and choices. Similarly, allocative efficiency may also be defined in terms of marginality concept as'the marginal costs (MC) of production equal to the marginal utility of the output'. Increases in the tot also leads to growth in inclusive welfare due to availing better export prices in response to payments for imports. Capital stock also shown improvement due to trade liberalization that in turn increase the local productive capacity and also inclusive welfare.

Results demonstrated in Table 5 showed that Pakistan's welfare will decrease by 7 million US dollars. Though there is an increase in the allocative efficiency by US$ 5.4 Million but there is decrease in the terms of trade by US$ 6.83 million and investment-saving driven tot will decrease by 6.42 percent. Thus, there is a decrease in overall welfare in case of Pakistan. The welfare gain in china will be US$ 2.9 million followed by EU-25, Malaysia, US and Thailand with equivalent variation of US$ 2.13, 1.4, 1.39 and1.18 million respectively.

Table 5

Equivalent variation in income of various regions (US million $)

Country	Equivalent variation (Million US $)	Country	Equivalent variation (Million US $)	Country	Equivalent variation (Million US $)
Pakistan	-7.03698	Indonesia	0.045507	Singapore	-0.02775
China	2.901201	Australia	-0.05389	Brunei	0.00119
India	-0.63146	Korea	0.37017	Japan	0.417049
Turkey	0.083756	New Zealand	0.065074	chile	0.025043
Thailand	1.185016	United States	1.392175	RSA sian	0.62298
Malaysia	1.404379	Vietnam	-0.19904	Restof Asia	0.002821
Sri Lanka	-0.09735	Brazil	0.03155	Mexico	0.229106
UAE	0.515249	Peru	0.009192	Egypt	-0.02275
KSA	0.545138	Iran	0.190816	EU_25	2.131399
Bangladesh	0.109587	Canada	-0.17168	RestofWorld	2.104703

Source: Authors own simulations

Conclusion

Pakistan Government has decreased tariff on wood import from 16percent to 11percent on wood importer's demand. This research is designed to study the impact of this reduction in import tariff on macro economy along with the level of house hold in Pakistan by applying a global CGE model. The model was standardized with SAM of Pakistan. Results of a unilateral duty reduction on wood in Pakistan has both positive and negative effects on different sectors of the country due to cross sectoral linkages. Government income, market price of wood in Pakistan, tot and earnings of capital has revealed declining pattern. Aggregate imports and exports of wood increased along with volume of merchandised imports and exports. The Real GDP of Pakistan has also been slightly increased. Aggregate import and local demand of wood by various communities has been improved

due to reduction is market price. The capital is an important factor of production and the return to capital investment in wood sector has declined by 0.01 percent. The return to capital ratio in agriculture sector has been badly damaged at 0.27 percent indicating that it is major looser as compared to all other sectors. Likewise, reliance on import enhanced besides environmental benefits.

Recommendation/ Policy Implications

Based on conclusion of the study, it is recommended that such duty reductions are not justified in the large interest of poor to middle class population that constitutes major part of the country and if such policy is inevitable then proper compensation to losers may be provided. Being forest/wood deficient country, such duty reductions may discourage tree planting on private lands by the people as reduced tariff lead to decreased domestic wood price, while imported wood is available at less price. This trend will not help benefit countries environment. Furthermore, mechanism may be planned to analyze the impact of these policy changes by the research & development institutions prior to the execution of such policies.

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Annex-1

Pakistan's Tariff structure on wood

Country	AVE[1] %	Country	AVE %	Country	AVE %
Pakistan	0.00	Indonesia	18.49	Singapore	15.93
China	18.28	Australia	21.26	Brunei	0
India	8.49	Korea	24.25	Japan	31.49
Turkey	22.18	New Zealand	7.23	Chile	0
Thailand	21.91	United State	11.48	RS Asian	14.23
Malaysia	18.3	Vietnam	7.29	Rest of Asia	10.91
Sri Lanka	6.43	Brazil	19.69	Mexico	0
UAE	21.38	Peru	0	Egypt	0
Saudi Arabia	24.95	Iran	0	EU_25	8.68
10 Bangladesh	14.2	Canada	0.79	Rest of World	2.38

Source: GTAP database version 9a (Base year 2011)

Annex-2

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[1] Ad Valorem Tariff. Tariff imposed by Pakistan to Rest of the World.

Rural and Urban Household Classes as per SAM 2010-11

No	Household Types	HHD Code	Population (million)	Income (Rs. billion)
1	Rural farm worker (quartile 1)	hhd-rw1	6,333	238.934
2	Rural farm worker (quartile 234)	hhd-rw234	8,305	722.218
3	Rural small farmer (quartile 1)	hhd-rs1	4,193	275.632
4	Rural small farmer (quartile 234)	hhd-rs234	15,565	2,232.853
5	Rural medium+ farmer (quartile 1)	hhd-rm1	208	14.132
6	Rural medium+ farmer (quartile 234)	hhd-rm234	2,914	853.368
7	Rural landless farmer (quartile 1)	hhd-rl1	3,348	194.388
8	Rural landless farmer (quartile 234)	hhd-rl234	7,292	947.845
9	Rural non-farm (quartile 1)	hhd-rn1	12,595	481.570
10	Rural non-farm (quartile 2)	hhd-rn2	10,888	645.376
11	Rural non-farm (quartile 3)	hhd-rn3	9,088	849.502
12	Rural non-farm (quartile 4)	hhd-rn4	6,316	1388.453
13	Urban (quartile 1)	hhd-u1	5,930	271.756
14	Urban (quartile 2)	hhd-u2	8,820	657.425
15	Urban (quartile 3)	hhd-u3	11,506	1,366.653
16	Urban (quartile 4)	hhd-u4	17,080	6,979.068
All households total			130,381	18,119.000

Source: Pakistan SAM 2010-11(IFPRI, 2016), HIES-2010-11. HHD= household

Annex-3

Types of Factors of production in SAM 2010-11

No	Factor Code	Factor Types	No	Factor Code	Factor Types
1	Flab-S	Labor - small farmer	7	Flnd-M	Land – medium
2	Flab-M	Labor - medium+ farmer	8	Flnd-S	Land – small
3	Flab-W	Labor - farm worker	9	Fliv	Livestock
4	Flab-L	Labor - non-farm low skilled	10	Fcap-A	Capital – agriculture
5	Flab-H	Labor - non-farm high skilled	11	Fcap-F	Capital – formal
6	Flnd-L	Land – large	12	Fcap-I	Capital – informal

Source: Pakistan SAM 2010-11 (IFPRI, 2016). HIES 2010-11