CHAPTER

3

Non-tariff measures and their relationship to international standards

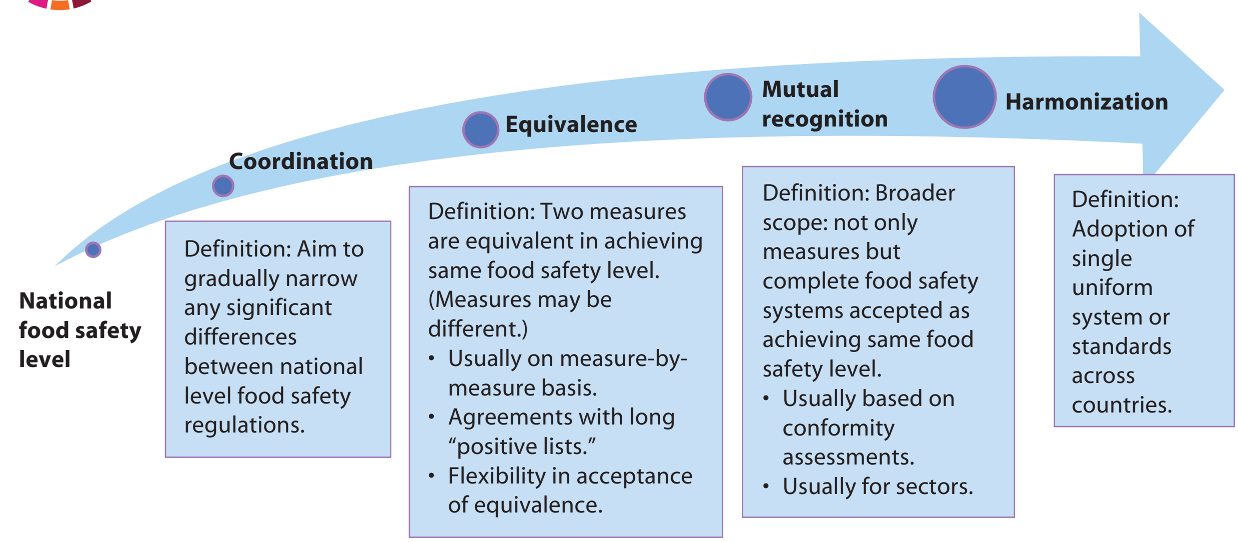
The costs of complying with non-tariff measures (NTMs) in international trade are high (as detailed in chapter 2). A significant share of such costs stems from the fact that technical regulations are often very different between countries. The Transatlantic Trade and Investment Partnership negotiations between the European Union and the United States that were mostly about NTMs have demonstrated how different regulations can be even in countries with similar levels of safety requirements. For example, the United States allows farmers to rinse chicken with chlorine to remove harmful bacteria, whereas this is not permitted in the European Union to ensure higher hygiene standards in earlier production processing steps. With the United Kingdom of Great Britain and Northern Ireland seeking a separate trade agreement with the United States, post-Brexit, the chlorinated chicken issue is also likely to be placed on the table (BBC, 2019).

> *"To protect health, safety and the environment, NTMs need to be coordinated or harmonized, rather than eliminated."*

Recognizing the necessity for sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBT) to protect health, safety and the environment entails the need for such NTMs to be coordinated or harmonized, rather than eliminated. Several studies have shown the beneficial effect of regulatory cooperation. For example, Wilson, Otsuki and Majumdsar (2003) examined the impact of residue limits of the antibiotic tetracycline in beef. They found that beef imports are significantly lower in countries that have a more stringent residue limit. They estimate that regulatory convergence towards the international standard set by Codex Alimentarius would increase international trading of beef by $3.2 billion. Other studies have assessed the aggregate impact of NTMs and regulatory cooperation. Knebel and Peters (2019), for example, showed that a light reform in the Association of Southeast Asian Nations (ASEAN), where regulations are brought in line with each other without increasing nor decreasing their numbers, could reduce trade costs of NTMs by 25%. In other words, a similar level of protection of health, safety and the environment can be achieved at lower costs if regulations are made more similar or mutually recognized.

Regulatory cooperation can have different forms, ranging from coordination to harmonization (figure 3.1). According to the categorization by Wieck and Rudloff (2019), coordination is the weakest form of cooperation, followed by equivalence, where a partner's measure is seen to achieve an equivalent level of protection; mutual recognition, where a partner's measures are recognized; and harmonization, where countries agree on the same measures.

Figure 3.1 **Forms of regulatory cooperation**



Source: Wieck and Rudloff (2019).

> *"International standards are one way of overcoming challenges related to technical regulations in international trade."*

International standards are one way of overcoming challenges related to technical regulations in international trade caused by differences in regulations and standards developed independently and separately by each country, a national standards organization or the private sector. The use of international standards is a form of harmonization. For food products, countries may, for example, follow the standards developed by the Codex Alimentarius Commission and make them mandatory national or regional regulations. An advantage of the adoption of such standards is that they are normally developed based on scientific evidence and then used by a wider group of countries. Countries may also use such standards as a basis and make certain modifications. This can be justified as the concrete situation in terms of geography, climate, culture or risk aversion varies. Any changes, however, reduce the advantageous effect of having a uniform regulation across various countries.

The objective of this chapter is to assess the use of international standards and their similarity to national technical regulations in terms of measure type and stringency. International standards are considered scientifically justified, and are accepted as the benchmarks against which national measures and regulations are evaluated.

> *"There is no systematic information available about the use of international standards in national regulations."*

It appears that there is no systematic information available about the use of international standards in national regulations. Only in some cases are specific references to the corresponding international standard made in national regulations. Sometimes the same or similar language is used with small changes in the text. It is nearly impossible to judge if such changes are significant in terms of the actual requirements that producers have to comply with on a broad scale.

This chapter is structured as follows. Section A introduces international standards in trade while section B prepares the ground for analysing international standards and presents some stylized facts. Section C compares the regulatory structure between national regulations and international standards on a broad level, drawing from a regulatory similarity metric. Section D delves into a more granular assessment of regulatory stringency vis-à-vis international standards for selected countries and products. Section E synthesizes results and provides the conclusion.

A. INTERNATIONAL STANDARDS IN TRADE

Standardization has a long history and became particularly important during the period of industrialization. In electricity, for example, scientists and engineers from around the world realized at a world fair in 1904 that standards for electrotechnology were urgently needed because incompatible electricity of numerous different voltages, frequencies and currents were being used (IEC, 2019). This led to what has been referred to as the first international standards organization, the International Electrotechnical Commission (Garche and others, 2009).

The focus here is on such international standards.[1] International standards are technical standards developed by international standardizing bodies (ISBs). The World Standards Cooperation (WSC), established by the International Telecommunication Union (ITU), the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), aims to strengthen and advance the voluntary consensus-based international standards systems. Furthermore, in the agriculture and food sector, three ISBs stand out: Codex Alimentarius Commission, the World Organisation for Animal Health (OIE)[2] and the International Plant Protection Convention (IPPC).

> *"International standards are aimed at protecting consumers health, safety and the environment, and are intended to assist in harmonization of measures, thereby facilitating international trade."*

International standards are aimed at ensuring safe, reliable and good quality products to protect consumers health, safety and the environment. Measures are supposed to be technically justified. Furthermore, they are also intended to assist in harmonization and facilitation of international trade. For example, the "Codex Alimentarius is intended to act as a guide and to promote the elaboration and establishment of definitions and requirements for foods in order to assist in their harmonization and, in doing so, to facilitate international trade" (FAO, undated).

In the multilateral trading system, international standards also play a critical role. The WTO SPS and TBT Agreements are aimed at striking a balance between the public policy objectives of protecting health, safety and the environment, and the policy goal of trade facilitation. For this purpose, the SPS

1 For disambiguation for types of standards, see online annex at www.unescap.org/resources/aptir-2019-online-annex-ntms-and-standards.

2 The International Office of Epizootics (OIE) became the World Organisation for Animal Health in 2003.

and TBT Agreements both recognize the importance of international standards in facilitating the conduct of international trade and encourage their use. According to the SPS Agreement, unless there is a scientific justification for more stringent SPS protection, members will base their SPS measures on international standards for achieving broad harmonization and lower trade costs.

Similar to the SPS Agreement, the TBT Agreement (WTO, 1995a) also places an obligation on members to use international standards, wherever they exist, as a basis for their technical regulations and standards, unless the existing international standards or their parts are ineffective or inappropriate for fulfilling the respective legitimate objectives.[3] If technical regulations pursue legitimate objectives and are consistent with relevant international standards, they are presumed to not be creating unnecessary obstacles to international trade.

> *"The TBT Agreement does not define to what 'international standards' precisely refers. The SPS Agreement, on the other hand, explicitly mentions Codex Alimentarius, OIE and IPPC."*

Despite the fact that the term "international standard" has been mentioned numerous times in the TBT Agreement, the Agreement does not define the names of ISBs whose documents would be considered as international standards.

Unlike the TBT Agreement in this regard, the SPS Agreement provides a clear answer by explicitly mentioning the "three sisters" ISBs, i.e., Codex Alimentarius for food safety, OIE for animal health and IPPC for plant health (WTO, 1995b).

The Codex Alimentarius Commission has 188 member countries, while IPPC has 180 and the OIE has 182, indicating a potentially broad use of their standards. However, there are no clear statistics showing to what extent the international standards are actually used in national regulations. This chapter utilizes extensive data on the "three sisters" ISBs and country legislation in order to shed light on the use of these international standards.

B. ANALYSING INTERNATIONAL STANDARDS AND STYLIZED FACTS

1. A common language: the International Classification of Non-tariff Measures

In order to systematically assess the "three sisters" international standards, and to be able to compare them with national regulations, the International Classification of Non-tariff Measures (ICNTM) is used here.

As noted in chapter 1, ICNTM is maintained by UNCTAD in coordination with a group of international organizations – the Multi-Agency Support Team (MAST). ICNTM has 16 chapters. Each chapter is further broken down into more detailed measures types (see the example of SPS measures in the right-hand side of table 3.1). The "tree structure" allows for a rather fine-grained classification of measures. In total, ICNTM has 442 codes at the most disaggregated level.

Most important for this analysis of international standards are the classification chapters on SPS measures and TBT. The SPS chapter (A) and TBT chapter (B) consist of 34 and 23 NTM codes, respectively, at the finest level of detail.

[3] Legitimate objectives that are explicitly stated in the TBT Agreement are: national security requirements; the prevention of deceptive practices; and the protection of human health or safety, animal or plant life or health, or the environment.

Table 3.1 **Disaggregation and tree structure of ICNTM**

Import-related measures	Technical measures	A	Sanitary and phytosanitary (SPS) measures
		B	Technical barriers to trade (TBT)
		C	Pre-shipment inspections and other formalities
	Non-technical measures	D	Contingent trade-protective measures
		E	Non-automatic licensing, quotas, prohibitions and quantity-control measures
		F	Price-control measures, including additional taxes and charges
		G	Finance measures
		H	Measures affecting competition
		I	Trade-related investment measures
		J	Distribution restrictions
		K	Restrictions on post-sales services
		L	Subsidies (excl. export subsidies)
		M	Government procurement restrictions
		N	Intellectual property
		O	Rules of origin
Export-related measures		P	Export-related measures

Tree structure – for example:

A. Sanitary and phytosanitary (SPS) measures

- A1. Prohibitions/restrictions of imports for SPS reasons
  - A11 Temporary geographic prohibition
  - (…)
- A2. Tolerance limits for residues and restricted use of substances
  - (…)
- A3. Labelling, marking, packaging requirements
  - (…)
- A4. Hygienic requirements
  - (…)
- A5. Treatment for the elimination of pests and diseases
  - A51 Cold/heat treatment
  - A52 Irradiation
  - (…)
- A6. Requirements on production/post-production processes
  - (…)
- A8. Conformity assessment
  - A81 Product registration
  - A82 Testing requirement
  - A83 Certification requirement
  - A84 Inspection requirement
  - A85 Traceability requirement
    - A851 Origin of materials and parts
    - A852 Processing history
    - (…)
  - A86 Quarantine requirement
  - A89 Other conformity assessments

Source: UNCTAD (2016).

2. Collecting and classifying data on countries and international standards

While NTMs refer to mandatory government regulations and international standards refer to voluntary recommendations, their substantive contents are comparable. Therefore, ICNTM can be used to categorize international standards.

For this study, the Codex Alimentarius, OIE and IPPC standards were read and analysed carefully in order to categorize their policy recommendations into the NTM classification. For each NTM derived from an ISB, affected products are also classified according to the Harmonized System (HS) at 6 digits, which distinguishes more 5,000 tradeable products.

The great advantage of using ICNTM is that the data collected from these international standards can be compared with those from national legislation in more than 100 countries.

3. Stylized facts about international standards

Table 3.2 shows that a large majority of NTMs derived from “three sisters” ISBs belong to the SPS chapter. Specifically, 87% of all observations fall under chapter A on SPS measures. This reflects the fact that the products covered by those ISBs, by and large, are food, animal and plant products, whose regulation mostly fall under SPS measures. Indeed, that is why they are referenced in the WTO SPS Agreement.

The remaining 13% of NTMs belong to the TBT chapter. In general, requirements on product quality, product identification or animal welfare constitute TBT measures because they are not applied with the purpose of prevention of SPS risks. For example, the standard for eggplant requires that it must be intact, firm and fresh in appearance. Whether or not the eggplant is firm does not pose an SPS risk, but it is rather for quality purposes, which would be coded as a TBT measure. As a result, NTMs derived from ISBs feature both SPS and TBT measures.

Furthermore, the breakdown of NTMs by source shows considerable variation. While Codex Alimentarius covers more divergent NTMs, IPPC and OIE standards are concentrated more on few NTM categories. This variation stems from the fact that the three ISBs develop standards for different types of products, for which different regulations and measures are necessary and more important. For example, Codex Alimentarius covers more divergent group of products, which includes all foodstuffs from all sorts of plants and animals, and processed food and drinks. Conversely, most of the NTMs derived from IPPC are inspection requirement (A840). That reflects the preponderance of selected IPPC standards, notably “Guidelines for Inspection”, which cover all plants and plant products, amounting to a vast number of products.

The most prevalent NTMs across the three sources are on storage and transport conditions (A640) and on hygienic practices during production (A420). Each covers about 10% of all observations. The product nexus helps put in perspective the importance of these two NTMs – transport and storage conditions as well as hygienic conditions during production are critical for food products. Further, the systems approach requirement, also known as a requirement for adopting the Hazard Analysis and Critical Control Point (HACCP) approach (A130), comes in third in importance. Labelling requirements, both SPS and TBT related, are also among the top 10 measures identified in the examined international standards and guidelines.

NTMs derived from the “three sisters” ISBs affect a limited scope of tradeable products. Defined in the trade nomenclature of HS, these primarily include food, plants, animals and products thereof. However, affected products also go beyond these sectors. For example, affected products also cover used vehicles, machinery and equipment utilized in agriculture, forestry and horticulture. The reason is that the WTO SPS Agreement defines an SPS measure based on its objective, not on the affected products.

Table 3.2

NTMs derived from international standards, by measure

NTM	Total observations	Share (%)	Observation by source		
			Codex	IPPC	OIE
A640: Storage and transport (SPS)	4 475	10.2	4 285	0	190
A420: Hygienic production practices (SPS)	4 403	10	4 205	0	198
A130: Systems approach (SPS)	3 887	8.9	3 887	0	0
A310: Labelling (SPS)	3 705	8.5	3 705	0	0
B310: Labelling (TBT)	3 587	8.2	3 395	2	190
…	..	..	..	..	..
A840: Inspection requirements	855	2	349	472	34
…	..	..	..	..	..
Total	43 838	100	40 438	490	2 910

Source: UNCTAD TRAINS database and ESCAP. (For the full table, see online annex available at www.unescap.org/resources/aptir-2019-online-annex-ntms-derived-international-standards.)

Table 3.3 **Products affected by NTMs derived from international standards, by HS chapter**

HS Section	Total observations	Observations by source			Distinct HS6 products
		Codex	IPPC	OIE	
Animal and animal products	19 944	17 160	0	2 784	228
Vegetable products	14 049	13 664	345	40	295
Foodstuffs	9 100	9 014	38	48	186
Mineral products	46	46	0	0	1
Chemicals and allied industries	589	550	1	38	61
Plastics/rubber	4	4	0	0	2
Wood and wood products	87	0	87	0	76
Textiles	19	0	19	0	19
Total	43 838	40 438	490	2 910	868

Source: UNCTAD TRAINS database and ESCAP.

Table 3.3 provides an overview to that end. It shows the affected products that NTMs from ISBs define. First, NTMs affect, by and large, agricultural products. Indeed, animal, vegetable and foodstuff products make up 95% of all observations. Second, NTMs from the Codex Alimentarius drive this pattern, accounting for the greatest share. Third, in total, ISBs affect 868 unique HS6 products – around 17% of the HS product universe that countries trade in and regulate. As mentioned, the limited range of affected products reflects the clearly-defined mandate of the WTO SPS Agreement, the remit of which is confined to SPS objectives.

C. ASSESSING OVER-REGULATION, UNDER-REGULATION AND OVERALL "REGULATORY DISTANCE" BETWEEN INTERNATIONAL STANDARDS AND NATIONAL LEGISLATION

This section takes a first look at the similarity between the "three sisters" ISBs and national legislation. The approach followed here is similar to regulatory distance that is discussed in chapter 2, except that instead of comparing the regulations bilaterally between economies, the comparison is made for each economy with international standards. The 57 categories of SPS measures and TBT distinguished in ICNTM are used for a comparison across many countries and products. However, within each of these 57 measure types, there can still be major differences in detail and sub-requirements. For a closer inspection of those detailed differences, product-specific case studies are given in section D.

1. Assessing over- and under-regulation across products and countries

Table 3.2 in the previous section introduced the most frequent NTM categories derived from the "three sisters" ISBs. At this level of detail, the standards recommendations are compared with national mandatory legislation in a number of countries covered in the UNCTAD TRAINS database. The approach is illustrated in table 3.4.

In this example, country *i* and ISBs both apply certain maximum residue limits (A21) to the product, here referred to as a "match in regulation" (1;1 pair). As neither ISB nor the country apply fumigation requirements (A53), this is referred to as a "match in non-regulation" (0;0 pair). Both matches in regulation and non-regulation are considered as regulatory similarity. The next row shows that country *i* applies certain product quality requirements (B7), whereas ISBs do not. This case is considered "over-regulation" vis-à-vis the ISB recommendations. The last row shows the opposite case where country *i* does not require hygienic production practices (A42), but which are recommended by ISBs. This is referred to as "under-regulation". A more detailed and

Table 3.4 **Example of data mapping comparing international standards and country legislation**

NTM types and codes for a specific product at HS6 level, e.g., beef	Country *i*	International standards recommendation	Interpretation
A21: Maximum residue limit (SPS)	Yes (1)	Yes (1)	Match in regulation (1;1)
A53: Fumigation (SPS)	No (0)	No (0)	Match in non-regulation (0;0)
B7: Product quality (TBT)	Yes (1)	No (0)	Over-regulation (1;0)
A42: Hygienic production practices	No (0)	Yes (1)	Under-regulation (0;1)
… up to 57 rows of possible NTMs	…	…	…

technical explanation of this method is laid out in the online annex to this chapter.[4]

Table 3.4. also illustrates the fact that countries can both over-regulate and under-regulate at the same time. In this example, both country *i* and ISBs each apply two measures to the product. Still, country *i* over-regulates one measure (B7) and under-regulates another (A42).

Importantly, this analysis is based on a large amount of data. First, there are not just four rows of possible NTMs as shown in the example, but up to 57 rows for all possible SPS and TBT measure types. Furthermore, 868 products are considered for which there are "three sisters" ISB policy recommendations (table 3.3). Last, ISBs of many countries are compared. Through aggregation across NTM types and products, counting cases of over-regulation and under-regulation separately, gives a general idea of the overall adherence by countries to ISB recommendations.

Figure 3.2 shows the average number of over-regulated and under-regulated NTMs per product, vis-à-vis international standards. For example, India over-regulates about eight NTMs per product (vertical axis) and under-regulates about five NTMs per product (horizontal axis).

The (0;0) position can be interpreted as the perfect match with the regulatory recommendations of international standards. The country that comes closest to this is New Zealand, with an average number of 3.1 over-regulated NTMs and 6.5 under-regulated NTMs per product.

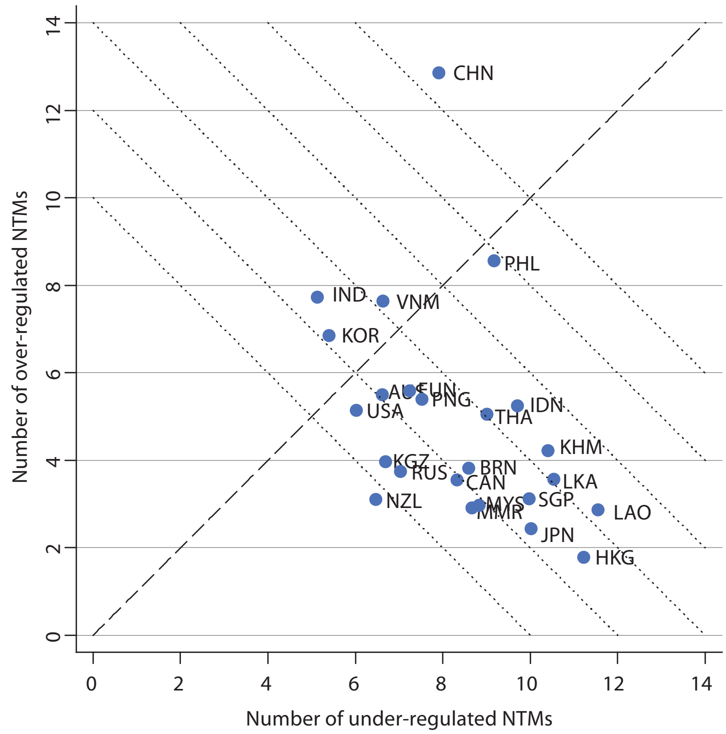
> *"Over-regulation is likely to result in higher import and consumer prices, whereas under-regulation may expose the population to higher health or environmental risks."*

Countries that tend to over-regulate are likely to have higher import and consumer prices, whereas countries that under-regulate may expose their population to higher health or environmental risks. Countries above the dashed 45° line tend to over-regulate more than they under-regulate. This is the case for China, India, the Republic of Korea and Viet Nam. All other countries below the 45° line tend to under-regulate vis-à-vis "three sisters" ISB recommendations. As a point of reference, the "three sisters" ISBs recommend, on average, 13.6 NTMs per product. The countries shown in figure 3.2 impose, on average, 10 NTMs per product. This certainly explains the overall tendency to under-regulate, as shown in figure 3.2. However, only half (5.2) of those 10 NTMs applied by the average country match the ISB recommendations. This further increases divergence from ISB recommendations and leads to an average of 8.4 under-regulated NTMs per product.

The parallel dotted lines in figure 3.2 show points with the same overall "distance" from the ISB recommendations, counting over-regulation and under-regulation equally. For example, the Republic

[4] www.unescap.org/resources/aptir-2019-online-annex-methodology-assess-regulatory-difference-and-regulatory-distance.

Figure 3.2 **Average number of over- and under-regulated measures (per product) vis-à-vis international standards, by country**



Source: UNCTAD and ESCAP calculations.

Notes: AUS – Australia; BRN – Brunei Darussalam; CAN – Canada; CHN – China; EUN – European Union; HKG – Hong Kong, China; IDN – Indonesia; IND – India; JPN – Japan; KGZ – Kyrgyzstan; KHM – Cambodia; KOR – Republic of Korea; LAO – Lao People's Democratic Republic; LKA – Sri Lanka; MMR – Myanmar; MYS – Malaysia; NZL – New Zealand; PHL – Philippines; PNG – Papua New Guinea; RUS – Russian Federation; SGP – Singapore; THA – Thailand; USA – United States; and VNM – Viet Nam.

of Korea and Australia lay on the same dotted line. The Republic of Korea over-regulates about 6.8 NTMs per product and under-regulates 5.4 NTMs per product; in sum, 12.2 differences from the ISB recommendations. Australia over-regulates about 5.5 NTMs per product and under-regulates 6.6 NTMs per product, in sum, 12.1 differences from the ISB recommendations. While the Republic of Korea tends to over-regulate and Australia tends to under-regulate, both are similar in their overall "distance" to the ISB benchmark. The following subsection further assesses this perspective.

Of course, this approach of binary similarities and differences cannot replace a detailed review of individual NTMs for specific products. For example, tolerance limits for residues (A21) can be determined for many substances. The Codex lists more than 200 dangerous substances and respective residue limits for each substance. While a "match in regulation" (1;1 pair) may be seen, as shown in table 3.4, there may be substantial differences in detail. As important as a detailed NTM-and-product-specific analysis may be, it is not feasible to conduct this for hundreds of products, dozens of measures and countries.

2. "Regulatory distance" between countries and ISBs in a single metric

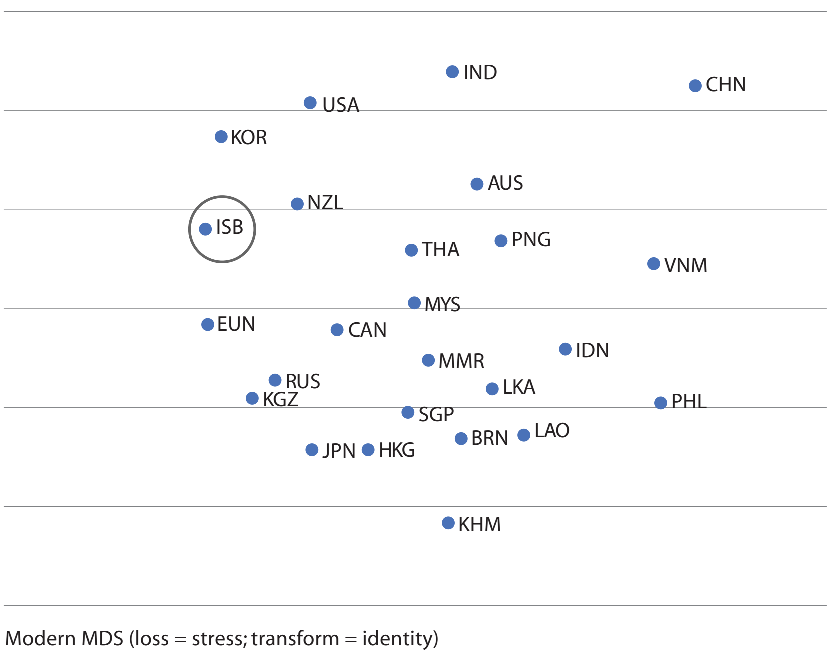
The previous subsection distinguishes between over-regulation and under-regulation as the two sides of "regulatory difference". This subsection goes one step further and reduces regulatory distance to a single indicator. The objective is to employ the indicator to simultaneously compare ISBs with countries and countries with each other.

For this single indicator, this chapter draws from, and refines, the regulatory distance metric first introduced by UNCTAD in Cadot and others (2015) and used in chapter 2. It starts out by following the same logic as that presented in table 3.4 and the previous subsection, using the NTM classification to assess similarities and differences in regulation between countries and ISB recommendations. The main distinction is that cases of over-regulation and cases of under-regulation are counted equally towards the indicator of regulatory distance. The rationale for this step is that over-regulation and under-regulation are counted as being equally undesirable, albeit for different reasons – over-regulation because it is economically costly, and under-regulation because it may cause health risks to humans, animals or plants.

When countries diverge, a regulatory distance of *1* is registered, irrespective of whether it is a case of over-regulation (1;0) or under-regulation (0;1). In all other cases, i.e., matches of regulation (1;1) or non-regulation (0;0), the regulatory distance is 0. To analyse regulatory patterns, the average "distance" across measures and products is calculated. This yields a single indicator between each pair of countries, and between each country and the "three sisters" ISB recommendations. For a more detailed and analytical explanation of the calculation, refer to the online annex to this chapter.[5]

Having called the indicator the regulatory distance, alluding to geographical distances that also cause trade costs, a "multi-dimensional scaling" method is employed that illustrates the results like a geographical map. Figure 3.3 plots all bilateral distances between countries and ISBs in a two-dimensional map. The interpretation focuses entirely on distances between the indicated points for countries/ISBs. The position of points on the horizontal and vertical axes is meaningless in this graph.

Figure 3.3 **Overall regulatory distance map**



Source: UNCTAD and ESCAP calculations.

Notes: AUS – Australia; BRN – Brunei Darussalam; CAN – Canada; CHN – China; EUN – European Union; HKG – Hong Kong, China; IDN – Indonesia; IND – India; ISB – International Standardizing Bodies; JPN – Japan; KGZ – Kyrgyzstan; KHM – Cambodia; KOR – Republic of Korea; LAO – Lao People's Democratic Republic; LKA – Sri Lanka; MMR – Myanmar; MYS – Malaysia; NZL – New Zealand; PHL – Philippines; PNG – Papua New Guinea; RUS – Russian Federation; SGP – Singapore; THA – Thailand; USA – United States; and VNM – Viet Nam.

[5] www.unescap.org/resources/aptir-2019-online-annex-methodology-assess-regulatory-difference-and-regulatory-distance.

For example, the distance between ISBs and New Zealand is short, whereas the distance between ISBs and China is long. This confirms conlusions previously made in figure 3.2.

"It is mostly developed countries that come close to the reference point of 'three sisters' ISB recommendations."

Overall, it is notable that in most of the cases only developed countries come close to the reference point of "three sisters" ISB recommendations. This may be a consequence of a stronger involvement of developed countries in the process of standard-setting. The countries closest to ISBs also tend to be important traders of agricultural goods – as exporters such as New Zealand, importers such as the Republic of Korea or both, such as the European Union and the United States.

While not distinguishing over- and under-regulation, regulatory distances between countries can also be compared. For example, while the Republic of Korea and the Russian Federation are both relatively close to the ISB recommendations, they are quite far apart from each other. This would indicate that they achieve similarity to international standards, but in such different ways that it does not lead to trade-promoting regulatory similarity between them. Conversely, Malaysia and Thailand are closer to each other than to the ISB recommendations. In fact, they are among each other's main trading partners and it is presumed here that the evident regulatory similarity is a contributing factor. Most other ASEAN member States also appear in a cluster of relative proximity, but notably those ASEAN members with a lower share of intra-ASEAN trade appear more distant from the rest of the group (Viet Nam, Cambodia, the Philippines, Indonesia). The regulatory proximity of Singapore, Brunei Darussalam and Hong Kong, China should also be noted. The proximity of the Russian Federation and Kyrgyzstan may also show the impact of the Eurasian Economic Union.

The high levels of over-regulation and under-regulations observed for China in figure 3.2 also manifest in a high overall regulatory distance from ISBs and other countries in figure 3.3. While the European Union, the United States and Australia appear close in figure 3.2, they exhibit a relatively high regulatory distance from each other. This indicates that, while having similar numbers of NTMs, their regulatory structures tend to be quite different.

D. ASSESSING REGULATORY STRINGENCY BETWEEN INTERNATIONAL STANDARDS AND NATIONAL LEGISLATION

The preceding section used metrics that compare types of NTMs used in national legislation vis-à-vis international standards. However, having the same type of NTMs does not mean that they have a similar level of stringency. Depending on detailed requirement criteria, one measure can be more stringent than the other measures of the same type.

For example, consider that both an international standard and a country's regulation have a labelling requirement for SPS reasons (A31) on pre-packaged food. On the one hand, the international standard requires an importer to label the country of origin on the product. On the other hand, the country's regulation requires labelling not only the country of origin, but also the expiry date, ingredients and name of the importer in black colour in the country's national language. In such cases, although both measures are the same A31, the measure imposed by the country's regulation is more stringent than that of the international standards.

For an in-depth understanding and comparison of NTMs, it is important to open the black box of the NTM type (e.g., A31) and look into their stringency based on their detailed criteria (e.g., labelling contents, labelling colour and labelling language). This section describes three case studies on stringency of NTMs concerning the import of cashew nuts in Viet Nam, fresh apples in Bangladesh and animal feed in the Lao People's Democratic Republic in relation to international standards adopted by the "three sisters" ISBs.

1. Methodology

After selecting countries and products of interests, the three case studies were built on the NTM data collected from national regulations of the country (hereafter, "country NTMs") as well as from international standards (hereafter, "international standard NTMs"). Where the NTM types overlap between the two, a text analysis was undertaken and each type of NTMs was decomposed into several detailed criteria – in other words, opening the black box. Then the individual criterion of the country NTMs were organized into the following five stringency categories that reflect the perspective of a country. For a more detailed description of the methodology, see the online annex to this chapter:[6]

- Over-regulated criterion: When the criterion exists only in country NTMs. For example, maximum residue limit of a harmful substance, Aflatoxin B1, exists only in Vietnamese regulations.
- Under-regulated criterion: When the criterion does not exist in country NTMs but only in international standard NTMs. For example, a maximum residue limit of harmful substance, Aflatoxin B1, does not exist in Vietnamese NTMs but is only in the Codex Alimentarius.
- Similar criterion: When the criterion exists in both country NTMs and international standard NTMs and it is equally strict. For example, the maximum residue limit of a harmful substance, Aflatoxin B1, exists both in Vietnamese regulations and the Codex Alimentarius. The limit, 5µg/kg, is the same in both cases.
- Stricter criterion: When the criterion exists in both country NTMs and international standard NTMs but the criterion in the country NTMs is stricter. For example, a maximum residue limit of a harmful substance, Aflatoxin B1, exists both in Vietnamese regulations and the Codex Alimentarius. However, Vietnamese regulations set the stricter limit of 1µg/kg.
- Less strict criterion: When the criterion exists both in country NTMs and in international standard NTMs, but the criterion in the country NTMs is less strict. For example, the maximum residue limit of a harmful substance, Aflatoxin B1, exists both in Vietnamese regulations and the Codex Alimentarius. However, Vietnamese regulations set a less strict limit of 10µg/kg.

This allowed each NTM type to be presented as shares of the five categories. For example, A21 on maximum residual limits for SPS reasons that Vietnamese regulations imposed on cashew nuts is 50% equally strict (3 out of 6 criteria), 33% over-regulated (2 criteria) and 17% stricter (1 criterium) than the international standards on cashew nuts.

2. Results

The following country and product case studies were selected:

- Viet Nam – cashew nuts in shell (HS 080131). Viet Nam is the leading exporter of shelled cashew nuts (HS 080132), capturing more than 60% of the global market share. At the same time, Viet Nam's cashew nuts exports are highly dependent on the import of cashew nuts in shells. Comparing trade regulations of this intermediate input with international standards is critical for this value chain. First, harmonization with international standards could result in the cost-effective import of intermediate inputs. Second, the domestic processing is closely related to sustainable development goals in terms of labour and environmental issues;
- Bangladesh – fresh apple (HS 080810). While Bangladesh does not produce apples, its middle class is gradually demanding more diversified foods, including imported fresh apples. Indeed, today fresh apples are one of the most imported fresh fruits in Bangladesh. During the past five years, Bangladesh imported apples totalling $540.80 million. Moreover, private sector associations, such as the Bangladesh Fresh Fruits Importer Association, have voiced great interest in further understanding the regulatory burden vis-à-vis international standards;
- The Lao People's Democratic Republic – animal feed (HS 230990). The Lao People's Democratic Republic remains an agricultural, semi-subsistence economy, in which animal feed serves as a critical input for the plantation and livestock sector. Indeed, animal feed saw high import values during recent years, amounting to around $26 million-$32 million annually between 2015 and 2018. Furthermore, consultations with stakeholders confirmed the need to understand the extent to which national regulations are in line with international standards.

The following list summarizes the NTMs that these countries impose, those that are recommended by international standards, and those that overlap between the two (see online annex table 3.1[7] for further details):

[6] www.unescap.org/resources/aptir-2019-online-annex-methodology-assessing-regulatory-stringency-ntms.
[7] www.unescap.org/resources/aptir-2019-online-annex-ntms-derived-international-standards.

- For cashew nuts in shell, Vietnamese regulations apply 21 types of NTMs, while the international standards apply 31 types of NTMs. They share 11 NTM types in common;
- For fresh apples, Bangladesh regulations apply 19 types of NTMs, while the international standards apply 29 types of NTMs. They share 9 NTM types in common;
- With regard to animal feeds, the Lao People's Democratic Republic regulations apply 15 types of NTMs, while the international standards apply 34 types of NTMs. They share 6 NTM types in common.

It should be noted that the international standards recommend more types of NTMs (between 31 and 34) than those imposed by the above three countries (between 15 and 21 types). Of these measures, 6 to 11 measures overlap (see online annex table 3.2[8]). This means that about half of NTMs applied by these countries are the same types as in the international standards.

> *"Even when the countries examined in the case studies apply the same type of NTMs as the international standards, the NTMs often have a different level of regulatory stringency."*

In the case of the 6 to 11 types of overlapping NTMs, the text analysis of national regulations and the international standards revealed that even when Viet Nam, Bangladesh and the Lao People's Democratic Republic apply the same type of NTMs as the international standards, the NTMs often have a different level of regulatory stringency. Depending on the product, country and NTM type, a country NTM is more or less stringent than an international standard NTM.

Figures 3.4 to 3.6 show the results of regulatory stringency for each of the three country case studies. The horizontal axis shows the overlapping types of NTMs as reflected in the column "Commonly existing NTMs" in online annex table 3.2.[9] The vertical axis shows a proportion of five stringency categories for each NTM type, as explained above. Furthermore, dimensions above 0 indicate the share of over-regulated or stricter criteria that a country NTM has vis-à-vis an international standard NTM. Conversely, dimensions below 0 indicate a share of under-regulated or less strict criteria of a country NTM in comparison to an international standard NTM. Therefore, one can visually grasp that the higher the dimension that a bar plot is located in, the more stringent a country NTM is than in the case of the same type of international standard NTM. In the discussion below, the perspective of the countries in the case studies is taken into account when evaluating regulatory stringency.

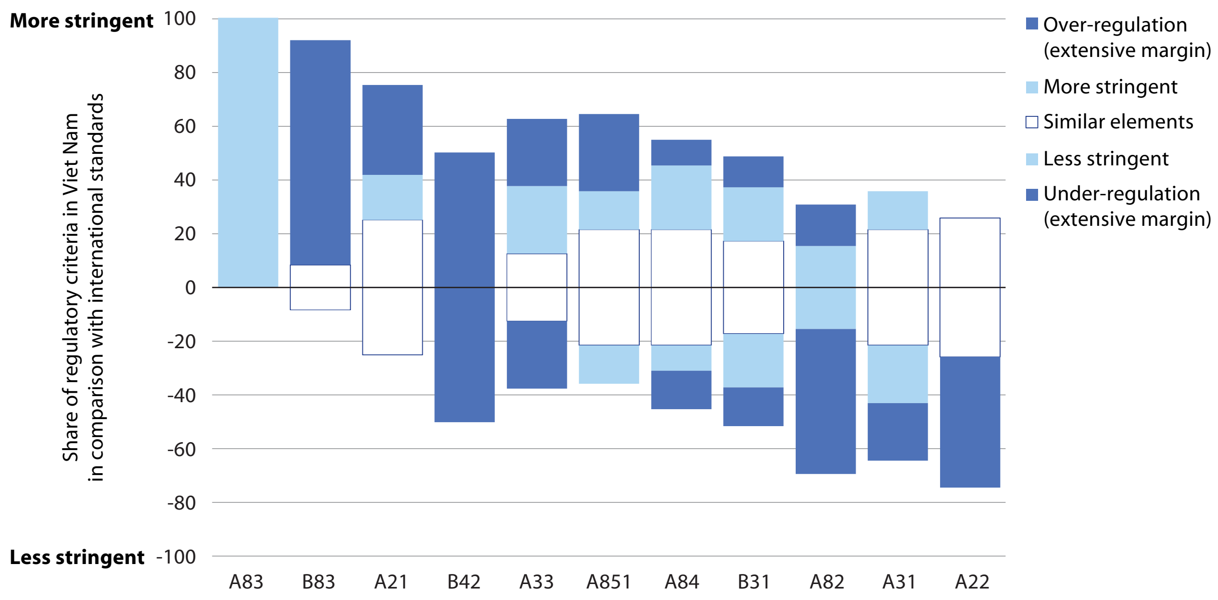
Figure 3.4 shows the relative stringency in Viet Nam's NTMs on cashew nuts vis-à-vis international standard NTMs. Three findings stand out. First, the white bar plots represent the share of the similarly stringent criteria. Of 11 types of NTMs that overlap between Viet Nam and international standards, 8 types are also partially similar in terms of stringency (indicated by the white areas). The share of similarly stringent criteria varies from 16% to 50%, depending on the NTM type.

Second, individual NTM types tend to exhibit a heterogenous pattern of dissimilarity. Some NTMs in Viet Nam are more stringent (indicated by bars above zero in figure 3.4). However, others are notably less stringent (indicated by the bars below zero in figure 3.4). Specifically, Viet Nam's A83 and B83 on certification requirements exhibit greater regulatory stringency than those of international standards. For example, Viet Nam requires a certificate with regard to food containing genetically modified ingredients and irradiated food, unlike the international standards. Consideration of the context of Viet Nam's cashew value chain can shed light on this result. Viet Nam's overall export competitiveness in shelled cashews highly relies on the import of cashew nuts in shell, the product of interest. As a result, certification standards for this intermediate input serve to safeguard its quality and help underpin its value proposition.

Third, types of divergence that drive dissimilarity in regulatory stringency between Viet Nam's NTMs and international standards are considered. Divergence is mostly due to criteria that only exist in either Vietnamese regulations or the international standards (dark blue areas in figure 3.4). Viet Nam's more stringent NTMs exhibit a large share of the over-

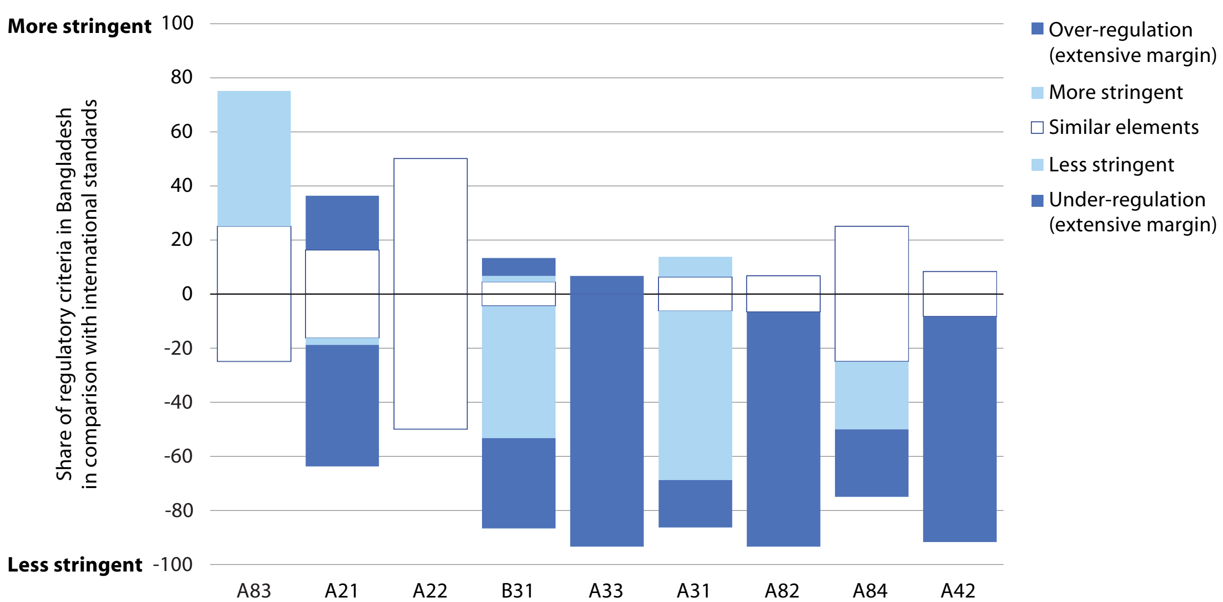
[8] www.unescap.org/resources/aptir-2019-online-annex-methodology-assess-regulatory-difference-and-regulatory-distance.
[9] Ibid.

Figure 3.4 Regulatory stringency in Viet Nam's imports of cashew nuts in shell, by NTM type



Source: UNCTAD and ESCAP calculations.

Figure 3.5 Regulatory stringency in Bangladesh's imports of fresh apples, by NTM type



Source: UNCTAD and ESCAP calculations.

regulated criteria that lack any equivalence in international standards. By the same token, its less stringent NTMs show a large share of the under-regulated criteria; in other words, the criteria that are absent in Viet Nam.

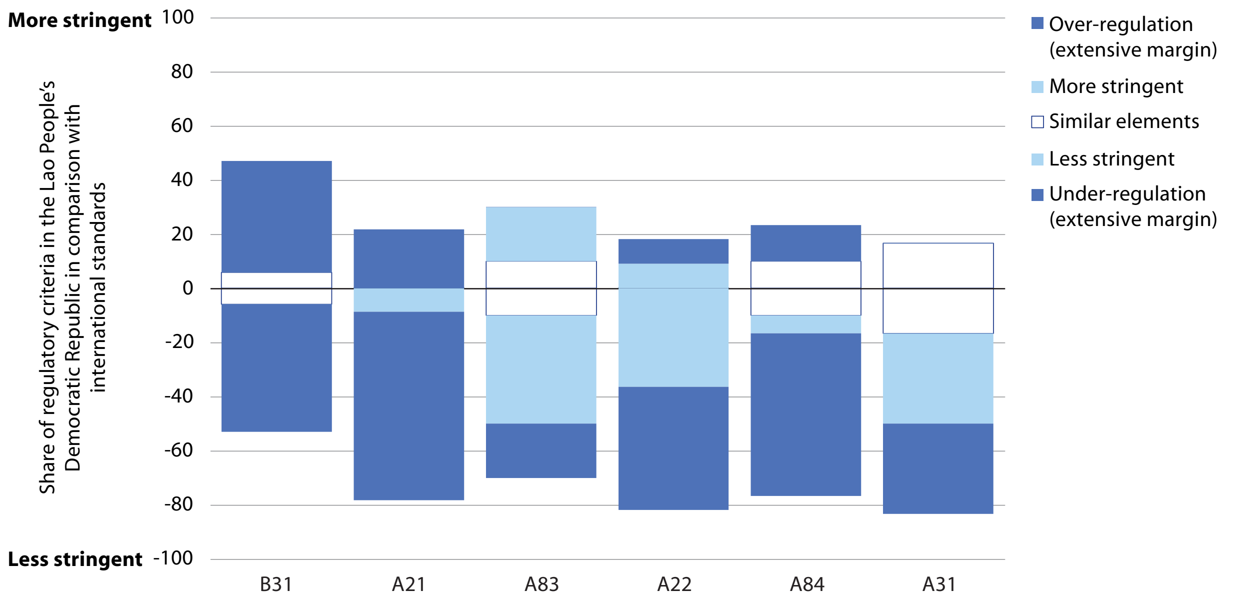
Figure 3.5 reveals the findings of regulatory stringency for imports of fresh apples in Bangladesh. As before, the three concepts of overall similarity, pattern of dissimilarity and driving margin are used to evaluate regulatory stringency. First, the NTMs in Bangladesh display moderate similarity in regulatory stringency vis-à-vis international standard NTMs. All NTMs have some share of similarly stringent criteria, which is on average 31%.

Notably, Bangladesh's A22 on the restricted use of certain substances for SPS reasons has 100% similar stringency to that of the international standards. However, this does not represent an anomaly: in the absence of national standards, many developing countries adopt the ISBs' international standards *per se* as its own standards. In this case, Bangladesh adopted the Codex Alimentarius's "General Standard for Food Additives (CODEX STAN 192-1995)" as its own standards. In fact, section 9 (3) of the "Use of Food Additives Regulations, 2017" of Bangladesh states that if the Regulation does not mention the name of specific food additives or others relevant agents, the "General Standard for Food Additives (CODEX STAN 192-1995)" should be followed (Bangladesh Nirapod Authority, 2017). In addition, the Bangladesh Standard and Testing Institute (BSTI) Standard Catalogue, 2018 lists international standards that are adopted as Bangladesh standards (BSTI, 2018).

Second, Bangladesh's NTMs are largely less stringent and under-regulated vis-à-vis international standards (light and dark blue areas, respectively, below 0 in figure 3.5). On average, less strict and under-regulated criteria amount to 58% of all detailed criteria. Further, this regulatory laxness is most pronounced for A33 on packaging requirements, A31 and B31 on labelling requirements as well as A82 on conformity assessment requirements.

Last, under-regulated criteria – which are absent in Bangladesh's NTM despite being recommended by the international standards – tend to dominate. They shape A82 on conformity assessment requirements, A33 on packaging requirements, A21 tolerance limits for residues and A42 on hygienic practices (dark blue areas below 0 in figure 3.5). Two distinctive

Figure 3.6 **Regulatory stringency in the Lao People's Democratic Republic's imports of animal feeds, by NTM type**



Source: UNCTAD and ESCAP calculations.

exceptions are A31 and B31 on labelling requirements, which are driven by overwhelmingly less strict criteria (light blue areas below 0).

Figure 3.6. shows the relative stringency in the Lao People's Democratic Republic's regulation of animal feed vis-à-vis international standards. The same conceptual structure is used to evaluate regulatory stringency here, focusing on overall similarity, pattern of dissimilarity and driving margins. First, compared with the previous case studies, the Lao People's Democratic Republic NTMs exhibit the lowest similarity with international standards. Only a few and small white bar plots associated with regulatory similarity are shown. On average, the share of similarly stringent criteria for all NTM types is just 14%.

Second, dissimilarity is driven by less stringent or under-regulated criteria (bars below 0 in figure 3.6). Last, under-regulated criteria (dark blue areas), rather than less strict criteria (light blue areas), drive this pattern of regulatory laxness.

In summary, the Lao People's Democratic Republic has the smallest overlap with international standards, both in terms of both NTM types (only six overlapping types) and NTM stringency (only 14% are similarly stringent on average). Also, those six overlapping NTM types are all less stringent. This hints at the limited capacity of the Lao People's Democratic Republic in various aspects. First, the country has limited capacity to formulate NTMs. It is not fully exploiting the benefit of using international standards. Further, many of the regulations that could have been in line with international standards remain outdated, such as the *Quality Animal Feed Standard and Animal Feed Recipes Handbook, 2001* (Lao People's Democratic Republic, 2001). Second, the capacity to enforce the NTMs may also be low. Generally, the country lacks technical expertise in the area of animal feed along the value chain. In addition, existing animal feed laboratories need more resources.

E. CONCLUSION

The objective of this chapter was the assessment of the use of international standards and their similarity to national technical regulations. Technical regulations have important non-trade objectives of protecting health, safety and the environment, yet they also raise production and trade costs, affecting economic development. A significant trade barrier, especially for middle- and lower-income countries as well as small and medium-sized enterprises, is the heterogeneity of regulations. International standards are aimed at harmonizing national regulations and standards. The international standards referenced in the WTO SPS Agreement, the "three sisters" of Codex Alimentarius, and IPPC and OIE standards, have even been developed to provide "appropriate levels of protection" while facilitating trade. They provide a natural reference point as the benchmark against which national measures and regulations are evaluated.

The structural regulatory similarity analysis compares national regulations with the "three sisters" international standards at the level of ICNTM. Most countries analysed here diverge from the recommendations of the standards and have less measures. A likely reason is that many developing countries lack the necessary quality infrastructure to assess conformity, and thus apply less regulations. Many of the countries with a relatively high similarity to the international standards are significant agricultural goods traders, either as agricultural exporters such as New Zealand – which is a Cairns Group member – or as food importers, such as the Republic of Korea.

While such structural analysis allows the assessment of many countries, it does not allow the comparison of the stringency of national regulations with international standards. A regulatory stringency approach was applied in the case studies looking at certain products in Bangladesh, the Lao People's Democratic Republic and Viet Nam. The analysis of regulatory stringency confirmed the findings about the regulatory structure. Where countries diverge from the international standards, they more often underregulate than overregulate. A sector that is relatively more integrated in global value chains is closer to the international standard than other sectors.

This analysis focused on laws and regulations and did not assess the actual implementation of those regulations. It is very likely that, in some cases, implementation in terms of border controls checking conformity assessments is lagging behind the formal requirements including due to a lack of institutional and quality infrastructure. As such, chapter 4 looks at best practices and recommendations on these issues as well as others to streamline NTMs for sustainable development.

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