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**Classification of Natural Resources:
Linking the 1993 SNA REV.1 and the Revised SEEA-2003**

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CLASSIFICATION OF NATURAL RESOURCES: LINKING THE 1993 SNA REV.1 AND THE REVISED SEEA-2003

Issue paper

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A. Introduction

1. The update of the 1993 SNA considered, among many issues, the issue of classification and terminology of non-financial assets. The revised asset classification in the 1993 SNA Rev.1 has been greatly aligned, for what concerns the category “natural resources”, to the classification of assets presented in the SEEA-2003. A few differences remain and are discussed in detail below.

2. The objectives of these papers are: (a) to identify the remaining differences between the assets classification in the 1993 SNA Rev.1 and the SEEA-2003; and (b) to suggest ways to reconcile these differences in the revised SEEA-2003. In general, our approach has been to suggest reconciling the two classifications as much as possible, in order to avoid confusion.

3. The paper only addresses the classification of items in the balance sheet except for contracts, leases and licenses which are still under discussion. It does not address the classification of flows, which should be the topic of a different paper.

4. The paper presents at the outset a brief description of the definition of an asset in the 1993 SNA and in the SEEA-2003, it is the point of departure for developing the asset classification. At the end of the paper there is a list of questions to the London Group to guide the discussion.

5. An earlier version of this paper has been discussed at the London Group meeting in New York in June 2006.

B. Definition of assets

Definition of asset in the 1993 SNA

6. The 1993 SNA defines economic assets, the assets recorded in the balance sheets of the System, as entities:

- (a) Over which ownership rights are enforced by institutional units, individually or collectively; and
- (b) From which economic benefits may be derived by their owners by holding them, or using them, over a period of time. (1993SNA para 10.2)

¹ The paper represents the views of the authors and not those of the United Nations.

The above definition will remain unchanged in the 1993 SNA Rev.1. The definition of assets, however will be included in Chapter 3 of the 1993 SNA Rev.1 which is not yet been written.

7. Assets do not necessarily have to be owned by individual units and may be owned collectively by groups of units or governments on behalf of the communities. In addition there may be others that cannot be treated as economic assets because they do not actually belong to any particular units. These include not only those whose existence is unknown but also those including uncultivated forests, that may be known to exist but remain so remote or inaccessible that in practice they are not under the effective control of any units. (1993SNA para.10.10)

8. In order to comply with the general definition of an economic asset, natural assets must not only be owned but capable of bringing economic benefits to their owners, given the technology, scientific knowledge, economic infrastructure, available resources and set of relative prices prevailing on the dates to which the balance sheet relates or expected in the near future. (1993SNA para.10.11)

9. The 1993 SNA Rev.1 has broadened the scope of classification of assets to cover some natural resources that were previously not covered in the 1993 SNA. This is the case for example for certain categories of water and fish in international waters, insofar as they meet the criteria (a) and (b) outlined in para 6. A more detailed discussion on the expansion of the 1993 SNA Rev.1 asset classification is discussed below.

Definition of assets in SEEA-2003

10. The asset boundary in the SEEA-2003 applies to environmental assets, which are defined in terms of the provision of environmental functions. Environmental functions are the uses to which the physical surroundings are put for economic ends (SEEA-2003 para 7.31). These environmental functions yield benefits to the economy. Those benefits can be grouped into two categories use and non-use benefits (SEEA-2003 para 7.35). Economic benefits are a small portion of those benefits and are included in “direct use benefits”. The inclusion of benefits such as option and bequest benefits broadens the scope of the SEEA asset boundary to include all land and natural resources and ecosystems (SEEA-2003 para 7.35-7.39).

11. The definition of environmental assets in the SEEA-2003 is presented in terms of the description of the functions the assets provide. It runs over several paragraphs making it difficult to have a clear cut definition.

12. ***We recommend that the definition of assets presented in the SEEA-2003 be tightened.***

13. The SEEA-2003, in the asset accounts module, considers the environment as the system of reference. The environment is the holistic system which also includes the

economy as part of it. The definition of assets in the SEEA-2003, which looks at use and non-use benefits that can be derived from the asset, is a direct consequence of this approach. This approach is not fully consistent with the approach taken in the modules on physical and hybrid accounts, which take the economy as reference and only look at the interactions between the environment and the economy. This approach is also not consistent with the 1993 SNA which takes the perspective of the economy and considers the environment only in-so-far as it is an input in the production process, providing that the goods and services provided by the natural is scarce and thus carries a positive price.

14. The change in perspective described above has implications in the asset classification in the SEEA-2003.

C. Classification of assets

15. The main changes in the classification of assets in 1993 SNA Rev.1, related to natural resources, are outlined in Table 1 below. They include the following:

- (a) Replacing the term “tangible non-produced assets” with “natural resources”;
- (b) Split the old category “intangible non-produced assets” into "Contracts, leases and licences" and "Goodwill and marketing assets". The first category is of relevance to the SEEA;
- (c) Within buildings and structures, a term is added for land improvements. This is a major change as compared to the 1993 SNA, where land improvements were recorded as capital formation to the non-produced asset “land”. The SEEA-2003 followed the 1993 SNA and should be updated accordingly;
- (d) The item "mineral exploration" has been modified to "mineral exploration and evaluation" to emphasize that the coverage (and probable data source) is that of the international accounting standards;
- (e) Classification of natural resources. This is discussed in more details below.

Classification of natural resources – Differences between the 1993 SNA Rev.1 and the SEEA-2003

16. To start with, the coverage of the category “natural resources” in the 1993 SNA Rev. 1 and in the SEEA-2003 differs. In the 1993 SNA Rev.1, it includes land in addition to subsoil assets, non-cultivated biological resources, water resources and other resources. In the SEEA-2003 asset classification, the term “natural resources” includes mineral and energy resources, soil resources, water resources, biological cultivated and non-cultivated resources.

17. There are the following differences between the 1993 SNA Rev.1 and the SEEA-2003 coverage of “natural resources”:

- (a) Land is included as part of natural resources in the 1993 SNA Rev.1 but it appears as a separate category in the SEEA-2003. Further the treatment of recreational land differs;
- (b) Soil is not a separate item in the classification in the 1993 SNA Rev.1 but it is included in land;
- (c) Presentation/order of items in the classifications in 1993 SNA Rev.1 and those in the SEEA-2003, including the classification of cultivated biological resources.

18. The annex presents the items in the 1993 SNA Rev.1 asset classification which are relevant for the SEEA. It also include the asset classification of the SEEA-2003 for ease of reference.

(a) Land

19. Land is included as part of natural resources in the 1993 SNA Rev.1 but it appears as a separate category in the SEEA-2003.

20. ***We recommend aligning the revised SEEA-2003 asset classification with the 1993 SNA Rev.1 that is including land as part of natural resources.***

21. The 1993 SNA Rev.1 does not specify a disaggregation of land, but it recommends that if a disaggregation is required, it should be according to that used in the SEEA-2003 (1993 SNA Rev.1 – draft para 10.166):

Land under buildings and structures and associated surface water

Agricultural land and associated surface water

Other land and associated surface water

Wooded land

Other

where “Other” includes major water bodies and other land in the SEEA-2003 asset classification.

22. In both the 1993 SNA Rev.1 and the SEEA-2003, the land classification is a mix of land use and land cover, although it is closer to a land use type of classification. The SEEA goes further and proposes a matrix to cross-classify land use (as represented by the classification of land as in the 1993 SNA) and land cover, which classifies the land exclusively on the basis of the cover of the land and not on the basis of the function. Land cover type of classification is represented by the category “ecosystems” in the SEEA-2003 classification of environmental assets.

23. The SEEA-2003 uses the same principle of valuation of land as the 1993 SNA. If the value the buildings or structures, or forest or water body (in terms of water volume)

cannot be separately identified from the underlying land, the value of the compound asset (land and building, structure or forest) should be allocated to the highest value asset.

24. The 1993 SNA used to include a category “recreational land” as an exhaustive category. In the spirit of reconciliation recreational land does no longer appear in the 1993 SNA Rev.1. It still appears as “of which” item under the relevant heading. The reason for this, is that in the SEEA, the asset categories are determined by use. Since recreational land typically has a dual use, it can be allocated to two headings. In the case of the 1993 SNA, the principle basis for the categorisation is that of economic value. Thus land which is used both for agriculture and recreation is treated as one or the other depending on whether its value as agricultural land exceeds that of its value of recreational land or viceversa.

25. At the last London Group meeting in New York it was agreed to remove the category “of which recreational land” as a disaggregation of the land in the revised SEEA-2003.

(b) Soil resources

26. The 1993 SNA Rev.1, explicitly mentions soil in the definition of land:

Land consists of the ground, including the soil covering and any associated surface waters, over which ownership rights are enforced and from which economic benefits can be derived by their owners by holding or using them.

27. In the 1993 SNA they are included in land. The value of the soil is in fact intrinsic to the value of the land. In the SEEA-2003, soil resources are identified as a separate item.

28. ***Given the importance of soil resources, especially in some countries, we suggest maintaining the difference between the 1993 SNA Rev.1 and the revised SEEA-2003, that is maintaining soil as a separate category in the SEEA-2003..***

(c) Presentation/order of items in the classification of assets in 1993 SNA Rev.1 and SEEA-2003.

29. Cultivated biological resources are included under “Natural resources” in the SEEA-2003. This has to do with the presentation/order of the classification of assets in the 1993 SNA Rev.1 and those in the SEEA-2003.

30. ***We recommend presenting cultivated biological resources as part of produced assets as in the 1993 SNA Rev.1.***

31. There are two other issues linked with the presentation/order of items in the classification of assets. One has to do with the fact that the SEEA-2003 does not make explicit the distinction between fixed assets, inventories and non-produced assets,

although this difference can be inferred from the various items (e.g. cultivated plants yielding repeat products are fixed assets and yielding one-time harvest are inventories, non-cultivated timber resources are non-produced assets). The other has to do with the order of presentation of the items in both classifications.

32. Table 1 presents an example of the different presentation. The reason for the differences in grouping is an issue of perspective. The 1993 SNA groups the items according to whether they are produced as a result of a production process or a natural process and according to whether they are used more than once in the production process. This also involves different valuation. The SEEA-2003 groups them according to the resource and further subdivides them on whether they are produced or non-produced. It takes the perspective of the physical aspect.

Table 1. Presentation of cultivated and uncultivated biological resources in the 1993 SNA Rev.1 and the SEEA -2003

1993 SNA Rev.1	SEEA-2003
Produced assets	Biological resources
Fixed assets	Timber resources
Cultivated biological resources	Cultivated
Animal resources yielding repeat products	Non-cultivated
Tree, crop and plant resources yielding repeat products	Crop and plant resources other than timber
Inventories	Cultivated
Work in progress	Yielding repeat products
Work in progress on cultivated biological resources	Yielding one-time harvests
Non-produced assets	Non-cultivated
Natural resources	Aquatic resources
Non-cultivated biological resources, water resources and other natural resources	Cultivated
	Non cultivated
	Animal resources
	Cultivated
	Non cultivated

33. Because of the difference in perspective, the order in the presentation of the items in the classification of assets of the 1993 SNA Rev. 1 and the SEEA-2003 differs. The 1993 SNA Rev.1 starts with land and continues with other natural resources that are input in the production process. The SEEA-2003 starts with natural resources as providing use benefits through the provision of raw materials and energy used by the economy and are subject to quantitative depletion through human activities. It follows with land and surface water, as providers of direct and indirect use benefits (or may provide such benefits in the future) through the provision of space for economic and non-economic human activities; and lastly it includes ecosystems as they provide indirect use benefits for humans in the form of a variety of services including cleansing of fouled air, water and soil and protection against solar radiation, regulation of geochemical flows and others.

34. *We suggest aligning the order of the items in the classification of assets in the revised SEEA-2003 with that of the 1993 SNA Rev.1.*

Mineral and energy resource

35. The 1993 SNA uses the term “reserve” rather than “resource”. This seems to be consistent with the asset boundary of the 1993 SNA which considers assets as those entities from which economic benefit can be derived. “Reserve” is that part of the “resource” that can be exploited. Further, the 1993 SNA uses the term “coal, oil and mineral gas reserves” instead of “fossil fuels”.

36. ***We recommend that the 1993 SNA Rev.1 includes as part of the mineral and energy reserves the total of proven and probable reserves, defined as those reserves that have a probability higher than 50 percent to be exploited.***

Non-cultivated biological resources

37. The current draft of the 1993 SNA Rev.1 does not provide a disaggregation for non-cultivated biological resources. It however includes forest and aquatic animals. As for aquatic animals, also those in international water over which ownership rights and benefits are derived, are considered within the 1993 SNA Rev.1 asset boundaries.

Water resources

38. The 1993 SNA Rev.1 is fully in line with the SEEA-2003, which classify water resources as “surface water” and “groundwater”.

Ecosystems

39. Ecosystem assets – are defined as groups of organisms and the physical environment they inhabit (Ricklefs 1990). They are recognized in the SEEA as assets for the provision of environmental services. Some elements of the environment are classified twice in the SEEA asset classification, once as natural assets and the other as components of ecosystems. For example forests are used as a source of timber (Natural resource) and as providing other benefits (e.g. carbon absorption) so they are also classified as ecosystems. There is an element of double counting introduced deliberately to enable different environmental aspects to be examined.

40. ***We recommend that the 1993 SNA Rev.1 mention that several ecosystem goods and services are implicitly included in the SNA, although not explicitly recognized in the classification.***

D. QUESTION TO THE LONDON GROUP

1. Does the London Group agree to tighten the definition of assets in the SEEA-2003, which now runs through several paragraphs?
2. Do you agree with including land as part of natural resources in the asset classification, rather than show it as a separate category?

3. Do you agree with maintaining soil as a separate item as part of the SEEA-2003 asset classification?
4. Do you agree aligning the structure of the SEEA-2003 classification with that of the 1993 SNA Rev.1, introducing the category produced asset and to present cultivated biological resources as fixed asset or inventory as relevant?
5. Do you agree to fully align the order the items of the classification of assets in the revised SEEA-2003 with those of the 1993 SNA?

ANNEX

1993 SNA Rev.1 Asset classification and comparison with the SEEA-2003²

1993 SNA Rev.1	Comments
Non-financial assets Produced assets Fixed assets Other buildings and structures Land improvements Cultivated biological resources Animal resources yielding repeat products (including aquatic resources) Tree, crop and plants yielding repeat products Costs of ownership transfer on non-produced assets Intellectual property products Mineral exploration and evaluation Inventories Work-in-progress Work-in-progress on cultivated biological resources	No longer classified under the non-produced category “land”. SEEA should change Change in terminology from the 1993 SNA The term has been modified to emphasize that the coverage is that of international accounting standards SEEA should be modified accordingly.
Non-produced assets Natural resources Land Land under buildings and structures and associated surface water Agricultural land and associated surface water Other land and associated surface water Wooded land Non-wooded land Mineral and energy reserves Coal, oil and natural gas reserves Metallic mineral reserves Non-metallic mineral reserves Non-cultivated biological resources <i>(includes tree, animal and plant resources that yield both once-only and repeat products)</i> Water resources Surface water Groundwater Other natural resources Radio spectra Other Contracts, leases and licenses Permission to use natural resources	Change in terminology from the 1993 SNA not in line with SEEA-2003 in terms of coverage. Land improvements are classified under other building and structures. It includes not only land under cultivation but also pasture land appropriated by farmer LG agreed to remove recreational land from the asset classification. SNA reserves: proven + probable, SEEA resources SEEA: fossil fuels In line with SEEA-2003 Change “timber” with tree resources in the SEEA-2003 In line with SEEA and SEEAW

² The items in bold are items whose terminology has changed from the 1993 SNA.

SEEA asset classification

Asset category	Within SNA boundary	Outside SNA boundary
EA.1 Natural resources		
<p>EA.11 Mineral and energy resources</p> <p><i>EA.111 Fossil fuels (cubic metres, tons, tons of oil equivalent, joules)</i></p> <p><i>EA.112 Metallic minerals (tons)</i></p> <p><i>EA.113 Non-metallic minerals (tons)</i></p>	<p>(AN.212) [1]</p> <p>(AN.2121)</p> <p>(AN.2122)</p> <p>(AN.2123)</p>	<p>[2]</p>
<p>EA.12 Soil resources (cubic metres, tons)</p> <p><i>EA.121 Agricultural</i></p> <p><i>EA.122 Non-agricultural</i></p>	<p>Not applicable [3]</p>	
<p>EA.13 Water resources (cubic metres)</p> <p><i>EA.131 Surface water</i></p> <p style="padding-left: 20px;">EA.1311 Artificial reservoirs</p> <p style="padding-left: 20px;">EA.1312 Lakes</p> <p style="padding-left: 20px;">EA.1313 Rivers and streams</p> <p><i>EA.132 Groundwater</i></p>	<p>Not applicable [4]</p> <p style="background-color: yellow;">(AN.214)</p>	<p>[16]</p>
<p>EA.14 Biological resources</p> <p><i>EA.141 Timber resources (cubic metres)</i></p> <p style="padding-left: 20px;">EA.1411 Cultivated</p> <p style="padding-left: 20px;">EA.1412 Non-cultivated</p> <p><i>EA.142 Crop and plant resources, other than timber (cubic metres, tons, number)</i></p> <p style="padding-left: 20px;">EA.1421 Cultivated</p> <p style="padding-left: 40px;">EA.14211 Yielding repeat products (vineyards, orchards etc.)</p> <p style="padding-left: 40px;">EA.14212 Yielding one-time harvests (crops etc.)</p> <p style="padding-left: 20px;">EA.1422 Non-cultivated</p> <p><i>EA.143 Aquatic resources (tons, number)</i></p> <p style="padding-left: 20px;">EA.1431 Cultivated</p> <p style="padding-left: 20px;">EA.1432 Non-cultivated</p>	<p>(Part of AN.1221)</p> <p>(Part of AN.213) [5]</p> <p>(AN.11142)</p> <p>(Part of AN.1221)</p> <p>(Part of AN.213) [7]</p> <p>(Part of AN.213) [9]</p>	<p>Not applicable</p> <p style="background-color: green;">[6]</p> <p>Not applicable</p> <p style="background-color: green;">[8]</p> <p>Not applicable</p> <p style="background-color: green;">[10], [17]</p>

<i>EA.144 Animal resources, other than aquatic (number)</i>		
EA.1441 Cultivated		Not applicable
EA.14411 Livestock for breeding purposes	(Part of AN.11141)	
EA.14412 Livestock for slaughter	(Part of AN.1221)	
EA.1442 Non-cultivated	(Part of AN.213) [11]	[12]
EA.2 Land and surface water (hectares)	(AN.211)	Not applicable [13]
Of which, recreational land	(AN.2113)	
EA.21 Land underlying buildings and structures	(AN.2111)	
<i>EA.211 In urban areas</i>		
EA.2111 For dwellings		
EA.2112 For non-residential buildings		
EA.2113 For transportation and utilities		
<i>EA.212 Outside urban areas</i>		
EA.2121 For dwellings		
EA.21211 Farm		
EA.21212 Non-farm		
EA.2122 For non-residential buildings		
EA.21221 Farm		
EA.21222 Non-farm		
EA.2123 For transportation and utilities		
EA.21231 Roads		
EA.21232 Railways		
EA.21233 Electric power grids		
EA.21234 Pipelines		
EA.22 Agricultural land and associated surface water	(AN.2112)	
<i>EA.221 Cultivated land</i>		
EA.2211 For temporary crops		
Of which, drained		
Of which, irrigated		
EA.2212 For permanent plantations		
Of which, drained		
Of which, irrigated		
EA.2213 For kitchen gardens		
EA.2214 Temporarily fallow land		
<i>EA.222 Pasture land</i>		

EA.2221 Improved		
EA.2222 Natural		
EA.223 Other agricultural land		
EA.23 Wooded land and associated surface water	(Part of AN.2112, AN.2113 and AN.2119)	
EA.231 Forested land		
EA.2311 Available for wood supply		
EA.2312 Not available for wood supply		
EA.232 Other wooded land		
EA.24 Major water bodies	(Part of AN.2119)	
EA.241 Lakes		
EA.242 Rivers		
EA.243 Wetlands		
EA.244 Artificial reservoirs		
EA.25 Other land	(Part of AN.2119)	
EA.251 Prairie and grassland		
EA.252 Tundra		
EA.253 Sparsely vegetated/barren land		
EA.254 Permanent snow and ice		
EA.3 Ecosystems [14, 15]	Not applicable	
EA.31 Terrestrial ecosystems		
EA.311 Urban ecosystems		
EA.312 Agricultural ecosystems		
EA.313 Forest ecosystems		
EA.314 Prairie and grassland ecosystems		
EA.315 Tundra ecosystems		
EA.316 Dryland ecosystems		
EA.317 Other terrestrial ecosystems		
EA.32 Aquatic ecosystems		
EA.321 Marine ecosystems		
EA.322 Coastal ecosystems		
EA.323 Riverine ecosystems		
EA.324 Lacustrine ecosystems		
EA.325 Other aquatic ecosystems		

EA.33 Atmospheric systems		
EA.M Memorandum item: intangible environmental assets		
EA.M1 Mineral exploration	(AN.1121)	Not applicable
EA.M2 Transferable licences and concessions for the exploitation of natural resources	(Part of AN.222)	
EA.M3 Tradable permits allowing the emission of residuals	(Part of AN.222)	
EA.M4 Other intangible non-produced environmental assets	(Part of AN.222)	

Note: Light shading indicates that monetary valuation is normally possible; dark shading that, while physical valuation is possible, it may be doubtful that monetary valuation is possible.

- [1] The mineral and energy resource assets that fall within the SNA boundary are those that are defined as proven reserves. In practice, though, some countries may include a wider class of resources even within the SNA accounts.
- [2] The mineral and energy resource assets that fall outside the SNA boundary are those that are defined as probable, possible and speculative reserves.
- [3] The value of soil resources cannot be separated from the value of the land of which they form an integral part. Therefore, only the physical extent of soil resources is measured in the SEEA.
- [4] The value of surface water as a natural resource cannot be separated from its value as an integral component of the national territory. Therefore, only the physical extent of surface water resources (measured in volumetric terms) is included in the natural resource category of the asset classification.
- [5] The non-cultivated timber resources that fall within the SNA boundary are those that are capable of producing a merchantable stand within a reasonable period of time, are accessible for logging purposes, and are not protected from logging.
- [6] The non-cultivated timber resources that fall outside the SNA boundary are those that are not suitable for timber harvesting, because of low productivity, inaccessibility and/or protection from logging.
- [7] The non-cultivated crop and plant resources that fall within the SNA boundary are those that provide harvestable materials that may be traded in the market or used for subsistence purposes, that are accessible and that are not protected from harvesting.

- [8] The non-cultivated crop and plant resources that fall outside the SNA boundary are those that potentially provide harvestable materials, but that are not suitable for harvesting because of inaccessibility or protection from harvesting.
- [9] The non-cultivated aquatic resources that fall within the SNA boundary are those that are the target of commercial or subsistence fishers, are found within the exclusive economic zone (EEZ) of the nation, are close enough to existing markets to be profitably exploitable and are not protected from harvesting.
- [10] The non-cultivated aquatic resources that fall outside the SNA boundary are those that are potentially harvestable, but that are not currently the target of fishers because they are not of commercial or subsistence interest, are located in remote fishing zones or are protected from harvesting.
- [11] The non-cultivated animal resources that fall within the SNA boundary are those that are the target of commercial, subsistence or sport hunters, are accessible for hunting and are not protected from harvest.
- [12] The non-cultivated animal resources that fall outside the SNA boundary are those that are potentially harvestable, but that are not currently the target of hunters because they are not of commercial, subsistence or sport interest, are located in remote areas or are protected from harvesting.
- [13] In principle, the entire national territory is included within the SNA asset boundary. For small densely populated countries, this should almost certainly be so. For large, sparsely populated countries, especially those with large areas that are remote and climatically hostile to mankind, there may be areas of land that are not thought to have any economic value. These would be included in this SEEA heading together with any recreational land not covered elsewhere.
- [14] In principle, ecosystems can be measured in both monetary and physical terms. In practice, valuing these systems may be extremely difficult and physical measures may be all that is possible.
- [15] Depending on the aspect of the ecosystem being measured, many different units of measure may be appropriate for describing environmental systems in physical terms. For example, biodiversity might be measured in terms of number of species or in terms of the area of suitable habitat. Waste assimilation capacity might be described in terms of the concentration of some key pollutant in the system. Other aspects will call for other units of measure.
- [16] With the increasing establishment of property rights over water, valuation may in some cases be possible.
- [17] Fish that are located outside a country's EEZ but over which internationally agreed quotas exist, may also be included.