General remarks:
In comparison to the System of National Accounts the SEEA is related to methodological aspects characterized by vague wordings and recommendations. In contrast, it would be helpful to operationally outline an ideal and consistent concept and to provide additional information on methodological alternatives that should be given priority if the proposed approach is not suitable.

Chapter 5.2 Assets in the System of Economic and Environmental Accounts
The question of valuating environmental assets especially in monetary values is a difficult and even delicate one.
The possible consequences of taking up monetary values for environmental assets in the SEEA are diverse. Some of them might influence not only economy but also our living environment and thus the base of the quality of our lives.
We suppose that the idea triggering the attempt to take up monetary values for environmental assets in the SEEA was that this could help to broaden the understanding of welfare. We suppose that this attempt was started because a positive influence was assumed. But we think that also negative effects could happen.

Therefore we think that the time for comments on a document with such delicate content is too short.

What will the consequences be of only estimated prices?
From highly distinguished scientific work, e.g. from Mc Fadden who was honoured by the Nobel Prize for Economics for work on this topic, we recognise that it is not possible to assess the proper value of nature and natural assests in monetary terms.
The Stiglitz-Sen-Fitoussi report recommends not searching for all assets for a monetary value but instead using only physical values.

Chapter 5.3 The structure of asset accounts
Soil is regarded as a key individual components in scope of the central framework (see paragraph 17) and therefore as an environmental asset. Hence it should be included also in Table 5.3.1 Conceptual form of the physical asset account. Stocks of soil in terms of volume can change in case of input of organic matter (compost, slurry, sewage sludge) or soil erosion (water and wind erosion), flooding desasters and extractions (removal for buildings, extraction for gravels or sand). Consideration of these flows is certainly a matter of scale at which asset accounts are provided.

Chapter 5.4 Principles of asset accounting
In paragraph 75 the second sentence should be changed into “It is clear that the definition must take into account the ongoing regenerative capacity of an environmental asset such that extraction is possible into the future.”

Chapter 5.5 Asset accounts for mineral and energy resources
Ad 170: Missing is aspect of recycling (secondary minerals) as option for “renewing” mineral resources. Also important: rate of recycling.

Ad 174: Important aspects to be considered for metallic minerals are not only the amount of deposits but also its concentration and energy/material demand / cost for making the deposits usable which in turn define the likelihood of extraction.

Ad 178: It would be important to note that the economic conditions are to a large extend determined:

a) By the size, concentration, accessibility of the deposit and thus by the energy/material demand / costs for making the deposits usable
b) By the market demand
c) By the competitive position of the supplying company and nation
d) Means of transport between mining and consumption

Ad 182: There are a number…

Ad 184: It should be considered if recycling flows and anthropogenic stock should also be taken into account.

Chapter 5.6: Asset accounts for land

5.6.2 Definition and classification of land

We appreciate the basic differentiation between land cover and land use. These two issues are often mixed, even if there are pragmatic reasons to argue for mixed usage of these two concepts it is essential to keep them separated at least from the theoretical point of view. The CORINE Land Cover Classification System is a good example for the advantages of a mixed usage, however in recent times due to advances in computation capacities and remote sensing methodologies the old mixed system turns out to be more and more obsolete. Many national mapping programmes are turning towards a two-fold data acquisition.

Whereas land cover can be extracted almost fully automated from RS-imagery, the extraction of land use data is only possible making usage of a row of existing inventories and sectoral geo information (IACS, nature conservation inventories, traffic infrastructure information, planning data, …).

This differentiation between land cover and land use is also reflected in INSPIRE as the two issues are in different annexes and two different working groups define the data specs.

Land Use classification:

The land use categories are much too coarse for the defined class “Land not in use”. This class currently contains all other classes that are not part of one of the other main classes. This ignores the fact that due to climate change mitigation and biodiversity protection (green infrastructure) more and more land is designated for specific ecosystem services (flooding retention, biodiversity production – wildlife areas, mitigation of urban heat islands, carbon sequestration areas, ecological corridors, …). As the land use classification is the base for the subsequent accounting a more detailed structure of this class is highly recommendable.

The class “construction” is a very temporary class. Something is constructed to serve for some future usage (industry, residential, transport, etc.). Maybe this class is regarded as remnant from the CORINE Land Cover nomenclature, but in a land use aspect this class should be avoided and only used if the purpose for the construction can not be extracted.

In general it should be highlighted that the differentiation between the transport infrastructure and residential areas is quite essential, but as well critical to draw the line. Major highways and connecting roads should be regarded as being part of the transportation network, whereas minor roads – connecting not the centres but only houses

within the immediate neighborhood should be regarded as part of the residential areas. A more detailed advice how to differentiate roads between those classes is needed.

Land Cover classification:
The FAO LCCS 3 and the LCML are in principal very valuable tools for describing current national land cover programmes. They are ideal to describe nomenclature based classification systems in hierarchical ordering (e.g. CORINE Land Cover legend). However the LCML does not fully support the description of the more advanced object based classification systems. Object based classification systems can not only be regarded as assemblage of certain classes. But they consist of abstract classes with heritage information, classes, attributes and methods. This feature based approach is not well reflected within LCCS. Therefore one has to take in mind the current development in the area of geo information that will break through within the next years and allow for a better semantic transformation and syntactic transformation between different data models.

The basic land cover types include also temporary elements (e.g. regularly flooded) – in our opinion these inter-annual regular changes of land cover should not be taken into account for defining land cover types. The main land cover type should be recorded occurring throughout the year.

The aggregation and mixture of land cover and land use to "mappable land cover classes" is not comprehensible. Whereas the argument throughout the text was that it makes sense to differentiate between land cover and land use, in abstract 247 the misleading concept of mappable land cover classes is introduced. As stated in the abstract that the way in which land cover classes can be mapped is subject of change in technology, one should avoid mixing the two concepts and keeping them separately without introducing the "mappable classes".

Ecosystem services:
The usage of the "mappable" classes as basic units for the ecosystem services completely ignores the facts that are mentioned within this comment under GENERAL. One can not assume that the mappable classes produced similar primary ecosystem services. Even when differentiating the classes according to the region and environmental attributes into basic landscape units this can be achieved. Often the ecosystem service will depend on the special designation of these areas (flood retention, nature protection, etc.).
At least the areas under major nature protection should be taken into account.
The five main categories of landscape units seem too coarse.

5.6.4 Physical asset accounts for forest and other wooded land

It is proposed to explain the requested approaches or methodologies by means of concrete examples, e.g. in a technical annex. (This should be done for the whole document.) For para 259 (p. 53) it could be presented how an allocation of land to different species of tree could be carried out if apart from monocultures with same age groups there are also forests composed of mixed species and varying ages (concept of proportion of area of tree species?).

256: Operationalisation of differentiating forest and other wooded land from other types of land use ('predominant agricultural or urban land use') should at least be described by an example. Are hazelnut or cork oak plantations, short rotational areas, parks etc. part of forests or not?

257: In countries like Austria where semi-natural forestry with a significant share of natural regeneration predominates a differentiation of 'other naturally regenerated forests' and 'planted forests' according to the given criteria is often difficult or highly uncertain, especially for older forests. Therefore the proposed differentiation should be optional on a deeper level, whereas at first it should only be distinguished between 'primary forests' and 'managed forests'.

260: The wording 'inclusive … as appropriate' leaves much room for interpretation which could potentially constrain international comparability. In any case it should be pointed out that only those areas like water bodies or wasteland are to be included which are not already registered by other national statistics, e.g. on water bodies (aspect of intersectoral consistency of accounts – avoidance of double counting).

Table 5.6.6:

1. A general remark concerning the design of the tables in the SEEA: Those cells that are empty by definition, e.g. additions to primary forest by afforestation, should be earmarked.
2. A further category 'other changes' should be included, especially covering the aspects of 'reclassification' and 'change in use / status' respectively as according to the definition in para 256 the classification of land as forests and other wooded land depends on the dominant type of land use, which can change over time. Furthermore measurement uncertainties or unclear / changed boundaries can lead to changes in forest area between different forest inventory periods. These should be taken into account when designing the tables. The respective category should comprise only balances. In contrast according to paras 261, 262 and 265 it would be necessary for such 'other changes' to differentiate between entries and removals and to allocate these to 'afforestation' or 'deforestation'. But such a differentiation between specific entries or removals will often not be possible. In addition the terms 'afforestation' and 'deforestation' are unusually broad defined if they shall also cover aspects of 'reclassification'. But this is a principle question which should be uniformly ruled throughout the whole SEEA and not only for forest and other wooded land.
3. In accordance with Forest Resources Assessment (FRA) a further breakdown by availability for production of wood and wood products should be proposed.

5.6.5 Monetary asset accounts for land

It should be addressed that the value of land could include a considerable speculative element. In addition to market prices one could therefore quote standardized expectation values using the Faustmann formula with a uniform real discount rate.

Chapter 5.7 Accounting for soil resources

We agree to that soil types that can provide the basis for a generalized accounting for soil resources (par. 294), but soil depth and climatic conditions have to be considered, e.g. in accounting as asset for agricultural production or ecosystem services (e.g. water storage, carbon sequestration).

It is stated that an accounting approach considering more directly the ecosystem services that are produced by soil would lead to the assessment of soil degradation (paragraph 299). This is not necessarily the case as the ecosystem services (soil functions) are inherent to

soils. In case of occurring soil degradation the fulfilment of these services (functions) are affected and this impact should be assessed accordingly. We strongly support that soil resources are considered as part of SEEA experimental ecosystem accounts as soil ecosystem services are crucial for land accounting and economic assets.

In paragraph 302 also the option of soil degradation (decrease of soil quality) and its consequences should be mentioned.

Chapter 5.8 Asset accounts for timber resources

5.8.2 Definition of timber resources

306: Dead trees lying on the ground should not be subsumed under standing timber. The inclusion of standing dead trees is also problematic. The biological production of wood only takes place at living trees. In forest ecosystems dead trees are very fast subject to devaluation by biodegradation whereby there are no distinct boundaries for a potential utilization. Therefore and because physical accounts are the basis for monetary valuation the focus should be – solely or at least primarily – on living timber resources. In that case mortality would be added to natural losses and would not have to be assessed accordingly in terms of the usability of dead wood as described in para 323.

5.8.4 Monetary asset accounts for timber resources

Concerning issues of valuation reference could be made to the overview of methods in the Eurostat publication 'The European Framework for integrated Environmental and Economic Accounting for Forests – Results of Pilot Applications'.

Concerning stumpage prices it could be considered to calculate them as average real prices of a multiannual assessment period to avoid that temporary price fluctuations directly influence the value of the total stock of standing timber.

336: This hint is not an operational approach. If future final receipts shall be discounted one should also address that from an economic point of view harvesting should take place when the current increment in value drops to the level of the discount rate. But such a model requiring a discount rate and a defined age of use disagrees with the empirical evidence that indeed there are also older stocks of standing timber.

337: This approach excludes aspects of preliminary use and mortality. But even in 'planted forests' only a part of planted plants reach maturity, e.g. 400 out of 2500 planted spruces in Austria. So this approach is more than debatable.

335, 343: When using roadside pickup prices to derive stumpage prices also the other unit of quantity has to be taken into account. E.g. in Austria roadside pickup prices are related to cubic meters underbark and therefore they cannot be related directly to the volume of standing timber (in cubic meters of stock overbark). In that case the conversion factor 'harvest loss' is to be taken into account, which however is something different than the 'felling residues' addressed in para 325. Also referring to this it is recommended to illustrate the proposed approach with a concrete example.

Chapter 5.11 Asset accounts for water resources

431: For groundwater the term “groundwater body” should be introduced as it is defined in the Water Framework Directive WFD (2000/60/EC) (Art. 2, #12. Body of groundwater means a distinct volume of groundwater within an aquifer or aquifers).
As a consequence, all relevant information for groundwater is available for the management unit “GW-body” – at least in all countries of the EU. It should be considered that the concept of the WFD is also applied in countries and regions beyond the EU.

432: Soil water can also move to groundwater and not only evapotranspirate.

436 and 437: Taking stock of the water resources is not a trivial task and is not necessary under all circumstances. Water management typically focuses on the relative changes of water quantity and water quality (e.g. seasonal changes of the level of the groundwater table and long-term trends, seasonal variations and water stresses on surface water bodies – and long-term trends). Water scarce countries might have good numbers on their groundwater stocks whereas other countries just monitor the relative changes and derive measures out of this information. 437 explicitly deals with the fact that computing the stock of rivers is not realistic and useless, but the same can be said for groundwater stocks under certain circumstances (when it is of no relevance for the regional, national or local water management).
For groundwater in particular the “available resource” is relevant. This is not necessarily directly depending on the stock of groundwater as defined under 436. It is proposed to refer to the definition of the WFD, Annex V 2.1.2. Definition of quantitative status: The level of groundwater in the groundwater body is such that the available groundwater resource is not exceeded by the long-term annual average rate of abstraction. Further criteria for the available resource are given as well (e.g. consideration of health of ecosystems, no intrusion). Maybe the distinction between fresh groundwater and saline groundwater could be emphasized again, because this is to be considered for stock assessments where saline groundwater might replace fresh groundwater in case of over-exploitation.
The foreseen data collection entity (national, regional, …) should be mentioned.
Finally a general remark: when introducing definitions concerning groundwater for SEEA already existing definitions, availability of data, expected efforts for generating requested information and practicability should be considered.

437 What about soil water?
It is recommended to also add a sentence here how relevant stock-taking is for soil water, as the concept of soil water is neither used in European legislation nor applied in water statistics of UNSD (soil water is not part of the UNSD water questionnaire), OECD or Eurostat (OECD/Eurostat Joint Questionnaire on Inland Waters). It is acknowledged that the soil water aspect is relevant for taking account of rainfed agriculture in arid regions, but it seems that there is still lack of a common methodological understanding and that even from a conceptual perspective different expert groups might differently use it. Soil water is usually considered in relation to the use of water by rainfed agriculture. Consequently the soil water stock of agricultural areas might be of interest (but on a very short-term perspective). Conceptually, to be consistent with the other resources of water, it is necessary to take stock of all soil water in the accounting area, which includes all types of land use, not only agriculture. It would be appreciated if the aspect of soil water (system boundaries, relevance, temporal and spatial aspects) could be discussed in more detail (paragraph 437 and paragraph 432) as many questions still remain open.

439 Abstraction:

It needs to be stressed in the text that this definition of water abstraction significantly differs from the definitions used in water statistics of UNSD, Eurostat and OECD. The crucial points are:

- Water used for hydroelectric power generation: This is not part of any of the above mentioned water statistics and would dominate any other water uses to a huge extend.
- Water used in rainfed agriculture is not considered as abstraction by the above mentioned questionnaires.

It is acknowledged that both water use for hydroelectric power generation and water used in rainfed agriculture have to be covered by SEEA to provide a complete picture on the interactions between the environment and the economy. However, this should not be done without stressing at the same time the different meanings and definitions used in other important frameworks. However, it also needs to be stated that e.g. a water resource efficiency indicator expressing generated electricity per m^3 of water abstracted is absolutely misleading.

It is important to be semantically explicit with the term "abstraction" and to refer to other existing definitions as this is a potential source of misunderstanding and misinterpretation – not only for the producers of water accounts but also for the users of the data.

Furthermore a discussion and clarification of in-situ uses of water and off-situ uses of water is missing in the entire chapter on water resources. This would be crucial to understand why e.g. hydropower (e.g. in the case of chains of dams in a river) is considered as a water abstraction. Here again, different expert groups have a different understanding and this needs to be made explicitly clear. See also discussion on artificial reservoirs below. Conceptually it seems to be more appropriate to consider artificial reservoirs (e.g. for hydropower) already as abstracted water and to account the consumption of water (evaporation) as consumption by the economy (rather than part of the natural water cycle).

430 Artificial reservoirs:

More discussion is needed why artificial reservoirs are part of the water resources system. Conceptually water in artificial reservoirs has been already abstracted from nature for a particular economic purpose or several purposes. This is conceptually the same as water stored in a water tank or the inventory of water in water pipes. If artificial water reservoirs are considered as part of the surface water system SEEA will consequently not take account of water losses which might occur in arid countries because of the artificially increased surface area. Studies of the US Geological Survey and the World Commission on Dams show that these losses (higher evaporation rates of water) caused by dams can be significant. See also the discussions in a paper presented to the London Group in April 2009: http://unstats.un.org/unsd/envaccounting/londongroup/meeting14/LG14_13a.pdf

However, it is acknowledged that there are practical limitations and that this is relevant only under specific circumstances.