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Reporting on Response Measures under Biennial Update Reporting – Case Study on Chile

ERCST Methodology Development

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Background on response measures

- In UNFCCC negotiations the issue of impacts of climate change mitigation measures is known as response measures.
 - The Kyoto Protocol in Article 2.3 states that Annex I parties *“shall strive to implement policies and measures (...) in such a way as to minimize (...) effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties.”*

Background on response measures

- Understanding these concerns is fundamental when assessing the sustainability of the transition to a low GHG global economy, as stakeholders with concerns that are not taken into account can potentially play a strong role in slowing down the transition.
- Yet, while there has been considerable debate on how to achieve this, currently there is a lack of empirical studies to provide substance to the UNFCCC discussions on response measures and a lack of methodologies to report on the impact of response measures.

Background on response measures

- Biennial update reporting (BUR) allows for reporting on economic and social consequences of response measures by non-Annex I Parties
 - Decision 2/CP.17 Annex III contains the guidelines on RM reporting for BUR
- Parties are encouraged to provide detailed information on the assessment of economic and social impacts of response measures
 - Annex III.D.90 of Modalities, procedures and guidelines for the transparency framework

Project objectives

- To design and create a methodology on response measures (RM) under Biennial Update Reporting.
- To test this methodology through a case study on a country which has the available data, looking to see if the methodology works with the available data.

Suggested tabular format for reporting on response measures in BUR (UNFCCC secretariat)

Reporting information on any economic and social consequences of response measures

Response measures action	Social and economic consequences from the response measures action	Challenges and barriers to address the consequences	Support needed to address the consequences
<p><i>1. In this column, non-Annex I Parties could provide a description of specific action(s) of response measures</i></p> <p>.....</p> <p>.....</p>	<p><i>2. In this column, Parties could report on the consequences of the specific action identified in column 1, including any information regarding how the consequence has been linked to the action.</i></p> <p><i>-Disaggregate the information in terms of intensity and magnitude in:</i></p> <p><i>Low;</i></p> <p><i>Medium or moderate; and</i></p> <p><i>High</i></p> <p><i>(to create specific criteria for disaggregation)</i></p> <p>.....</p> <p>.....</p>	<p><i>3. In this column, Parties could report on challenges and barriers in address/coping with the consequences identified in column 2.</i></p> <p><i>Parties may also provide further elaboration under the section on reporting finance, technology and capacity-building needs and support received</i></p>	<p><i>4. In this column, Parties could report on the support needed for economic diversification.</i></p> <p><i>Parties may also provide further elaboration under the section on reporting finance, technology and capacity-building needs and support received</i></p> <p>.....</p> <p>.....</p>
<p>.....</p>	<p>.....</p>		<p>.....</p>

Overview: ERCST RM methodology

Step 1: Country description

Step 2: Identify the top 100 sectors in terms of value added.

Step 3: Collect data on characteristics of top 100 sectors.

Step 4: Building on Steps 2 and 3, identify vulnerable sectors, using two methods:

» **Method 1:** Threshold method.

» **Method 2:** Weighted scores method.

Identifying
the
vulnerable
sectors

Overview: ERCST RM methodology

- Step 5:** Stakeholder input to identify anything which was missed in Step 4.
- Step 6:** Identify the response measures that might impact sectors from Step 4. (Country-level discretion whether to include positive as well as negative impacts.)
- Step 7:** Once completed further employing stakeholder input, to identify RM identified in Step 6.
- Step 8:** Assess the impacts of response measures on identified sectors.
- Step 9:** Look at possible domestic and international tools and support which may be needed to address the impacts.

Step 1: Country description

- Step 1 focuses especially on the past and current economic, social and environmental evolution of the country, including its geography, history, and political system
- It will center on the recent evolutions in the country's economic, social and environmental sectors.

Step 2: Identifying the vulnerable sectors

- Step 2 identifies the main sectors of the economy - which will subsequently be assessed for vulnerability to Response Measures (Steps 3 & 4).
- Using the activity classification system appropriate to the country (ISIC Rev 4, in the case of Chile), at a high level of disaggregation (4-digit level, in the case of ISIC), list the top 100 sectors in the economy ranked by **total value added**.

Step 3: Sector characteristics through key variables.

Describe the sectors' key characteristics. For each sector identified in Step 2, collect the data on the following key variables. These will be used in Step 4 to identify vulnerable sectors.

- Sectoral employment at fulltime equivalency (FTE), or labour input value.
- Sectoral emissions per value added (g CO₂e/ USD).
- Exports (USD), (based on concordance between ISIC classification and HS codes at 6-digit level) total, and as share of national and world exports.
- Top 3 Export Destinations (+% of total exports of product).
- Gross domestic production

Step 4: Using the two methods below, determine which are the vulnerable sectors

- Step 2 identified the most significant sectors for the country, and Step 3 described some of their relevant characteristics.
- Step 4 acts as a filter to identify the sectors which are:
 - vulnerable to response measures, and
 - significant to the national economy.These are the sectors which will be focused on.
- We propose two possible methods to do so:
 - Method 1: Threshold method
 - Method 2: Weighted scores method

Step 4: Method 1: Thresholds

- This method involves testing whether a sector passes each of the three listed threshold conditions.
 - If it does pass the three thresholds, the sector will be considered vulnerable to RMs.
- The thresholds are to be considered to be in series, giving them equal weight.
- The first two determine vulnerability, and the third determines significance.
- This method therefore incorporates a process of elimination from the very first threshold, allowing for more efficient gathering and analysing data

Step 4: Method 1: Thresholds

- The three sectoral thresholds are:

1. Trade intensity

- First we look at trade exposure of the sectors by calculating the level of trade intensity:

$$\textit{Trade intensity} = \frac{\text{exports}}{\text{domestic production}}$$

- The higher the trade intensity, the higher the relevance and vulnerability of the sector for our analysis
 - Higher than 19%: high trade intensity
 - Between 10 and 19%: medium trade intensity
 - Lower than 10%: low trade intensity: sector does not pass the threshold

Step 4: Method 1: Thresholds

- The three sectoral thresholds are (continued):
 2. GHG emissions per unit of value added
 - Energy use could also be used as a proxy for GHG emissions.
 - The suggested threshold will be 0.2 gCO₂e/USD.
 3. Value added as a percentage of GDP
 - Importance of the sector in the economy of the country.
 - If greater than 1%: sector passes third threshold
- Thresholds might need to be adjusted depending on the country being assessed
 - For example, due to differences in structure of economies between developed and developing countries.

Step 4: Method 2: Weighted scores

- The second method, the **weighted scoring method** provides a systematic process for selecting the vulnerable sectors based on the same three criteria seen above:
 - trade intensity (calculated through trade intensity: exports/domestic production),
 - GHG emissions per unit of value added (g CO₂e/USD), or energy use, depending on the available data, and
 - national sectoral significance, which will be calculated by looking at the value added relative to GDP.
- Whereas in Method 1 these values were categorised as thresholds, in this Method the values are used in a weighted average formula.

Step 4: Method 2: Weighted scores

- Each criterion is assigned a weight based on its level of importance to calculating the sector's vulnerability to RM.
 - Trade intensity and GHG emissions per unit of value added are each assigned a weight of 40%.
 - National sectoral significance through value added relative to GDP is assigned a weight of 20%.
- For a sector to be classified as vulnerable to RMs, it must achieve a certain overall cut-off score (**TBD**) in this weighted assessment.

Step 4: Method 2: Weighted scores

Tabular overview of the weighted scoring method

Trade intensity (trade intensity: exports/domestic production). Scored zero to 100, derived by multiplying number by 4, cap at 100.	40%
GHG intensity (grams of CO ₂ e/value added), or energy costs per unit of value added, depending on data availability. The figures will be normalized to a score between zero and 100.	40%
National sectoral significance: value added relative to GDP. Scored zero to 100, derived by multiplying number by 50, cap at 100.	20%

Step 4: Method 2: Weighted scores

- Method 2 provides a clear overview for each sector.
 - Method 1 does not provide this general overview, as the criteria are incorporated as automatic elimination thresholds
- Method 2 allows for incorporation of weight differentiation for the criteria.
 - Method 1: all thresholds are equally important
- Research and administrative burden for Method 2 will be higher due to the lack of elimination process.
- Method 2 cut-off score may have to be adjusted once seeing the results (for example, 0 sectors pass)
 - Allows for an added level flexibility beyond Method 1

Step 5: Stakeholder input to identify anything which Step 4 missed.

- Stakeholder consultations will supplement the above methods.
- Consultations will be designed to capture sectors of concern that the methodologies may have missed.
- Where missing sectors of concern are identified, the team will review the methodology for revisions that might help avoid such misses in future.

Step 6: Identify the response measures

Four-part procedure:

1. For the vulnerable sectors identified in Steps 4 and 5, identify top 3 importers (top export destinations)
2. For the vulnerable sectors, identify the types of response measures likely to impact (country-level discretion whether to include positive as well as negative impacts)
3. Search in identified trading partners for identified types of response measures
4. Search international initiatives for identified types of response measures

Step 6: Identify the response measures

Parts 3 & 4: Where to look for response measures

Looking at domestic measures from international trading partners, as well as international measures at the end from ICAO and IMO:

- EEA database: climate change mitigation P&Ms in Europe
- OECD database of environmental measures
- Party NDCs
- WTO environmental database
- IEA Building Energy Efficiency Policy Database
- ICAP carbon market database
- FAOLex database of food and agriculture laws and regs
- Global Climate Legislation Database
- IEA/IRENA Joint Policies and Measures Database
- ITC Sustainability Map, Standards Map
- UNFCCC compilation report on response measures
- ICAO and IMO climate actions

Step 6: Identify the response measures

Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
<u>Carbon taxes</u>	decreased demand for carbon-emitting goods; increased demand for low-carbon emitting goods	<ul style="list-style-type: none"> Negative effects: fossil fuel producers. Positive effects: low-carbon goods (e.g., renewable energy/EV components) 	•Effects on low-carbon goods exports?
<u>Subsidies</u>			
for low-carbon transport	decreased demand for goods associated with internal combustion engines.	<ul style="list-style-type: none"> Negative effects: producers of fossil fuels, lead. Positive effects: producers of EVs, cobalt, lithium, vanadium. 	•Ex: Effect on Chile as a lithium exporter: continue to export raw materials like lithium? Is Chile looking to become a downstream manufacturer of batteries?
for low-carbon energy production	decreased demand for thermal fuels	<ul style="list-style-type: none"> Negative effects: coal, natural gas, oil producers. Positive effects: low-carbon energy technology (e.g., PV solar cells) 	
removal of, for fossil fuel production	decreased production of fossil fuels	<ul style="list-style-type: none"> Positive effects: fossil fuel producers. Negative effects: fossil fuel consumers. 	
removal of, for fossil fuel consumption	decreased consumption of fossil fuels	<ul style="list-style-type: none"> Negative effects: fossil fuel producers. Positive effects: fossil fuel consumers. 	
for energy efficiency in buildings	decreased energy consumption	<p>Effects depend on fuel source used in implementing country buildings. If fossil fuels used:</p> <ul style="list-style-type: none"> negative effects on producers; positive effects on consumers. 	

Step 6: Identify the response measures

Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
<u>Green procurement</u>			
of energy	decreased demand for thermal fuels	<ul style="list-style-type: none"> Negative effects: coal, natural gas producers. Positive effects: coal and natural gas consumers. 	
of automobiles	decreased demand for goods associated with internal combustion engines.	<ul style="list-style-type: none"> Negative effects: fossil fuel producers. Positive effects: cobalt, lithium, vanadium producers, EV producers. 	•Same question on lithium export + manufacture of batteries?
<u>Cap and trade schemes</u>	decreased demand for carbon-emitting goods; increased demand for low-carbon emitting goods	<ul style="list-style-type: none"> Negative effects: fossil fuel producers. Positive effects: renewable energy/EV components producers; fossil fuel consumers. 	
<u>Liberalization of trade in environmental goods</u>	boost in consumption of green goods	<ul style="list-style-type: none"> Positive effects: producers of covered environmental goods 	

Step 6: Identify the response measures

Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
<u>Border carbon adjustment</u>	decreased demand for high-carbon goods	Depends on carbon intensity, and regime details, but likely: <ul style="list-style-type: none"> • Negative effects: aluminum, steel, cement, plastics, pulp & paper. • Positive effects for low-carbon producers. 	•For example: Energy efficiency of copper + wood pulp production in comparison with that of other global players?
<u>Standards and labelling requirements</u>			
for agricultural goods, involving GHG emissions	depends on details of the scheme, but likely loss of market share for non-certified air-freighted goods, inter alia	Depends on details of the scheme, but possible: <ul style="list-style-type: none"> • Negative effects: perishable fruits such as berries, high-value horticulture 	•What sorts of environmental standards and labelling present market access barriers for Chilean agricultural exports?
mandatory efficiency performance standards for consumer goods, industrial equipment	restricts the market to high-efficiency products; reduces demand for fuel	<ul style="list-style-type: none"> • Negative effects: fossil fuel producers; producers of low-efficiency consumer goods and industrial equipment. • Positive effects: fossil fuel consumers; producers of high-efficiency goods/equipment 	

Step 6: Identify the response measures

Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
<u>International aviation levies</u>	reduction in air travel consumed	<ul style="list-style-type: none"> Negative effects: flight-based tourism sectors (e.g., hotels, restaurants) 	<ul style="list-style-type: none"> For example: In the agricultural sector, what goods tend to be air freighted? Possible changes and/or trends? Possible effects on tourism?
<u>International maritime levies</u>	increase in shipping costs	<ul style="list-style-type: none"> Negative effects: increased costs of imports and exports using maritime transport 	<ul style="list-style-type: none"> Which agricultural goods are shipped? Possible changes/trends?

Step 7: Once completed further employing stakeholder input, to assess RMs identified in Step 6.

- Stakeholder consultations assess:
 - whether any relevant RMs have been missed, or
 - whether too many RMs have been listed as relevant for the list of sectors.
- The research team will contact key sectoral stakeholders (business, government and unions) to identify policies and impacts and verify our findings.
- To be carried out through workshops where the methodology and the main findings are presented, followed by requests for input and feedback, as well as inviting stakeholders to identify other policies (out-of-jurisdiction and international) and other negative impacts on their sector.

Step 8: Assess impacts of response measures

- Assessing the impacts of the identified response measures.
 - Finding quantitative data where available and generating needed data where feasible.
 - Quantitative data would be sourced from policies, impact assessments and other available studies related to any environmental, economic and social impacts, looking at:
 - Type of impact (positive or negative, economic, social or environmental)
 - Size of impact
 - Timeline of impact
 - Possible contributing factors that might compound the problem.
- Each of the impacts identified above needs an in-depth discussion.
- A central issue is the quantification of impacts
 - Dependent on available information and methodologies!

Step 8: Assess impacts of response measures

Quantitative and Qualitative Assessment

- The nature, and extent of vulnerability will be analysed through quantitative and qualitative assessment, looking at economic, social and environmental factors.
- Depending on the data and resources available, quantitative analysis would be done using general equilibrium modelling.
- Qualitative overview will concentrate on a basic description of vulnerability, and the causal chain, including positive or negative, and intended or unintended impacts. Challenges/barriers to addressing vulnerability will also be looked at.

Impacts on Government Revenue

- The impacts will also be assessed by looking at royalties, corporate income taxes, and concession fees.
- This method will only be relevant for extractive sectors and other primary sectors, such as mining, oil and gas, and possibly forestry and fisheries.

Step 9: Look at possible tools and support which may be needed to address the impacts.

- Domestic measures:
 - cost alleviation domestic safety nets, worker training/retraining and adjustment programmes and economic diversification efforts.
 - Support and capacity-building, which are central issues for various mitigation tools.
- Possible international cooperative approaches.
 - International approaches could play a large role in light of their characteristics and ability to assist countries in tackling negative impacts from outside of their own jurisdiction.
- These tools and approaches may operate at a regional or global level.
 - Examples of such tools and approaches are the Technology Mechanism, the Green Climate Fund, the Adaptation Committee, the Capacity Building Framework and the REDD+ Framework.

Overview of current progress

- Most data collected
- Still issues with some data, not ideal, difficult concordances
- First stakeholder consultation in Santiago, June 2019
- Identified sources, databases of response measures, conducted preliminary searches

Step 2: Identifying top 15 sectors in terms of value added

- We have a list of the top 100 sectors, compiling various sources of data on sectoral added value
 - Most data: Central Bank of Chile - based on 2016
- Challenge: different levels of sector aggregation
 - ISIC 4 digit, 3 digit, 2 digit
 - Sometimes partial coverage of a 2 digit ISIC sector
 - World Tourism Organisation definition of tourism sector

Sector description		Domestic Value Added (billions 2016 pesos)		
ISIC code	Description	Ranking	Gross production value	Value added
0729	Mining of copper	1	21.846	12.004
6810 (?)	Housing services	2	11.447	9.091
84	Public administration and defence; compulsory social security	3	11.630	8.204
46	Wholesale trade, except of motor vehicles and motorcycles	4	14.591	7.364
47	Retail trade, except of motor vehicles and motorcycles	5	13.336	6.909
64	Financial service activities, except insurance and pension funding	6	8.428	6.027
85 (partial)	Public education	7	6.612	5.381
82	Office administrative, office support and other business support activities	8	7.381	5.097
WTO 1.33 & 1.36*	Tourism (travel, and expenditure by main purpose of trip)	9	5.055	5.055
74	Other professional, scientific and technical activities	10	6.431	4.436
71	Architectural and engineering activities; technical testing and analysis	11	5.989	4.041
86, 87 & 88 (partial)	Private human health and social work activities	12	6.586	3.866
43	Specialized construction activities	13	7.016	3.814
86	Public human health activities	14	5.552	3.804
68	Real estate activities	15	5.349	3.789
42	Civil engineering	16	7.630	3.497
85 (partial)	Private education	17	4.304	3.188
5610	Restaurants and mobile food service activities	18	5.814	2.907
3510 (partial)	Electric power generation	19	5.176	2.713
4100 (partial)	Construction of residential buildings	20	6.463	2.694
4921 & 4922	Passenger land transport	21	4.768	2.505
69	Legal and accounting activities	22	2.693	2.129
62 & 63	Computer and information services activities	23	3.382	2.122
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	24	3.659	1.917
0122-0126	Cultivation of other fruit	25	2.835	1.911
96	Other personal service activities	26	2.121	1.772
4923	Freight transport by road	27	5.450	1.769
19 (?)	Manufacture of coke and refined petroleum products	28	4.070	1.651

Step 3: Collect data on characteristics of top 15 sectors.

- Work continues, data has been gathered on:
 - Employment
 - Chilean National Statistics Institute (ISIC 2 digit level)
 - GHG emissions
 - From National Inventory (IPCC codes)
 - Exports and trading partners
 - Subdepartament of Información Comercial, DIRECON-ProChile, with numbers from Banco Central de Chile; and UN Comtrade database (HS codes: 6 digit level)
 - Domestic gross production value
 - Chile National Bank (various levels of aggregation)
- Concordance exercises are in progress

Sector Description			Employment FTE (thousands of persons)		
Ranking	ISIC code	Description	ISIC Code	Broader sector	Employment
1	0729	Mining of copper	Section B (05 - 09)	Mining and Quarrying	222
2	6810 (?)	Housing services	Section L (68)	Real Estate Activities	82
3	84	Public administration and defence; compulsory social security	Section O (84)	Public administration and defence; compulsory social security	475
4	46	Wholesale trade, except of motor vehicles and motorcycles	Section G (45-47)	Wholesale and retail trade; repair of motor vehicles and motorcycles	1,540
5	47	Retail trade, except of motor vehicles and motorcycles	Section G (45-47)	Wholesale and retail trade; repair of motor vehicles and motorcycles	1,540
6	64	Financial service activities, except insurance and pension funding	Section K (64-66)	Financial and insurance activities	170
7	85 (partial)	Public education	Section P (85)	Education	715
8	82	Office administrative, office support and other business support activities	Section N (77-82)	Administrative and support service activities	231
9	WTO 1.33 & 1.36*	Tourism (travel, and expenditure by main purpose of trip)		Tourism (transport, restaurants, accommodation, tour operators)	
10	74	Other professional, scientific and technical activities	Section M (69-75)	Professional, scientific and technical activities	259
11	71	Architectural and engineering activities; technical testing and analysis	Section M (69-75)	Professional, scientific and technical activities	259
12	86, 87 & 88 (partial)	Private human health and social work activities	Section Q (86-88)	Human health and social work activities	484
13	43	Specialized construction activities	Section F (41-43)	Construction	715
14	86	Public human health activities	Section Q (86-88)	Human health and social work activities	484
15	68	Real estate activities	Section L (68)	Real Estate Activities	82
16	42	Civil engineering	Section F (41-43)	Construction	715
17	85 (partial)	Private education	Section P (85)	Education	715
18	5610	Restaurants and mobile food service activities	Section I (55-56)	Accommodation and food service activities	144
19	3510 (partial)	Electric power generation	Section D (35)	Electricity, gas, steam and air conditioning supply	49
20	4100 (partial)	Construction of residential buildings	Section F (41-43)	Construction	715
21	4921 & 4922	Passenger land transport	Section H (49-53)	Transportation and storage	557
22	69	Legal and accounting activities	Section M (69-75)	Professional, scientific and technical activities	259
23	62 & 63	Computer and information services activities	Section J (58-63)	Information and communication	144
24	45	Wholesale and retail trade and repair of motor vehicles and motorcycles	Section G (45-47)	Wholesale and retail trade; repair of motor vehicles and motorcycles	1,540
25	0122-0126	Cultivation of other fruit	Section A (01-03)	Agriculture, forestry and fishing	829
26	96	Other personal service activities	Section S (94-96)	Other service activities	270
27	4923	Freight transport by road	Section H (49-53)	Transportation and storage	557
28	19 (?)	Manufacture of coke and refined petroleum products	Section C (10-33)	Manufacturing	884

Sector Description

GHG emissions

Ranking	ISIC code	description	IPCC code	Description	gCO ₂ e/\$		Source
					2016 kt CO ₂ e	value added	
1	0729	Mining of copper	n/a	Copper	3,910	0.200	Energy balance sheets, BUR, IEA
2	6810 (?)	Housing services					
3	84	Public administration and defence; compulsory social security					
4	46	Wholesale trade, except of motor vehicles and motorcycles					
5	47	Retail trade, except of motor vehicles and motorcycles					
6	64	Financial service activities, except insurance and pension funding					
7	85 (partial)	Public education					
8	82	Office administrative, office support and other business support activities					
9	WTO 1.33 & 1.36*	Tourism (travel, and expenditure by main purpose of trip)					
10	74	Other professional, scientific and technical activities					
11	4100	Construction of residential and non-residential buildings	n/a	Construction	222	0.032	Energy balance sheets, BUR, IEA
12	71	Architectural and engineering activities; technical testing and analysis					
13	86, 87 & 88 (partial)	Private human health and social work activities					
14	43	Specialized construction activities					
15	86	Public human health activities					
16	68	Real estate activities					
17	42	Civil engineering					
18	85 (partial)	Private education					
19	5610	Restaurants and mobile food service activities					
20	3510 (partial)	Electric power generation	1 A 1 a i	Electricity generation	34,580	7.826	National inventory 2018
21	4921 & 4922	Passenger land transport					
22	69	Legal and accounting activities					
23	62 & 63	Computer and information services activities					
24	45	Wholesale and retail trade and repair of motor vehicles and motorcycles					
25	0122-0126	Cultivation of other fruit	(part of) 1 A 4 c	Agriculture, forestry, fis	882	0.101	National inventory 2018
26	96	Other personal service activities					
27	4923	Freight transport by road	1 A 3 b ii and iii	Light duty trucks; heavy	15,226	5.285	National inventory 2018
28	19 (?)	Manufacture of coke and refined petroleum products	1 A 1 b & 1 A 1 c	Petroleum refining; Mar	1,132	0.421	National inventory 2018

Sector Description			Export data		
Ranking	ISIC code	description	HS6 Code	Product Description	2018 Exports (in US\$) millions
1	0729	Mining of copper	260300	Copper ores & concentrates	18681.07
2	6810 (?)	Housing services			
3	84	Public administration and defence; compulsory social security			
4	46	Wholesale trade, except of motor vehicles and motorcycles			
5	47	Retail trade, except of motor vehicles and motorcycles			
6	64	Financial service activities, except insurance and pension funding			
7	85 (partial)	Public education			
8	82	Office administrative, office support and other business support activities			
9	WTO 1.33 & 1.36*	Tourism (travel, and expenditure by main purpose of trip)			
10	74	Other professional, scientific and technical activities			
11	71	Architectural and engineering activities; technical testing and analysis	490600	Plans & drawings for architectural, engineering, etc	0.6
12	86, 87 & 88 (partial)	Private human health and social work activities			
13	43	Specialized construction activities			
14	86	Public human health activities			
15	68	Real estate activities			
16	42	Civil engineering			
17	85 (partial)	Private education			
18	5610	Restaurants and mobile food service activities			
19	3510 (partial)	Electric power generation	271600	Electrical energy (optional heading)	0.9
20	4100 (partial)	Construction of residential buildings			
21	4921 & 4922	Passenger land transport			
22	69	Legal and accounting activities			
23	62 & 63	Computer and information services activities			
24	45	Wholesale and retail trade and repair of motor vehicles and motorcycles			
25	0122-0126	Cultivation of other fruit	80111-91099	Fruits, nuts etc, Fresh/dried	4,952.6
26	96	Other personal service activities			
27	4923	Freight transport by road			
28	19 (?)	Manufacture of coke and refined petroleum products	270400, 271311, 271312	Coke & Petroleum coke and coke products	25.85

Step 4: determination of vulnerable sectors

- Work in progress
 - Concordance exercises ongoing between:
 - Value added data
 - Domestic production data
 - GHG intensity or energy costs per unit of value added
 - Export data

Step 5: Stakeholder input to identify anything which Step 4 missed

- First two stakeholder workshops held in Chile
 - One for public sector, and one for private sector
 - Contact established
 - Project explained
 - Difficulties with respect to data discussed, and assistance requested
- Ready to test list of vulnerable sectors with stakeholders

Step 6: Identify response measures

- While data gathering is ongoing, the first efforts to compile list of response measures has been undertaken
 - Using list of sources discussed earlier:
 - EEA database
 - OECD database of environmental measures
 - Party NDCs
 - WTO environmental database
 - IEA Building Energy Efficiency Policy Database
 - ICAP carbon market database
 - FAOLex database
 - Global Climate Legislation Database
 - IEA/IRENA Joint Policies and Measures Database
 - ITC Sustainability Map, Standards Map
 - UNFCCC compilation report on response measures
 - ICAO and IMO climate actions

What does this look like in practice?

- The next slides look more in detail at 2 sectors
 - Fresh fruits (ISIC classes 0122-0126), and
 - Tourism
- Sector selection has not been finalised, but in principle, these two sectors should pass the thresholds (Step 4)
 - Important in terms of added value
 - High trade intensity
 - Emissions intensive (especially transportation)
- Stakeholders in both sectors have raised concerns (Step 5)

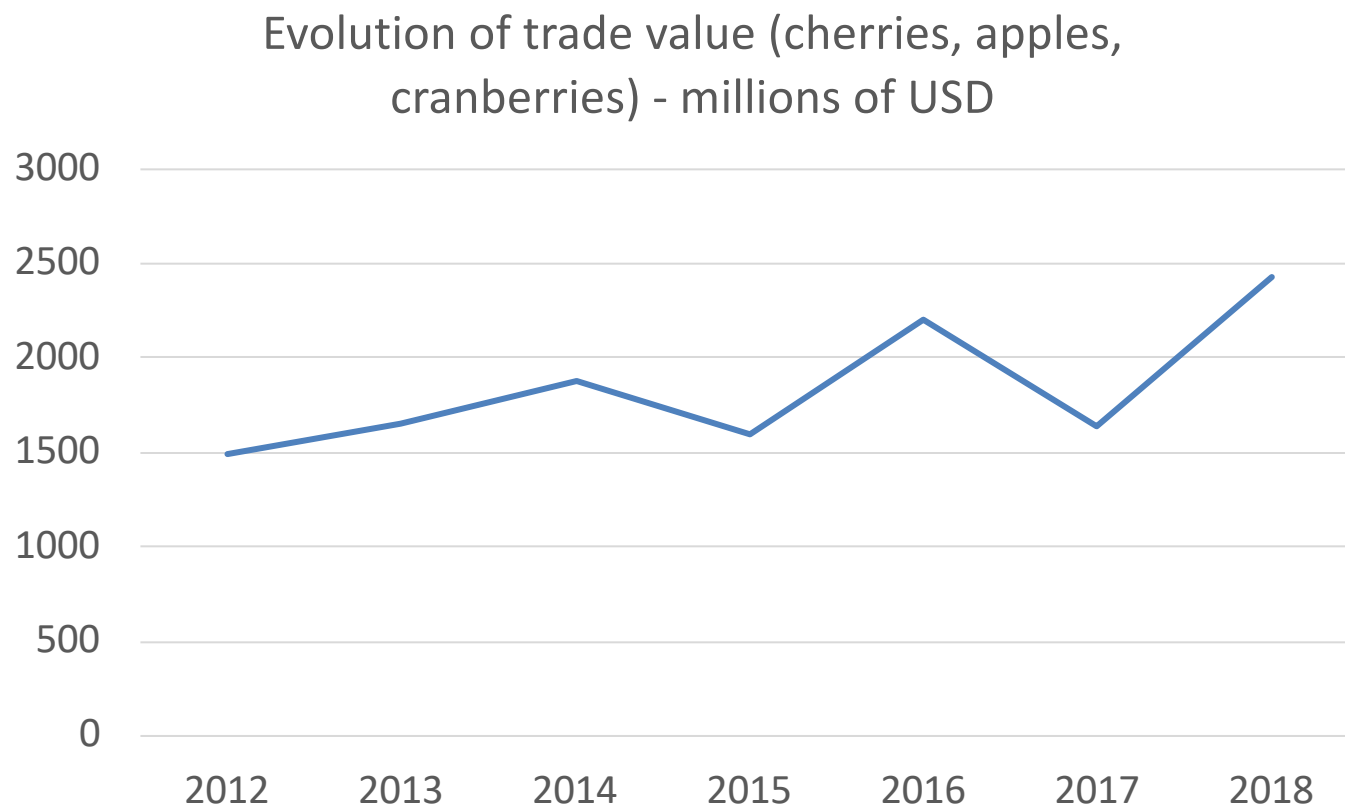
Sector description		Domestic Value Added (billions 2016 pesos)		
ISIC code	Description	Ranking	Gross production value	Value added
0729	Mining of copper	1	21.846	12.004
6810 (?)	Housing services	2	11.447	9.091
84	Public administration and defence; compulsory social security	3	11.630	8.204
46	Wholesale trade, except of motor vehicles and motorcycles	4	14.591	7.364
47	Retail trade, except of motor vehicles and motorcycles	5	13.336	6.909
64	Financial service activities, except insurance and pension funding	6	8.428	6.027
85 (partial)	Public education	7	6.612	5.381
82	Office administrative, office support and other business support activities	8	7.381	5.097
WTO 1.33 & 1.36*	Tourism (travel, and expenditure by main purpose of trip)	9	5.055	5.055
74	Other professional, scientific and technical activities	10	6.431	4.436
71	Architectural and engineering activities; technical testing and analysis	11	5.989	4.041
86, 87 & 88 (partial)	Private human health and social work activities	12	6.586	3.866
43	Specialized construction activities	13	7.016	3.814
86	Public human health activities	14	5.552	3.804
68	Real estate activities	15	5.349	3.789
42	Civil engineering	16	7.630	3.497
85 (partial)	Private education	17	4.304	3.188
5610	Restaurants and mobile food service activities	18	5.814	2.907
3510 (partial)	Electric power generation	19	5.176	2.713
4100 (partial)	Construction of residential buildings	20	6.463	2.694
4921 & 4922	Passenger land transport	21	4.768	2.505
69	Legal and accounting activities	22	2.693	2.129
62 & 63	Computer and information services activities	23	3.382	2.122
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	24	3.659	1.917
0122-0126	Cultivation of other fruit	25	2.835	1.911
96	Other personal service activities	26	2.121	1.772
4923	Freight transport by road	27	5.450	1.769
19 (?)	Manufacture of coke and refined petroleum products	28	4.070	1.651

Fresh Fruits: sector characteristics (Step 3)

- ISIC classes 0122-0126 – growing of:
 - tropical and subtropical fruits
 - citrus fruits
 - pome fruits, stone fruits,
 - oleaginous fruits, and
 - other tree and bush fruits and nuts
 - **Not: growing of fresh grapes**
- Includes major Chilean export products
 - cherries, apples, cranberries, pears, ...
- Value added of 4.6B USD in 2016.
- Broad sector (ag, food, forestry, fish): 882 kT CO₂e 2016
- GHG intensity: 0.101 g CO₂e/USD value added

Fresh Fruits: sector characteristics (Step 3)

- Major trade partners: China, USA, EU, RoK, Columbia



Source: UN Comtrade database

Fresh Fruits: sector characteristics (Step 3)

- Value added in 2016: 1,9 trillion Chilean Pesos (~3,1 billion 2016 USD)
- Gross production value in 2016: 2,8 trillion Chilean Pesos (~4,6 billion 2016 USD)
- Employment: we do not have exact figures for this subsector yet, but it is understood that this is a labour intensive sector
 - Broad agricultural sector is one of the largest employers in Chile (829.000 people)
- Emissions intensity is relatively low, BUT ...
- Transportation is the major issue in terms of response measures, as perishable goods need to be exported with speed – often air freighted

Fresh Fruits: Identifying Response Measures (Step 6)

- Response measures related to air and sea freight are the most relevant ones identified so far
 - Lead to cost increases for exporters
- There are both national and international measures in these areas

Fresh Fruits: Identifying Response Measures (Step 6)

- Aviation
 - National measures
 - Various types of direct and indirect response measures
 - Cap-and-trade systems (EU and Shanghai pilot project)
 - » However, EU ETS currently not covering international flights due to ‘stop the clock’
 - Biofuel targets (South Dakota – USA)
 - Many other taxes, charges and fees are indirect measures
 - » Aviation fuel taxes, noise charges, freight handling charges, landing/take-off fees etc. **Less relevant.**
 - International measures
 - CORSIA (ICAO) could also be relevant due to the possible increase in costs for air freight
 - However, CORSIA’s design is not yet finalized and published
 - Pilot and volunteer Phases to start after 2021.

Fresh Fruits: Identifying Response Measures (Step 6)

- Maritime
 - National measures
 - Various fees and charges related to fuel consumption (Canada, Spain, US)
 - International measures
 - IMO 2020 regs on use of bunker fuel, lowering sulfur content
 - Arctic black carbon regs in process
 - Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Management Plan (SEEMP) could have an effect on the cost of marine freight shipping for the fresh fruit goods in this sector. Phase 3 of EEDI has been moved up to 2022 for certain types of ships, including container ships; general cargo ships.
 - Could be a positive impact!
 - Potential future regulation related to speed of ships could also have a significant impact due to the perishable nature of the goods
 - Limiting potential export markets that can be supplied

Tourism: sector characteristics (Step 3)

- Chile is a popular tourist destination
 - Popular natural and eco-tourism attractions and varied climate, landscape and culture
- Tourism sector is set to continue to grow
 - Number of major awards and accolades in recent years (including: “No. 1 destination to visit” according to Lonely Planet 2018)



Source: World Tourism Organization (2018),
Note: tourists are defined as overnight visitors

Tourism: sector characteristics (Step 3)

- Major contributor to the Chilean economy
 - Value: over 5 trillion Chilean pesos (~ 8,2 billion 2016 USD) according to World Tourism Organisation
 - Major source of employment – though robust statistics not available yet
- Main sources of tourists are the Americas, Europe, East Asia and the Pacific
 - Air transport is an important mode of transportation, with over 2,5 million arrivals by air in 2017

Tourism: Identifying Response Measures (Step 6)

- Response measures related to air transport are the most relevant ones identified so far
 - Lead to cost increases for air travel and fare.
- There are both national and international measures in this area

Tourism: Identifying Response Measures (Step 6)

- Aviation

- National measures

- Various types of direct and indirect response measures

- Cap-and-trade systems (EU and Shanghai pilot project)

- » However, EU ETS currently not covering international flights due to ‘stop the clock’

- Biofuel targets (South Dakota – USA)

- Many other taxes, charges and fees are indirect measures

- » Aviation fuel taxes, noise charges, freight handling charges, landing/take-off fees etc. **Less relevant.**

- International measures

- CORSIA (ICAO) could also be relevant due to the possible increase in costs for air freight

- However, CORSIA’s design is not yet finalized and published

- Pilot and volunteer Phases to start after 2021.

Recalling the objectives

- To design and create a methodology on response measures (RM) under Biennial Update Reporting.
- To test this methodology through a case study on a country which has the available data, looking to see if the methodology works with the available data.

June 15, 2019 | Bonn, Germany

Reporting on Response Measures under Biennial Update Reporting – Case Study on Chile

ERCST Methodology Development

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