SNA/M3.21/11.4

17th Meeting of the Advisory Expert Group on National Accounts,
15, 16 and 19 November 2021, Remote Meeting

Agenda item: 11.4

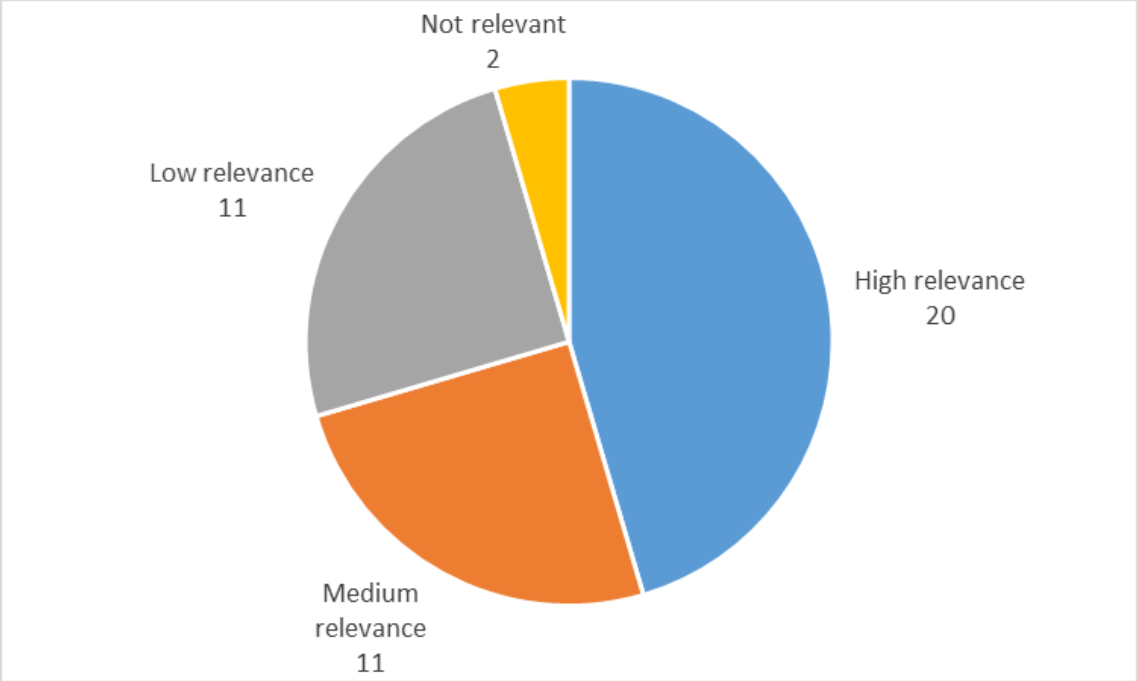
WS.6 Accounting for the Economic Ownership and Depletion of Natural Resources

Responses to the Global Consultation of:
WS.6 Accounting for the Economic Ownership and Depletion of Natural Resources

A total of 47 respondents contributed to this global consultation (after removing completely anonymous contributions and duplications). In some cases, multiple institutions from one country have responded to the questionnaire.

This document provides an overview of the written comments provided for each question.

2. How relevant is the topic of economic ownership and depletion of natural resources for your country?



Comments in support of 'high relevance':

- Economic ownership and depletion of natural resources is highly relevant given that my country relies on concession activity of multinational companies to generate revenue through royalties, but may not be considering the long-term impact due to resource depletion.
- This is important because the natural resources should be preserved and not to be exploited by citizens , but use by the government or citizens to gain economic and financial ownership that will not affect the natural resources by depletion or otherwise.
- Because we depend on natural resources, our country generates higher income from natural gas exports.
- We are currently advancing in the implementation of the System of Environmental and Economic Accounting (SEEA), through the development of the Environmental Satellite

Account. In this regard, asset valuation exercises have been developed for mineral and energy resources where the determination of depletion has been fundamental for the measurement. On the other hand, associated with the concept of depletion, we plan to advance in the measurement of adjusted net savings in the medium term.

- In a country like ours with a very important part of its production based on the use of natural resources, the aforementioned discussion is especially relevant. In particular, recent years measuring depletion of natural resources as a result of economic activity in the agricultural sector has become very relevant.
- Currently, a "road map" for the introduction of a system of natural and economic accounting accounts has been submitted for approval by the government, the priority is to build accounts of assets of uncultivated forest and aquatic biological resources. There is a gradual inclusion of natural assets in the balance of assets and liabilities, an assessment of resource productivity by types of natural resources is published for the first time.
- Natural resource assets are included in our quarterly national balance sheet – sectoring is required to maintain consistency with the other measures of national wealth.
- These are sensitive and important issues. For a very diverse country and possessor of a wide range of natural resources, it is a great opportunity to review the ownership and the mechanisms of allocation and use of resources in their different forms, as well as their impact on the environment. It is worth mentioning that we are in the process of implementing the environmental accounts based on the environmental and economic accounting system.
- We are a highly resource intensive and dependent country and therefore the topic of economic ownership and depletion of natural resources is highly relevant for us.
- The government is the legal owner of all natural resources in our country. But in practice, the actual ownership of some natural resources are shared between private and public sectors. We agree with the recommendations put forward in the guidance note that the SNA principles of economic ownership should be applied to natural resources.
- Forestry and mining have been, and still are important industries in our economy. The government is responsible for the allocation of allowances for the extraction of sub-soil resources. Our country has some of Europe’s largest reserves of strategic minerals needed for the phasing out of fossil fuels.
- We are dependent on natural resources with natural gas, minerals and water resources as the most important.
- Our economy is dominated by resource-dependent industries. Descriptions of our economy have traditionally placed great emphasis on accounting for the use of natural resources, e.g. by publishing estimates of the resource rent. Such analyses have strong policy relevance, both for managing natural resources, broadly speaking, and for questions bearing on taxation and the distribution of the resource rent. Changes to the way national resources are treated in the national accounts are therefore of great importance to us. We welcome the ongoing work on this subject, but in our view the proposed guidance note needs further discussion before concluding.

- Our environmental accounts, which include aspects of natural resource depletion, are part of the environmental adjustment to GDP. This indicator has been used in some policy and planning instruments for the country, as well as in some laws.
- The question of ownership of natural resource has high public interest in our country and assigning economic ownership is highly contentious. The proposed treatment around depletion of mining resources is likely to have a medium impact on the accounts. Mining industries contributed to a limited extent to our GDP in 2019 and relative importance steadily declining since 2009, although impacts on financial and non-financial assets could be more significant.
- We are a country that has many various natural resources. With the current conditions, the state has succeeded in acquiring several mining areas, which are very large, so the right instrument is needed to calculate the actual economic conditions and values obtained from these mining activities.
- Mining/Extractive industries form a substantial part of GDP.

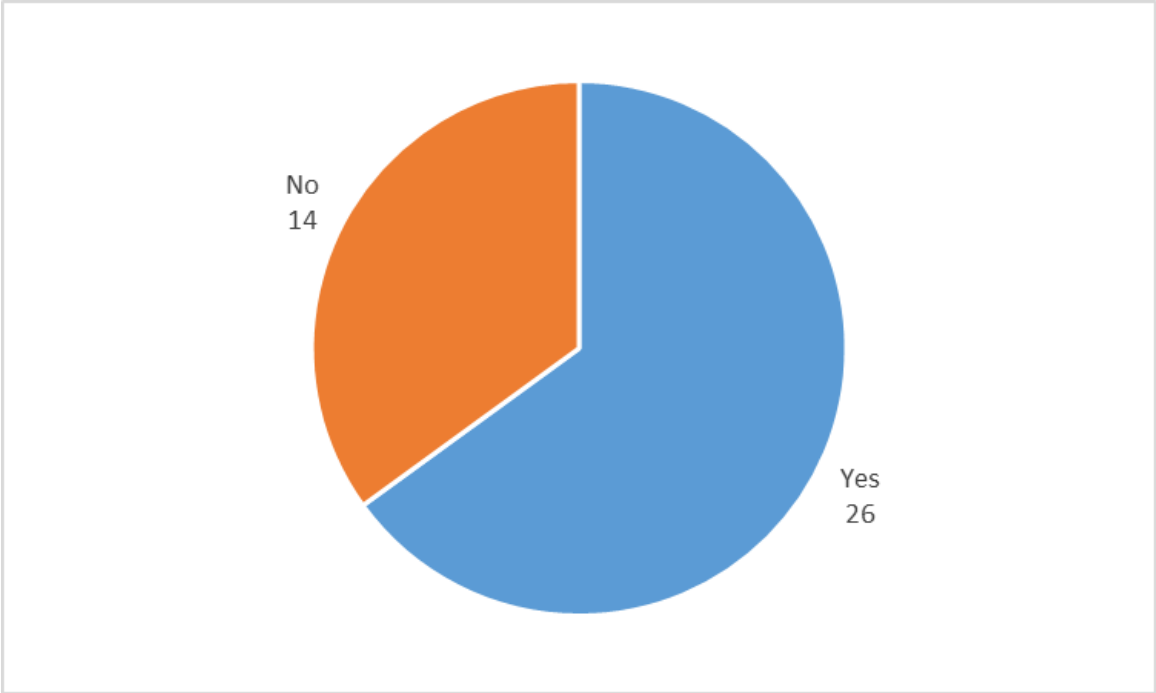
Comments in support of 'medium relevance':

- We are a resource rich country and mining is a significant portion of the economy. However, the compilation of subsoil asset is currently done only as an experimental exercise and measurement still needs to be refined as the all the data needed is not easily available
- Our country is not so rich in natural resources (e.g. oil resources, other mineral resources).
- We are a country with large supply of natural resources. Hence, their depletion would have a considerable impact on future economic growth. Assigning economic ownership of natural resources appropriately would be beneficial in formulating policy and regulating the uses of natural resources, since accountability of relevant institutions is clearly defined.
- Many users might be interested to have better information on use of natural resources in the field of NA.
- Mainly Natural Gas and Minerals.
- Oil and natural gas deposits have especially in the past been important for our economy, and asset accounts are published by us. The economic ownership issue has not been seen as an important issue. Instead overall valuation and measurement of depletion, etc. has been in focus. In general, it is important that countries need to take natural resource depletion into account, and it is necessary to find better and robust methods to emphasize the role of natural resources and depletion in the economy.

Comments in support of 'low relevance':

- In contrast to e.g. OPEC countries, our country is considered as relatively poor in natural resources. Moreover, the GDP contributions of its agriculture/forestry/fishery sector and the mining industry are minor. Nevertheless, the functions and services of soils and groundwater, of forests and waterbodies, of biota and regional biodiversity are essential preconditions for not only economic, but any human activity in our country and elsewhere. Hence, we chose to answer "low" instead of "not relevant".
- Mineral deposits, mainly of mercury and of coal, have been practically used up in the past centuries. The remaining significant natural resources are forests, mostly considered under cultivation and with clear owhership status, and potentially water sources with so-far small-scale exploitation.
- Our country has few valuable natural resources and income from them is rather low.
- The total impact from non-renewable and semi-renewable natural resources is very small, as there are very few minerals in our country. There are no "classic", high value minerals available, such as oil, natural gas, coal, but there are other non-renewable resources available (gypsum, freshwater lime, limestone, dolomite, boulders, sand, sand-gravel, clay, quartz sand, siltstone, loam and loamy sand) that do not make a significant contribution to the economy.
- We have limited natural resources and existing non-renewable resources are unlikely to be exploited for economic purposes.
- We are a resource-poor country, as far as subsoil assets are concerned.
- Firstly, the discussion on this topic should also address the possible separation between the ownership of two potential different assets: (i) the physical asset corresponding to natural resources, and (ii) the immaterial/intangible asset corresponding to the right to their exploration, even limited to certain extent (time, quantity, environmental impact, …). Secondly, the valuation of the stock of natural resources and, consequently of their depletion due to their exploration, remains an issue that could entail non homogeneous treatments across countries, blurring international comparisons, particularly if it is intended to focus on net aggregate measures of product and income. The conceptual and operational questions raised on the valuation of this type of assets merits more work before engaging on the proposed changes. If this is not possible we would favour the presentation of macroeconomic information outside the core national accounts under the form of satellite accounts.
- All countries have natural resources as defined in WS6, and all governments and people have a responsibility towards them. Depletion is not the main problem; responsibility is.
- We do not have many natural resources.
- Economic ownership and the depletion of natural resources do not have a measurement mechanism and environmental accounts have not been developed.

3. Do you agree with applying the split-asset approach for the recording of economic ownership of non-renewable natural resources?



Comments in support of 'no':

- We agree in principle that ownership of natural assets should not lie solely with government, because without efforts to extract the minerals they hold no future streams of income for the government. However, practical implementation of the split asset approach is complicated amid the lack of data already faced.
- We are in favor for a conceptual solution instead of implementing a further accounting convention for natural resources. Such a conceptual approach should preserve the accounting unity of assets in the SNA2008 and might result in a further development of the risks and rewards approach. In addition, the SNA2008 also recognizes the creation of statistical units to solve ownership problems, which makes clear that the split of assets should be limited to very specific exceptions (cross-border or joint-ownership issues). Natural resources are not such an exception. Furthermore, in a national context we prefer legal ownership to split of assets if the risks and rewards approach is not conclusive.
- We do not agree that applying the split asset approach to the economic ownership of non-renewable natural resources is the best approach. We note that there are many examples where a case could be made to split the economic ownership of assets, such as public private partnerships in the government sector. This is not considered in the guidance note, and we believe that applying a split-asset approach to only to non-renewable natural resources would create inconsistent ownership principles within the accounts.
- It is difficult to implement and it is not very relevant for our country, as it has few natural resources. In this case, the burden will outweigh its likely benefits.
- In our view, NA defines assets from the perspective of production. Assets (except for IPP) can only be used by one unit at time. The split-asset approach on the other hand defines

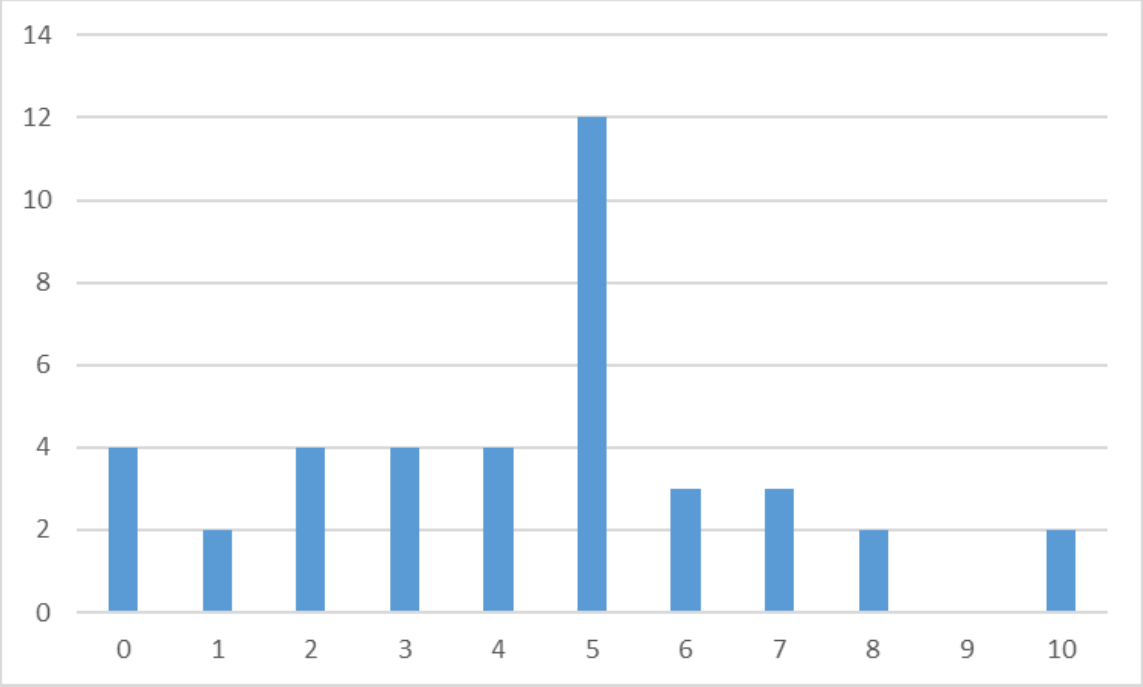
assets from the allocation of income perspective. Income in this sense can be received by several units and therefore it seems that each unit has a part in the asset. The production perspective: Economic ownership means that assets are recorded in the activity unit that benefits from using them and the institutional unit that is responsible for (takes the risk in) the activity the asset is used in. The economic ownership concept is a way to correct the mismatch between the unit owning the asset (legal owner) and the unit using it (economic owner). In case two units are using the same asset, they are regarded forming one single unit, a joint venture. The allocation of income perspective: The split-asset approach means that the same asset can be economically owned by several units at the same time. Their value of ownership is defined according to their part of the allocated income. In fact, several units, besides the actual producer, can receive income from the same asset used in production. The income is either due to legal ownership (rent), legal control (taxes) or a financial relation (interest). Government as regulator: The role of government in the use of natural resources is different from ownership of assets used in production. Government primarily acts according to other objectives like promoting employment and environmental protection. Government is therefore mainly responsible for the allocation of the use of natural resources. Only when government is undertaking extraction activities on own account it can be regarded an economic owner of the asset. Income allocated to government by the user of natural resources should be regarded as rent or as taxes.

- Due to the policy of nationalization of natural resources, the state recovered the property, possession and total and absolute control of these resources.
- Proposal to split-asset has not taken into account all the issues that can appear. What about other non-produced assets, should they also be split between lessor and lessee?
- The split-asset approach is a possible solution, but in our view it is not yet sufficiently analysed to be included in a guidance note. Cf. also our answer to question 6. We agree that a correct inclusion of natural resources is of great importance, and welcome work to include it in the SNA 2025 revision. We believe that the guidance note should be further elaborated before concluding.
- The notion of split ownership and the allocation of ownership to specific sectors needs further development in terms of underlying concepts, to determine the distinction between legal and economic ownership. The paper qualifies the approach to apply “when circumstances warrant such a treatment”. However, these circumstances are not unambiguously set out. A strong case to support the notion that Government receipt of a royalty reflects rewards from risk sharing is not made. In our case, legal title to a mineral deposit (until then “owned” by the Government) is ceded when the extractor receives a mining permit, and all risks and rewards associated with the extraction of that resource discovery lie with the extractor. The Government is little more than the passive recipient of royalty receipts, little different to its receipt of income tax revenue from the extractor. We have yet to settle on a definitive treatment, but we lean towards the view that the extractor is now both the sole legal and economic owner of the resource asset being exploited; the Government has “sold” the asset in return for a financial asset equal in value to the future flow of royalties. This financial asset is a financial liability of the

extractor. Both economic and legal ownership of the resource asset itself have changed. The royalty payments, in this scenario, will progressively reduce the financial liability.

- We applaud the attempt to reinstate the lost link between extraction and responsibility for the resource, which the splitting might partly achieve. However, we wonder why the notion of ownership is retained at all. Also, we recommend recasting this directly as responsibility rather than ownership and extraction.
- We do not have opinion at the moment.
- In our case, it is difficult to express an opinion since we have not carried out environmental accounts that allow us to have a clear overview of the division of assets.

4A. How do you regard the feasibility of applying this split-asset approach and to compile results accordingly (0-10 from not feasible at all to highly feasible)?] 4B. Please explain where you see main challenges.



Average: 4.57.

Main challenges:

- The stock of natural resources may not be available or information not shared after the size and concentration of ore is determined.
- Assets belonging to households.
- It is necessary to deepen the subject and see the availability of statistical information so that it is feasible.
- Data that is not available is one of the main challenges. We already make significant and broad assumptions when estimating the net present value of subsoil assets and applying the split-asset approach will add more layers of assumptions.
- Data sources and stock of assets estimates.

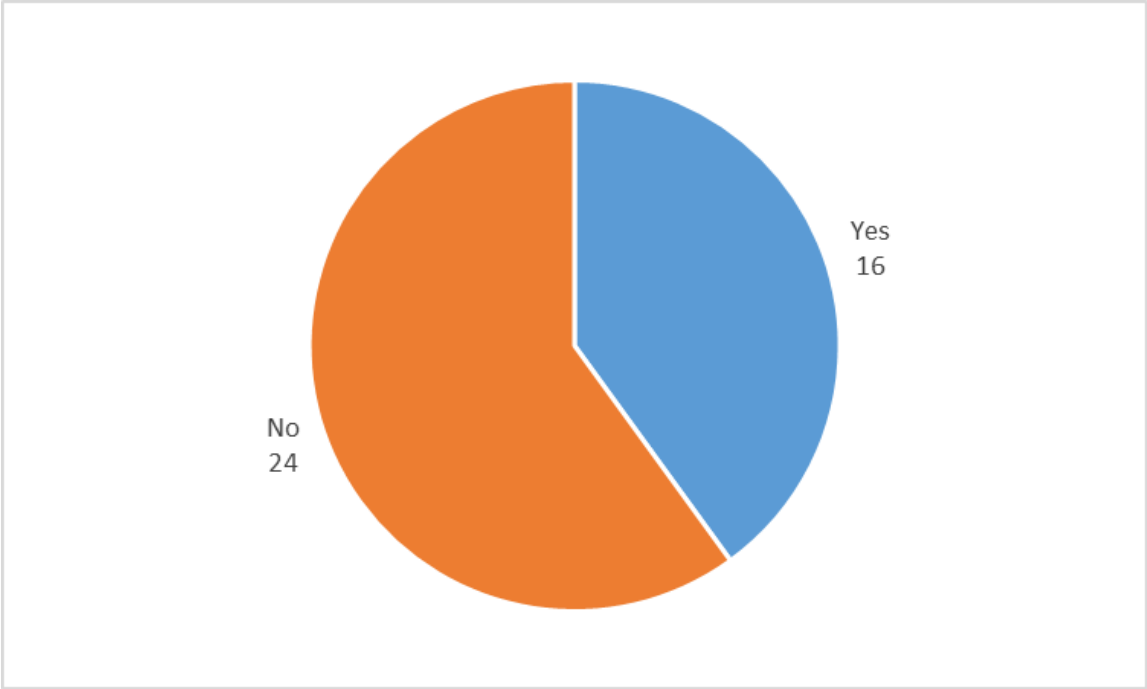
- Sources of information that contribute to the calculation of this division, calculation of the fixed capital consumption, economic resources to hire the necessary technical personnel, methodological documents and technical assistance for the development and measurement of these issues.
- Recording non-renewable natural resources as a whole and assigning ownership to relevant institutions seem feasible. However, estimating the value of them and assigning ownership to appropriate institutions at a particular period of time is challenging. This difficulty is mainly attributable to absence in market prices.
- For us, the case of mineral and energy resources is not as relevant as the case of biological resources of the soil. In any case, the challenge to be faced are the usual ones on the valuation of non-financial assets.
- In different countries, the distribution of property by natural resources may differ in accordance with the legislation. In this regard, a more precise description of the use of resource rents and operational risks in combination with specific sectors is required.
- Let aside the valuation problem (a challenging issue on its own) we doubt the good reason to model the split of risks and rewards without statistical foundation, i.e. based on pure "guesstimation", at least in the NA core system.
- The main challenge is finding the appropriate method of estimation of the asset. Confidentiality issues.
- Lack of monetary valuation of the stock of natural resources; specificities of the bookkeeping standards under the current legislation that do not allow full separation of assets between institutional units.
- Clear guidelines that could cover most cases in practice; as always, there is a trade-off between too detailed and too general guidelines, so some risk to comparability between countries or comparability in time may arise.
- One of the main challenges is finding royalty data on an accrual basis. This is required for sectoring the income streams in our current approach. A secondary issue is the extent to which harvesting activity trickles down to manufacturing and other industries – the timber asset, for example, can be harvested directly by pulp mills, shake and shingle producers, sawmills, etc. yielding an extension to a simple estimate based on primary producers (i.e. logging) only.
- Access to the source of economic and financial information to reflect in greater detail the legal and economic ownership of non-renewable resources. Exploit administrative records and have practical knowledge in applying the asset division approach.
- Data collection would be the main challenge in implementing a split-asset approach.
- Data collection.
- The related source data are usually difficult to obtain.
- Splitting of assets according to the income received might be problematic if the formula for how the parties split the income is unknown or gives different shares over the years. If the share to government shifts from year to year this can be an indication of differences in risk faced by the extractor and government. Besides the issue of shares the main practical problem lies in the valuation of natural resources. The calculation of resource rent and the net present valuation (NPV) of future income is not consistent with the main

valuation principles of NA. The theoretical foundation of NPV is general equilibrium. In order, to come closer to reality some observations of rate of return in the economy and possible discount rates are proposed. But in none of the proposals the actual risk faced by extractors are regarded in full. The resource rent can also turn out to be negative which has no economic meaning and this fact indicates that the NPV-method is inferior. Only accepting positive values would be to accept biased estimates. There is no discussion whatsoever of how negative values should be treated. The NPV uses simplified assumptions of future income and the discount rate which can lead to large errors in the estimated asset value. The uncertainty in the valuation will make the data less relevant for economic analysis and economic policy. The NPV can be improved by modification of the discount rate used. One improvement is to use the same discount rate as the expected rate of return in the activity instead of the market interest on long term bonds. Another improvement would be to accept that the rate of return is the same for all assets in an activity, natural as well as produced. Usually there is no or small possibilities to transfer construction work done on the site so the risk in these kinds of investments is approximately the same as for the natural resource.

- In practice, valuation of assets and the split relies on forward looking measures and assumption about what happens in the future. This makes the results more or less arbitrary (depending of assumptions) about the future, and hampers comparability. So it is not so much a question of feasibility but more about reliability and how the results can be intrepreted and used.
- Lack of administrative resources and time.
- Currently not possible because: lack of granular data that would allow to split the assets; no expertise in valuation of natural resources and expected future value of these resources; doubts concerning conceptual issues connected with this proposal.
- Compiling reliable and internationally comparable figures will require considerable experimentation and coordination.
- Fundamentally due to the availability of information.
- Issues and challenges outline in answer 3b.
- Our Ministry of Finance does not approve the application of split assets because it violates the constitution, which states that natural wealth belongs to the state for the prosperity of the people. The matter affects data availability from related agencies.
- The distribution of resource rent between the legal owner and the extractor, and consequently the value of assets transferred from the legal owner to the extractor, at any reference point in time may not be straightforward. This is due to a lack of readily available information on the income distribution as well as complexity of some sale agreements (e.g. provisional pricing where buyer first makes provisional payments and repays the remaining sum on the final settlement date).
- The split approach seems logical but will need to be further tested with real cases. Present value of future income streams is something used in business accounting of extractors but can constantly be revised. And how can we value natural resources correctly in the accounts? More work needs to be carried out on the various natural resources. How do you split the assets? And how do you correctly value the splits?

- The estimation of resource rents, assets values and shares is not straightforward.
- See 2B.
- We advocate the use of Dooyeweerd's aspects as spheres of meaning that enable analysts to systematically separate out issues and more clearly understand them. This makes the dealing with complexity as such easier, but poses new challenges on how value in each aspect is differently quantified.
- Identifying ownership is surely the simplest part this proposals.

5. Would your institution be interested in participating in an experimental estimate exercise for the split-asset approach of economic ownership?



Yes:

- Methodology use in the split-asset approach of economic ownership.
- Provide best practices.
- Technical assistance for the entire methodological process of preparing the measurement of natural resources.
- Our accounts are built on soft underlying data on subsoil assets. We would be happy to participate, but given the soft nature of our estimates, it might not be ideal.
- Advice from experts would be required for the entire process including conceptual framework, methodology and compilation of data. Also, training for practical implementation will be needed at a later stage.
- In principle, assistance with asset valuation methods will be necesary. Additionally, assistance will be required to determine the shares assigned to the different units for this kind of assets.

- Familiarization with the practical methods of property distribution between the relevant institutional sectors.
- Training courses (learning the experience of other countries).
- We do not require any technical assistance but would be interested in participating in any further discussions on methodology etc.
- Know the experience of countries that have been calculating under the split assets approach and training on the methodology of the economic ownership of split assets approach.
- A forum where methods and problems could be shared and discussed would be useful.
- Training in the implementation of the calculation of split assets.
- Discussions with other countries, e.g. in an international Task Force.
- Assistance in explaining to policy stakeholder to adopt-split-asset method.

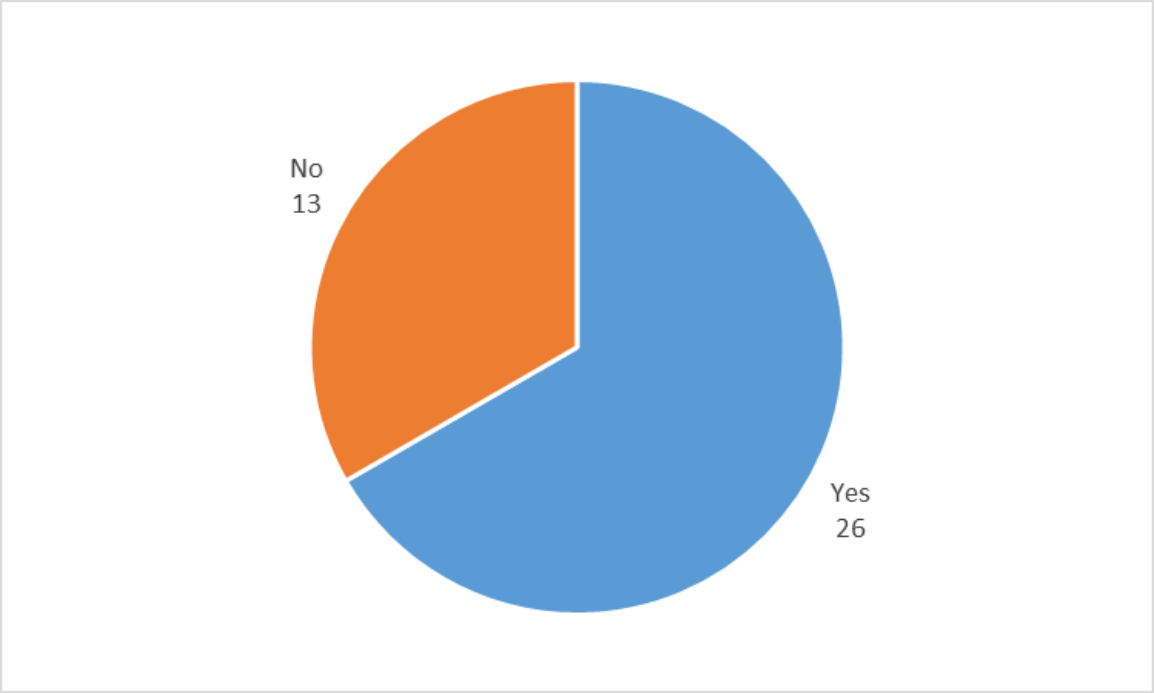
6. Do you have any other comments and suggestions in relation to economic ownership of natural resources?

- The document details the concepts necessary for the analysis of natural resource ownership, citing and analyzing paragraphs from both, the System of National Accounts (SNA) and the Central Framework of the System of Environmental and Economic Accounting (SEEA). In addition, it provides valuable examples in this regard, as the division approach will allow greater articulation between the SNA and the SCAE, taking into account that the ownership of natural resources should be approached from this perspective.
- As was mentioned earlier, for us, the case of mineral and energy resources is not as relevant as the case of biological resources of the soil. As our production is based on biological soil resources, it would be preferable to direct the theme in that direction.
- Aside from extraction and logging activities, especially the economic ownership of natural and environmental entities that are public goods in the conventional economic sense (i.e. non-excludability in the use and degradation of these goods, resulting in severe mining and high externalities) cannot be assigned to few identifiable users or economic owners, at least not to a sufficient degree of certainty. Hence, an attempt to determine their economic owner within NA calculations could lead to an even more distorted image of the real world.
- Natural resources should only be included in the NA asset boundary if they fulfil the criteria of being assets, i.e. are used in production or are used to transfer income from one period to another. To be used in production means that they are objects used to transform nature or manmade objects (inputs) and not the objects of transformation themselves. In order to transfer income from one period to the next, the natural resource need to be transferable between institutional units. This implies that it should, in principle, be possible to observe transaction prices at the time of transfer. Sub-soil resources and non-cultivated biological resources might only comply with these criteria in exceptional cases. They are not used to transform inputs into output, they are

the objects of transformation from their wild and natural state to be included in the economy as inventories. They are normally not transferred between units in their wild state. There might be an exception for sub-soil resources in case government has allowed for a separate ownership transfer of the resource. What normally might be transferred is the right to use or extract a natural resource (not the ownership). But, this is not the same as the transfer of the asset itself. We should not try to stretch the definitions of NA in order to include every economic phaenomena. In cases they do not fulfil the strict criteria of legal ownership the recording of natural resources can be left to SEEA.

- We understand that an alternative to splitting the physical asset has been suggested and tested by Canada. It involves the creation of additional assets. It would be useful to make more research in introducing such additional assets (and liabilities) instead of splitting the physical asset, since this may better reflect the reality and institutional arrangements. Much more practical testing of how revisions/new assumptions about the future should be taken into account, i.e. how much information obtained at various stages after the reference period should be taken into account and how? With regard to the split ownership approach it would be useful to consider to what extent it should/could be generalised, and, for instance, applied to intangible assets (software licences, etc.).
- Knowing the experience of applying the methodology in the countries of the region.
- As an alternative to splitting the asset, the introduction of a resource lease asset for the extractor could be considered. In general, it is important to ensure that the valuation methods are reliable and internationally comparable before this is introduced in the core SNA.
- In theory this is a good approach but it has many practical implementation problems, the main one being correct initial valuation of resources.
- We agree with the approach and the accounting recording proposed in example D, but are worried about the practical aspects. More detailed guidance is needed for the practical implementation.
- We question the whole idea of ownership.

7. Do you agree with recording depletion of natural resources as a cost of production?

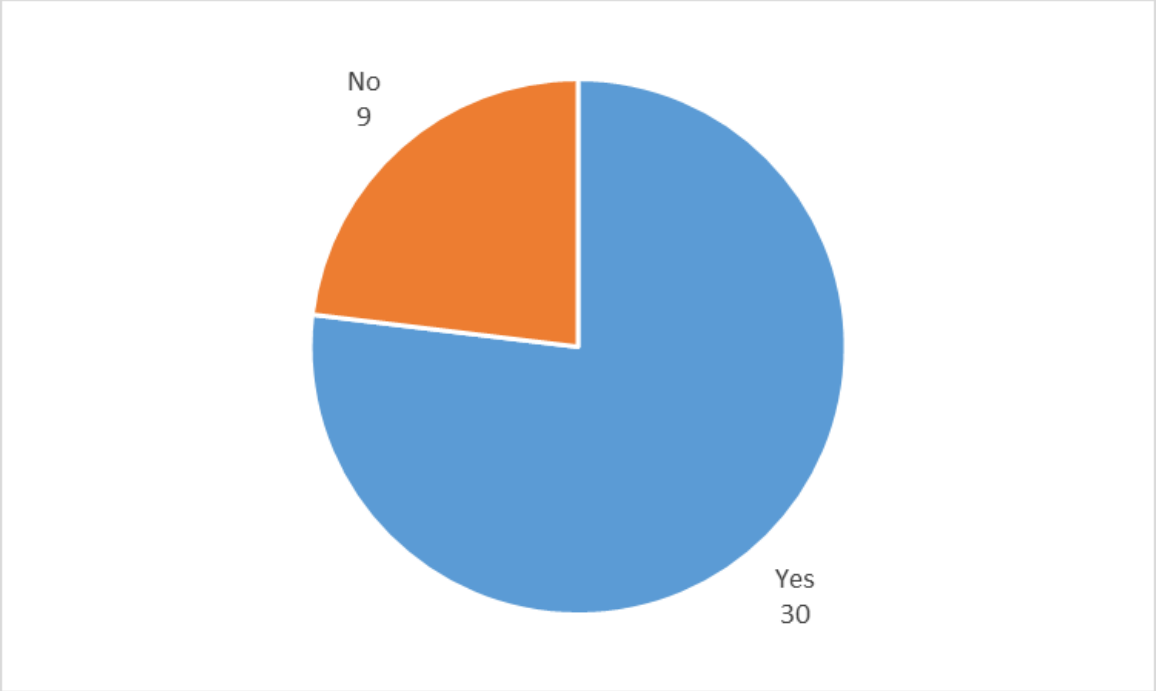


Comments supporting 'no':

- Because depletion is not a regular operational expense. And depletion is not a transaction between different transactors. How can we record the value in uses (as a consumption of fixed capital?!!) what about the renewal of the natural assets? It is difficult to evaluate the depletion and renewal of the natural resources.
- There's no available information.
- It would be better to first make satellite accounts before implementing this to core accounts.
- The Generation of Income approach should reflect production processes leading to dependable figures for e.g. value added and the GDP suitable for demanding business cycle analyses and similar tasks. We are afraid that the inclusion of debatable components could compromise this function. It would also be hard to explain why i.e. an effectively very profitable extraction company does not make (much) positive income once depletion costs have been considered.
- We do not necessarily agree that the depletion of natural resources should be recorded as a cost of production within the National Accounts. It is thought that the SEEA framework was developed to measure the interactions between the environment and the economy and that this is best suited to record depletion of natural resources. It is also acknowledged that the policy questions related to natural resources depletion can be answered using the SEEA. It is noted that if it were preferable to record depletion of natural assets within the National Accounts, then this would be best recorded within the capital accounts and balance sheets, where obsolescence of all assets (produced or natural) would be more accurately recorded.
- Our country has few natural resources so the issue is not very relevant.

- NA is about the costs and benefits of human productive activity. The use of natural resources is not a cost of human labour since natural resources are free of charge to the society. Depletion of natural resources should therefore not be included in the NA production account. Owners of natural resources can only charge costs by legal reasons (ownership and/or control). These costs should be regarded redistribution of income in the same way as rent and taxes on income and wealth. Some minerals that are being extracted can also be recycled and as such cheaper to re-use than extracting new resources. In such cases, depletion is not very relevant, it is more like transforming nature into useful goods, over and over again. The cost of using fuel is mainly due to the negative consequences of emissions and not the extraction activity which only to a limited extent is harmful. What is the alternative to use natural resources? Leave them in the ground, in the sea or in the forest forever? Natural resources that are transformed from a useful state to something not so useful or even harmful, notably fuels and fluorinated hydrocarbons, should also include their costs of the negative impact on humans and nature. That is the same as including negative externalities. From the NA perspective, the best way of including costs for using natural resources is to include the (future) costs of restoring extraction sites and removing externalities caused by human activity.
- The answer is no not on principal or theoretical grounds, but on practical. We find that more testing and more exploration of the consequences for the net measures are needed. If the methodology of SEEA CF is followed the estimate of depletion relies on forward looking measures, and the results are more or less arbitrary, and difficult to compare. So while in principle, we support the idea of recording depletion, but think that it would first be useful with an international and coordinated effort to collect and compare experiences of how it works in practice.
- The valuation of depletion is high-risk issue, this kind of estimates shouldn't have impact on core NA; it can be done as supplementary information developed on voluntary basis.
- We agree that a correct inclusion of natural resources is of great importance, and welcomes work to include it in the SNA 2025 revision. Our response reflects that we believe the guidance note should be further elaborated before concluding. Could the GN also discuss further why use of natural resources should be depletion of capital, or if it could be seen as use of inventories?
- See 2B.
- Doing this is an artifact that does not properly express reality, and will thus generate problems in the future. Instead, it is better to recognise the roots of the problem of depletion, namely of responsibility to future generations, fauna and flora, indigenous peoples, and so on, and then calculate the costs and benefits of such responsibilities.

8. Do you agree with further exploring the possibilities to extend the notion of depletion to non-cultivated biological resources, instead of restricting it to mineral and energy resources?

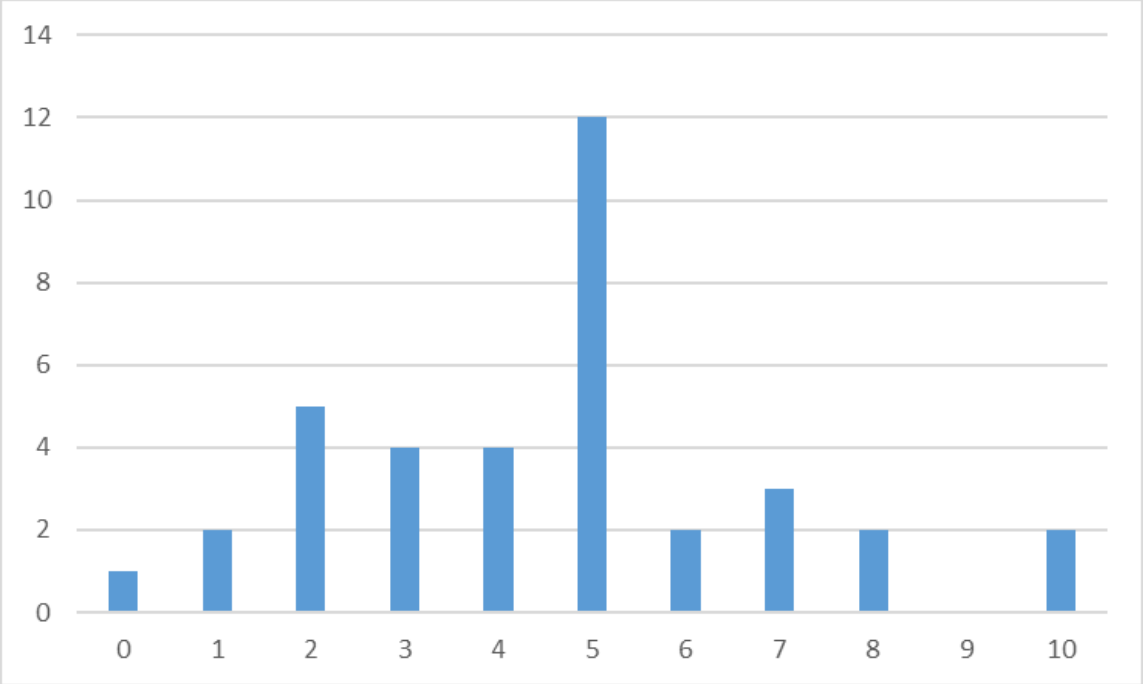


Comments supporting 'no':

- The depletion is the removal of national resources from the soil or the forest which can either be a mineral products like diamonds or an energy product like charcoal.
- No information available.
- The air is natural resources. How we can estimate that SNA is prepared to measure the economy with the business concept and frame work, and if the extensions is not matched with the business concept that mean recommendation will not be applicable regarding to the data availability.
- This topic should be outside the core of national accounts, could be covered by Environmental Economic Accounts.
- At the moment, this is not a priority, as the cost of the exploring this option would exceed the net effect of the evaluation.
- Besides the principal arguments put forward in 7B, one main issue is how to define depletion of biological natural resources. The problem is how to estimate the size of sustainable catches, i.e. when is the catch too large for the species not to recover at all. Catches above the current annual growth might lead to higher future growth rates both for a particular specie and other species as well. So, maybe the harvesting (depletion) of the stock is not the big issue but rather the change in growth factors leading to the extinction of species. This can be the outcome of permanently higher catches than sustainable, but still, mankind knows very little about these relations.
- If extended further the possibilities to extend the notion of depletion to non-cultivated biological resources, the relevance of the impact assessment to the GDP and to each institutional sector should be assessed.

- We consider the valuation of deplation of mineral and energy resources as highly difficult, both from practical and conceptual point of view. As for other non-cultivated biological resources it is not only practically but also theoretically impossible.
- Basically, we agree, if a resource-depletion model must be used. However, an extra harm aspect becomes important, the biotic, whose laws and ways of operation cannot be reduced to those of the economic aspect, such as depletion.

9A. How do you regard the feasibility of measuring depletion of natural resources (0-10, from not feasible at all to highly feasible)?] 9B. Please explain where you see main challenges.



Average: 4.31.

Main challenges:

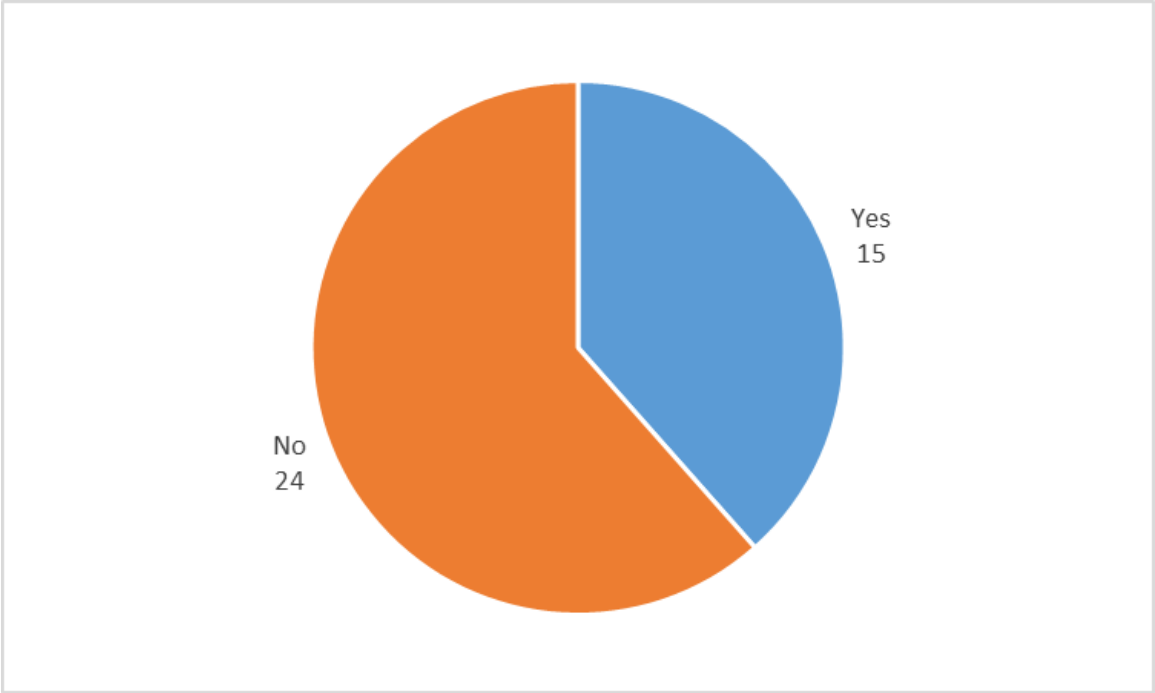
- The feasibility of measuring depletion of natural resources is a challenge because of the limitation in technology usage to determine natural resource stock over time.
- How do you know the causer and the extent of the depletion?
- It would be good to have technical assistance on the subject.
- Availability of source data is our main challenge. Our natural resource estimates are limited to minerals at this stage. We calculate depletion of natural resources in our experimental accounts, but only for minerals. Data shortcomings limit the expansion of the accounts. Therefore, measuring depletion of assets beyond minerals is not possible at this stage.
- Data availability; concept and boundaries of the measurement.
- Data sources and reasonable estimates for stock of assets.

- As mentioned before, we do not have sources of information to calculate depletion, nor economic resources to provide the necessary technical personnel to carry out the measurement. Additionally we would benefit from methodological documents and technical assistance to develop and measure the depletion of natural resources.
- Depletion might be estimated in terms of area or quantities. However, measuring the value of depletion is challenging due to absence in market prices.
- Practical solutions to measure and value the natural resources might be very challenging.
- The greatest difficulties will be related to the adequate measurement of the properties of the resources used and their change over time. And also the proper implementation of the valuation methods.
- Difficulties of interaction with environmental protection agencies.
- Neither for quantities nor for appropriate prices are sufficient data available. The undisputed need to integrate sustainability aspects into economic accounting must not lead to outcomes heavily biased by ultimately unprovable data. Hence, we advocate for the expansion and further development of satellite systems like EEA to provide desirable additional information on sustainability aspects.
- Valuation, potential for large revisions of past periods, thereby putting into question the relevance of current statistics.
- Renewable resources are much more challenging that non-renewables. For non-renewable resources the depletion estimates are highly feasible and are currently being produced for our natural resource asset calculations. The key challenge is for non-cultivated biological resources. We currently estimate a value for timber stocks in the national balance sheet, but to date a depletion estimate has not been calculated. To estimate depletion properly, a biophysical timber stock model with age class distributions, losses due to fire and insects, harvest, natural growth and regeneration etc. would likely be required. We used such a model in the past, but it was not maintained due to budgetary constraints. A similar type of model would presumably be required for fish stocks. This represents a significant amount of work for the calculation of non-cultivated biological resource depletion.
- Availability of information that makes it possible to measure the depletion of non-produced resources. Determination of the valuation of assets and methods to obtain depletion.
- We have previously produced estimates for depletion of natural resources within the environmental chapter of our yearbook. If the scope of recording depletion was to extend beyond the mineral and energy resources that are currently recorded there may be some difficulties in acquiring the relevant source data.
- Lack of information
- The economically recoverable reserves are difficult to estimate.
- Less reliable data for biological resources than in the case of sub-soil resources. The same problems to estimate the resource rent as in question 4A remains.
- It is not so much a question of feasibility but more about reliability and how the results can be used. Although the NPV method is conceptually sound, the practical application for national accounts and estimates of macroeconomic indicators seems to involve too

many unknowns. It is better suited for analysis, where assumptions can be explained and results are followed by sensitivity estimates.

- Strengthening of environmental statistics, technical training, and statistical application.
- By acquiring one natural resource, other natural resources are damaged, such as, for example, the landscape, nature views, the natural environment, which by nature cannot be assessed at all. Other costs and gains are likely to be identifiable.
- Not feasible at all
- Compiling reliable and internationally comparable figures will require considerable experimentation and coordination.
- Non-renewable mineral resources seem to have less measurement challenges, as we have a wide coverage of extraction volumes disclosed through our Central Government permit regulators. Other natural resources will rely on assessments of depletion relative to their current state and will also have more challenges in determining values of depletion. In many cases, the values of the natural resources go beyond economic monetary values. Accordingly, we note that the extension of measuring depletion of biological resources appears to be getting introduced without a full explanation and analysis of the practical implications. We await further details about the exploration of this notion.
- The diversity of the many types of mines, different locations, and many data sources that will be used
- One challenge is the valuation of natural resources assets and its cost of depletion. In particular, estimation is made more difficult due to volatile and uncertain commodity prices (e.g. the sharp fall and recovery in oil prices during the COVID-19 outbreak). Another challenge is ensuring consistency in the application of methodology across countries. We note that there will be a guidance note on the valuation of natural resources and their depletion which will help address some of these issues.
- We see the main challenges in the case of non-cultivated biological resources, as these are renewable and assessing degradation is more difficult than in the case of non-renewables.
- See 2B.
- Measuring the costs and benefits of the various responsibilities and of biotic issues like biodiversity.
- Measurement of natural resources are challenging.

10. Would your institution be interested in participating in an experimental estimate exercise on depletion of natural resources?



Yes:

- The key aspect is firstly to have access to mining sites using technology to determine stocks which I think needs to be approved by the Government. I think that this can be achieved if the United Nations Statistics Division makes a formal request to conduct a feasibility study to understand the natural resource size and depletion rate.
- On the methods use.
- Elaboration on the entire methodological process.
- Training course and best practices.
- Advice from experts would be required for the entire process including conceptual framework, methodology and compilation of data. Also, training for practical implementation will be needed at a later stage.
- The necessary technical assistance would be focused on the valuation methods of these assets and also on the measurement of their wear and the fixed capital consumption.
- Clarification is required on the calculation of depletion indicators by type of natural resources.
- We would not require any technical assistance in this domain, but would like to participate in any further discussions.
- To know the experience of the countries that have been calculating the depletion of natural resources. Training in the implementation of the different procedures to obtain the value of the assets and their depletion each year.
- We will be happy to share results and experiences we have in this area. A forum where methods and problems could be shared and discussed would be useful.
- Training in statistical application and the relationship with national accounts.

- Discussions with other countries, e.g. in an international Task Force.
- Detailed calculations to obtain calculation results that are close to real conditions.

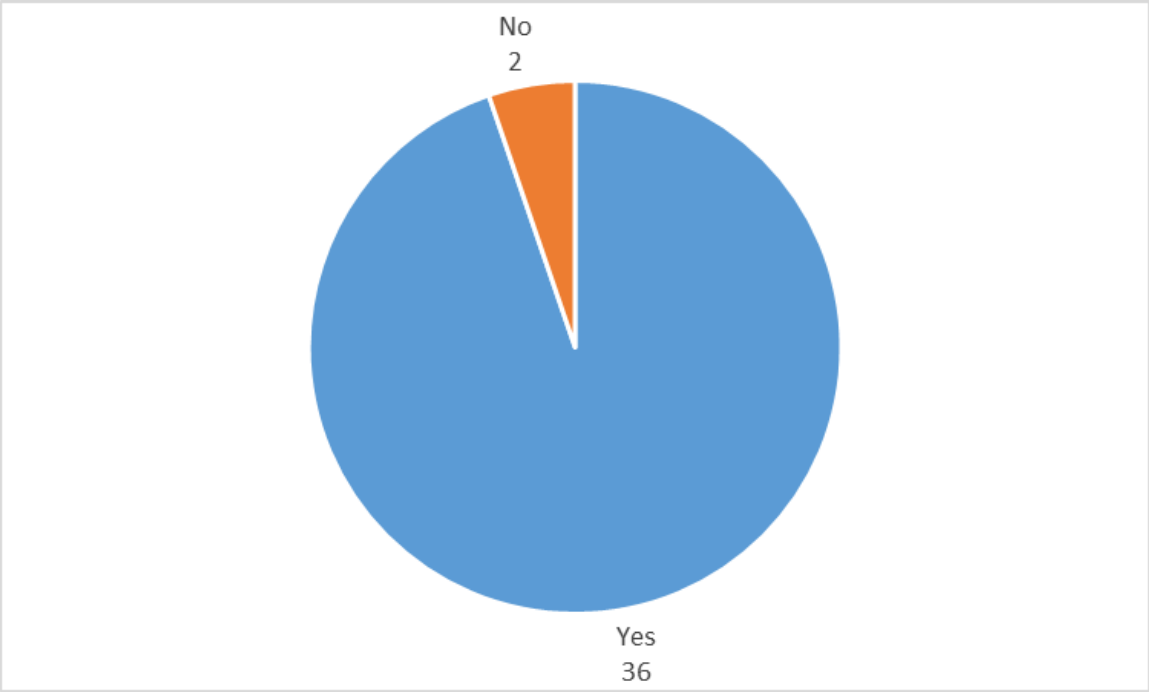
11. Do you have any other comments and suggestions in relation to depletion of natural resources?

- To provide manuals.
- The document explains in detail, through examples, the proposed ways of measuring resource depletion both, from the SNA and SEEA - CF perspectives. The final proposal to include in the next SNA natural resource depletion as a production cost contributes to the SEEA – CF conceptual articulation.
- Extending the notion of depletion to non-cultivated biological resources and including mesures of fixed capital consumption will impact our measures of economic activity, takin into accounts the reals costs of production
- The guidelines should provide a clear idea of possible approaches to assessing or calculating indicators of natural resource depletion. Also, in the absence of certain initial information, possible calculation alternatives should be provided.
- Depletion of non-cultivated biological resources is of interest to us, but it is not a priority in terms of the current planned improvements to the natural resource assets programme.
- We think the analogy between sub-soil resources and manmade capital assets (machinery) is misplaced. Machinery are used to transform inputs but sub-soil resources are the very inputs, in the extraction activity, that are transformed into inventories of raw materials. If the way to include natural resources is by including nature as capital assets, used up in production, then the accounting framework need to be radically changed. Hitherto, no costs have been recorded for inputs or the use of natural resources in the NA. We think it is a good ambition to include the costs of using natural resources in the NA, but the way to do this must start with a recognition of the specific role nature plays in the economy. First of all, a definition of the costs in terms of human resources need to be identified for natural resources.
- Conceptually, we agree that depletion should be accounted for. We do however have concerns about the practical implementation, and we also believe the conceptual issues should be studied more closely before concluding. It is important to ensure that the valuation methods are sound before depletion is introduced.
- In our view there needs to be more discussion of economic ownership and the circumstances in which the split asset case is intended to apply. This discussion should also be extended to include whether or not the legal owner is performing economic activity in stewardship and enablement of extraction. For example, we question the appropriateness of the conventions set out in SNA 7.157 and 17.343 and the implications they have for recording where certain transactions should be recorded. We note footnote 3 in the guidance note (GN) that a separate GN is being prepared that will discuss an alternative recording of income as output instead of property income. We await this with

interest and wonder whether or not the conclusions in the current GN may need to be reconsidered, in light of this alternative.

- The methodology for the initial valuation of assets and subsequent valuation of depletions needs to be harmonized across MS. Proper guidance needs to be provided. We have issues with comparability of correctly depreciating fixed assets of produced assets in PIM currently. Similar issues will be present when we try to value depletions.
- We agree with the approach and the accounting recording proposed in example D, but are worried about the practical aspects. More detailed guidance is needed for the practical implementation.
- See 2B.
- WS6 deals only with depletion of natural resources. It does not deal with the much more important issues in sustainability, such as climate change or biodiversity loss. For these, we need an approach that distinguishes harm from good in each aspect (in these two, the physical and biotic aspects). Whether another document will adequately cover these is not clear, so we must make this point here.

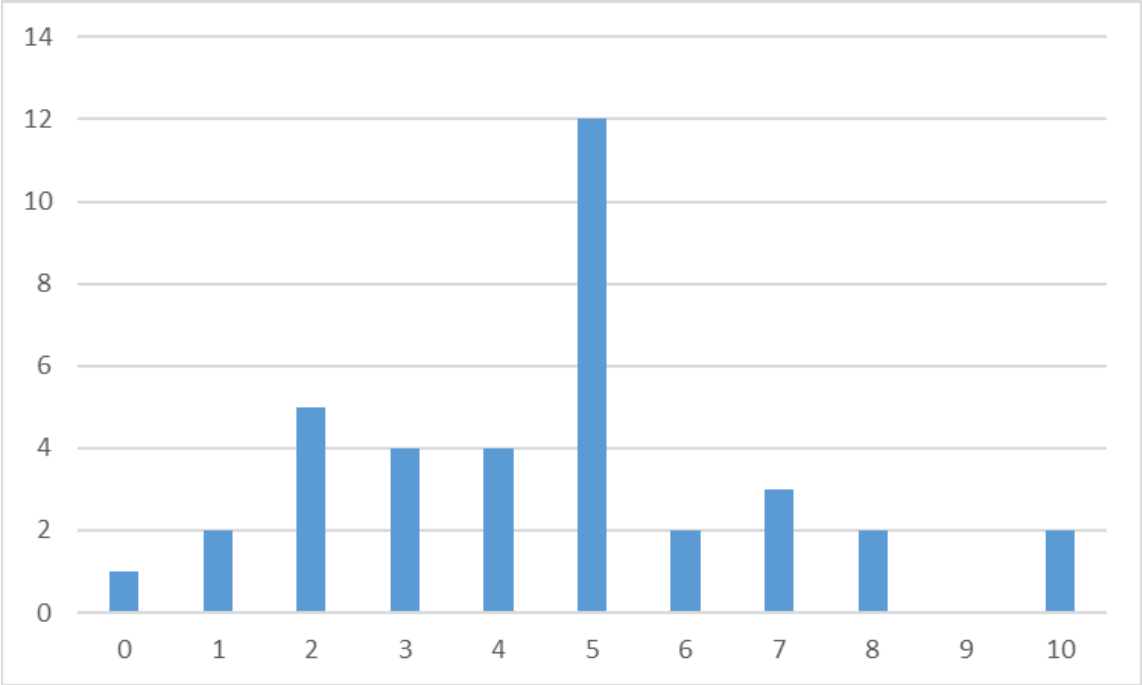
12. Do you agree with further exploring the positioning of net balancing items (e.g. NDP, NNI, net savings) in the next SNA?



Comments supporting 'no':

- Difficulties in obtaining consumption of fixed capital estimates with good (sufficient) quality.
- We believe that net measures should include, as negatives, not only depreciation and depletion, but also (the assigned cost of) harm that human activity does in each aspect.

13A. How do you regard the feasibility of deriving accurate estimates of consumption of fixed capital (and depletion) to arrive at reliable net balancing items (0-10, from not feasible at all to highly feasible)?] 13B. Please explain where you see main challenges that you currently encounter when compiling estimates for consumption of fixed capital (and depletion)?



Average: 5.49.

Challenges:

- Depletion is not covered adequately for consumption of fixed capital because of limited information from the mining companies.
- How to account for depletion.
- Statistical information on consumption of fixed capital is not available.
- Availability of source data is our main challenge. Our natural resource estimates are limited to minerals at this stage. We calculate depletion of natural resources in our experimental accounts, but only for minerals. Data shortcomings limit the expansion of the accounts. Therefore, measuring depletion of assets beyond minerals is not possible at this stage.
- Data availability.
- Not enough data sources for accurate compilation of stock of assets and consumption of fixed capital.
- Generally, we have the same challenges mentioned before, regarding sources of information, economic resources and technical assistance.
- The estimates for depletion do not currently exist. However, developing the estimation for depletion of mineral and energy resources is probable.

- Have an adequate measurement of the use of resources ijn monetary terms and the consumptionof fixed capital. In general, physical units are used and the use of prices or unit values is not so obvious.
- The main difficulty is the construction of long dynamic series of source data
- The PIM calculation of consumption of fixed capital (CFC) depends on reliable GFCF time series and service life data. Estimates of satisfactorily quality are available for all relevant produced assets. In the case of relevant non-produced assets (natural resources) and estimates for their depletion, in terms of usable data for physical inventories and prices as well as for time series of withdrawals we face the same challenges as mentioned regarding question 9B.
- The main challenge is finding the appropriate method of estimation of the depletion.
- Lack of detailed information.
- Accurate service lives and retirement profiles for some assets and how fast they change.
- We currently produce consumption of fixed capital estimates as part of the quarterly income and expenditure accounts. One potential challenge with produced capital depletion is the extent to which unexpected idling or movement of equipment might be missed in the PIM calculations (e.g. oil price declines in 2008 and 2015 may have led to impacts on capital stock in the extraction industries that are not fully picked-up through the PIM calculations). As noted above, we'd argue that there are potentially significant challenges with estimating depletion for non-cultivated biological resources.
- Availability of information, definition of the estimation method, adequate training and availability of resources.
- The main challenges currently encountered are the availability of accurate source data.
- Reclassification issues and reliability of assumptions on service lives.
- The main challenge is how to accuratly estimate fixed capital.
- The main challenge lies in distributing the investment value (GFCF) in the future periods as the assets are consumed (CFC). The total value should be known with high accuracy but the CFC pattern is only known after the entire asset has been consumed in production. Another challenge is the price changes of R&D and other IPP.
- It is impossible to say whether the consumption of fixed capital and depletion is measured accurately, since it is a non-observable modelling result, and it depends especially on assumptions about life-times of the assets. Therefore, it is rather a question of whether users will find the results credible and useful, also in the long run. For fixed assets data availability are rather good and much practical experience has been achieved (in some countries). While the estimation of fixed capital may involve many difficult choices, the practical estimation of depletion involves even more, since also assumptions about the future is needed (at least if the NPV method is used).
- The calculation of consumption of fixed capital is difficult to estimate due to the complexity of access to information by private and public non-financial corporations.
- Initial value determination of some assets.
- The key issue is the quality and comparability of CFC compilation methods among countries. Presentation of net values should be proceeded with an appropriate communication with data users. Consequently when communicating with data users NSIs

in different countries should follow a common recommendations developed by international working groups/task team.

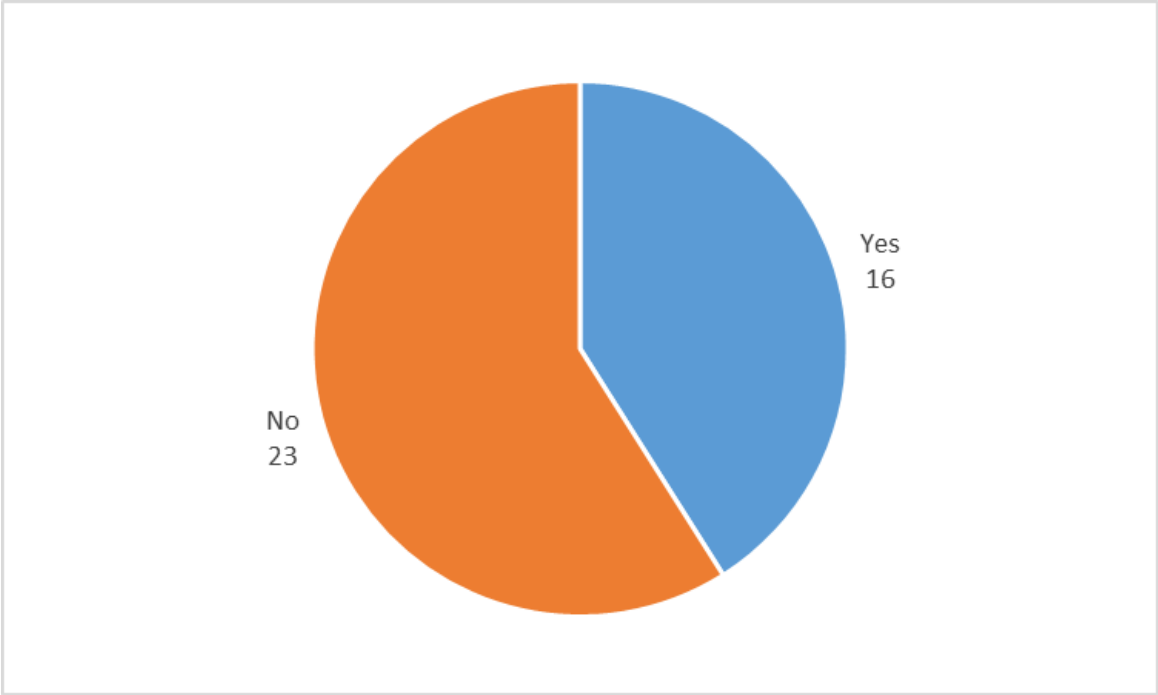
- For CFC, the main challenges are estimating appropriate and internationally comparable depreciation rates for the PIM. For depletion, the methodology still needs to be developed and agreed internationally. E.g. issues such as how to account for policy changes that may render capital obsolete is not sufficiently analysed.
- CFC and depletion in national accounts is in many cases a model based estimation requiring a high quality historical data, which may be a challenging part to obtain.
- Measuring CFK remains an ongoing challenge, particularly:
  - Accurate measures of building investment, from the difficulty of distinguishing maintenance from improvements
  - Establishing realistic life lengths and consumption patterns
  - Developing fit for purpose deflators across asset types as their characteristics change
  - Aligning accounting concepts of depreciation and dealing with alternative methods that businesses use to measure depreciation.
- Determine the appropriate discount rate, a large variety of minerals, access to the data needed in calculations such as the economic price of land, and the right service life of use.
- Detailed information on mean life lengths and rates of depreciation required for improving our current estimates of consumption of fixed capital is not readily available. [Refer to 9B for main challenges of compiling depletion costs.]
- Again, the correct valuation of assets, correct service lives to be used, correct depreciation rates, correct models of depreciation – all of these can be problematic and different across asset classes, and across countries. These same issues will occur for correct measurement of depletions of non-produced assets. So, proper guidance and a harmonized approach is best to achieve comparability of net indicators across the European Union.
- The overall rating of 5 above is based on the consideration that the estimation of depletion is quite difficult. As for the estimation of CFC, the main issue is the lack of empirical evidence supporting the assumptions underlying the perpetual inventory method that can hamper the comparability of net measures across countries. In this respect, the conclusions of the Eurostat Task Force FIXCAP will be highly welcome.
- Each aspect offers a different kind of value and a different kind of harm and good. Each requires a different way to transduce this into quantitative measures. Research is needed on how to derive quantitative estimates for each aspect. Time-use studies might provide data and artificial intelligence (machine learning) might provide the algorithms.
- Valuation issues are challenging both for CFC and depletion.

14. What additional issues should be considered when exploring the positioning of net balancing items in the next SNA?

- How depletion account is recovered in balancing items
- We will need some more guidance on how to practical implement the depletion and some advice regarding the industry allocation of GFCF.

- There is a high degree of subjectivity and lot of working hypothesis in the compilation of consumption of fixed capital for certain assets, because of lack of data sources.
- As mentioned in the document, countries should make efforts to calculate environmentally adjusted aggregates for depletion. Therefore, technical assistance on the subject and coordination with other countries and organizations is essential to promote its measurement.
- The valuation of this type of assets tends to undergo changes due to changes in prices that can affect the measurements of the net variables.
- See question 13B: the establishment of reliable measurements.
- Agreement in the SNA and the SEEA-CM regarding the procedures to obtain the depletion-adjusted net values.
- It should be recognised that producing and publishing a suite of estimates, including both gross and net measures, provides for a broader range of user needs.
- Estimates of CFC are not harmonized and therefore net balancing items could be not comparable.
- More instructions on estimating fixed capital should be included in the next SNA.
- Construction of good price indices for IPP.
- In general, the "uncertainties" and strong dependence on assumptions/modelling, and thereby the somewhat "hypothetical" nature of net measures seems to be something that could need further elaboration.
- Items that are close to the consumption of fixed capital, such as depreciation for the calculation of net book balances.
- Not yet complete information/data from mining activities and the value of mining positions in the previous period.
- That harm should be distinguished from good, and that these differ in each aspect.

15. Would your institution be interested in participating in an experimental estimate exercise for consumption of fixed capital (and depletion)?



Yes:

- Assistance regarding the methods.
- Elaboration on the entire methodological process.
- Guidance on how to arrive at the desired outcomes and review of the methodology applied on experimental statistics. Time use surveys should be designed and harmonised and designed to collect as much activity meeting the third party criteria as possible.
- Provide best practices.
- Advice from experts would be required for the entire process including conceptual framework, methodology and compilation of data. Also, training for practical implementation will be needed at a later stage.
- Technical assistance in asset valuation and depreciation methods.
- In terms of natural resources: recommendations for using the available information base, recommendations on the calculation method.
- We would not require technical assistance, but would be interested in participating in further discussions on the topic.
- Training in estimation procedures from the conceptual point of view and practical applications to carry out estimates on capital consumption and depletion.
- We will be happy to share results and experiences we have in this area.
- The methodology for calculating consumption of fixed capital.
- Discussions with other countries, e.g. in an international Task Force.
- Expert guidance will be needed.

- How to determine the right discount rate, How to calculate cofc with various types and locations of mines which will cause different durations of exploitation (this determines the age of use?).

16. Do you have any other comments and suggestions in relation to net measures?

- Re question 12A/12B: As far as "exploring" means establishing additional measures alongside the proved and tested gross items it could lead to useful and therefore welcome information.
- Regarding the fact that GDP is well established it will take long time until net measures can replace gross measures for policy issues.
- In the guidance note it is proposed that "a number of resource rich countries, with a broad worldwide representation, closely co-operate in further establishing an agreed methodology for compiling internationally comparable estimates for stocks and flows of natural resources, both in current prices and in constant prices". We strongly support this proposal and suggest that it should not only focus on methodology but also on practical possibilities and on testing. Results should be collected in a sort of publication/reference document which could be used as background for finding more solid ground for how natural resources and depletion should be treated in the SNA.
- Our country does not have a Single Account Plan in public and private non-financial corporations, being a weakness for the compilation of information that allows to have net measures. In this context, it is necessary to know the estimation process that can be implemented.
- While net balancing items is useful in accounting for costs needed to replace existing fixed assets and natural resources used in production, the measures across countries may be less comparable, as compared to gross measures, due to different methodologies and assumptions (e.g. assets' mean life lengths, rate of depreciation).